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Pain-and-Suffering Damages in Tort Law:
Revisiting the Theoretical Framework
and the Empirical Evidence

Ronen Avraham
Northwestern University School of Law, ravraham@law.utexas.edu

UNIVERSITY OF MICHIGAN

JOHN M. OLIN CENTER FOR LAW & ECONOMICS

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RONEN AVRAHAM

WORKING PAPER #03-001



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**Pain-And-Suffering Damages In Tort law:
Revisiting The Theoretical Framework And The
Empirical Data**

Feb 2003

Ronen Avraham

* Visiting Assistant Professor, Northwestern University School of Law. Kyle Logue provided invaluable support. I also wish to thank Omri Ben-Shahar, Phoebe Ellsworth, Jim Krier, Uzi Segal and Frank Yates. I also want to thank the John M. Olin Center for Law and Economics at the University of Michigan Law School for financial support.

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INTRODUCTION

Should there be pain-and-suffering damages in tort law? Most legal economists who wrote on the subject thought there should not be pain-and-suffering damages in tort law. An important minority of scholars thought the decision of whether tort law should provide pain-and-suffering damages is an empirical, or an experimental, question that cannot be armchair-theorized. Yet, *all* scholars who have done empirical or experimental work to explore the desirability of pain-and-suffering damages reached the conclusion that it is undesirable. In short, in this paper I argue that the majority's arguments are flawed and therefore cannot serve as a policy making aid. I side with the minority of scholars who argue it is an empirical or experimental question, yet, I provide experimental evidence that in fact it may be desirable to have pain-and-suffering damages in tort law.¹

Before the rise of the law and economics movement, the predominant compensation paradigm in tort law was the "make whole" doctrine. This paradigm included compensation for losses due to pain and suffering.² But this paradigm is not dominant in the economic analysis of law. Over the past decades, legal economists have been debating whether tort law should provide (on efficiency grounds) pain-and-suffering damages to injured parties. In particular, whereas most tort law and economic scholars justified pain-and-suffering damages on efficient care taking (or deterrence) grounds (i.e. parties should bear the full social costs of their conduct,

¹ Below I classify scholars along the lines mentioned in the main text. The term "tort law" should be interpreted to include "product liability law" as well, where injurers and victims are in some contractual relationships. In fact, the paradigm that this paper adopts, which asks whether consumers prefer more expensive products which include the extra costs associated with pain and suffering insurance, is most intuitively understood when product liability law, and not tort law, is what one has in mind. Yet, it is straight forward to extend the paradigm to parties that are not in contractual relationship, by asking whether consumers are willing to bear the extra first party insurance premium associated with providing pain and suffering damages in tort law. The idea is the same- there is no free lunch, pain and suffering awards do not fall from the sky, but rather are purchased, in one form or another, by the class of potential victims.

² Traditionally, scholars used the corrective-justice theory of tort law to explain and support pain-and-suffering damages. The idea was, as Justice Traynor explained, that pain-and-suffering damages are 'a means of punishing wrongdoers and assuaging the feelings of those who had been wronged.' *Seffert v. Los Angeles Transit Lines*, 364 P.2d. 337, 345 (Cal. 1961). *See also*, JULES COLEMAN, *MARKET VALUES AND THE LAW* (1988). *But see* WILLIAM M. LANDES & RICHARD POSNER, *THE ECONOMIC STRUCTURE OF TORT LAW* 187 (1987) (arguing that lack of pain-and-suffering damages was a shortcoming of the common law). The term "pain-and-suffering damages" includes all non-pecuniary costs recognized in the literature and by courts. The most obvious items include "non-economic losses," "loss of consortium," "hedonistic damages," "emotional distress," "mental anguish and damages," and "emotional losses."

including the non-pecuniary costs),³ the picture is much more vague with respect to the efficient risk-bearing (or insurance) grounds, the other goal of an efficient tort law system.⁴ Following Guido Calabresi, most legal economists accept the paradigm whereby tort law (which is virtually a system of third-party insurance) and the first-party insurance markets are alternative institutions that deal with the problem of accident costs.⁵ The economists, therefore, conclude that from a purely optimal insurance perspective, the optimal level of compensation (including non-monetary damages) should equal the efficient level of first-party insurance. This is coverage that an independent, rational and fully informed consumer (“sovereign consumer”) would have bought in a world without legal mechanisms of recovery of damages due to torts; a world with no tort law at all.⁶

Indeed, scholars who have supported at least *some* pain-and-suffering damages on efficient insurance grounds, justified doing so by claiming that such a consumer

³ WILLIAM LANDES AND RICHARD POSNER, *THE ECONOMIC STRUCTURE OF TORT LAW* at 186-7 (1987). STEVEN SHAVELL, *ECONOMIC ANALYSIS OF ACCIDENT LAW* 133-4 (1987); Samuel A. Rea, Jr., *Non-Pecuniary Loss and Breach of Contract*, 11 J. LEGAL STUD. 35, 39 (1982). In contrast, Jennifer Arlen argued that even on efficient deterrence grounds tort awards should not include compensation for pain-and-suffering losses. Jennifer Arlen, *Reconsidering Tort Rules For Personal Injury: The Case of Single Activity Accidents*, 32 WM. & MARY L. REV. 41 (1990). In Arlen’s model, parties impose “bilateral risks” on each other, as both are victims and both are injurers. Thus, the benefit that each individual has from the system of tort law, is the option to engage in a risky activity. This benefit by itself entails that full damages may not be necessary or available for an efficient recovery of tort damages. *Id.* at 45-51. Note, however, that this by itself does not say which component of the different types of damages should be eliminated. This dilemma is answered by Arlen, when she adopts Cook & Graham’s result that rational individual would not insure for pain-and-suffering losses. *Id.* at 248. Arlen never explains however, why she thinks that the optimal damages calculated for efficient care reasons will match the reduced optimal damages calculated for efficient risk spreading reasons. Similarly, Paul Rubin argued that since there are other forces for deterrence in the economy such as direct regulation and reputational effects, tort law must not carry the entire deterrence burden alone. PAUL RUBIN, *TORT REFORM BY CONTRACT* at 82-4 (1993).

⁴ Economic analysis of law views legal rules in an instrumental manner, i.e. the way they affect our lives. Specifically to tort law, the conventional premise is that “[t]he only important economic effects that any legal policy can have are effects on level of investments in prevention of losses and of insurance for losses not prevented.” George L. Priest, *The Current Insurance Crisis and Modern Tort Law*, 96 YALE L.J. 1521, 1537 (1987).

⁵ GUIDO CALABRESI, *THE COST OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS* (1970).

⁶ If an analysis on optimal insurance grounds reveals that pain and suffering damages are indeed desirable, then it seems that the debate is settled because then, on *both* grounds, optimal insurance and optimal deterrence, pain and suffering damages are warranted. Whether tort law should be tuned only towards achieving optimal deterrence, or alternatively towards achieving optimal insurance, or trying to simultaneously achieve both, is beyond the scope of this article. Paul Rubin, for example, argued that regulatory regimes and reputational effects weaken the need to focus on optimal deterrence. See Rubin, *supra* note 3. Richard Posner and William Landes on the other hand, believe that the major function of tort law is deterrence. See Landes and Posner, *supra* note 3. As an example of an intermediate approach consider Kip Viscusi’s claim that “[t]he competing objectives of deterrence and compensation in tort liability consequently result in pain and suffering damages that will typically range from zero [the optimal insurance amount for pain and suffering according to Viscusi] to deterrence values associated with the injury.” W. KIP VISCUSI, *REFORMING PRODUCT LIABILITY* 114-115 (1991).

would demand, and pay for, at least *some* coverage for their pain-and-suffering losses in a hypothetical (first-party) insurance contract.⁷ In contrast, a second group of scholars, while not disputing the efficient deterrence rationale for pain-and-suffering damages, argue that these sovereign consumers would prefer *not* to pay for any coverage at all.⁸ A third group of scholars concede that whether these consumers would buy pain-and-suffering coverage in a hypothetical first-party insurance market, is an empirical question that could not be addressed *a priori*.⁹

Given the significance of pain-and-suffering damages – usually thought to account for up to about 50 percent of the total tort damages paid in products liability and medical malpractice cases – and the various attempts to reform the tort system¹⁰, it seems important to clarify the debate. The project of this Article could be summarized in once sentence: Scholars who argue that pain-and-suffering damages in tort law should be eliminated based on optimal insurance grounds (people would not demand such coverage in a hypothetical insurance market), whether they rely on pure theory, or on any empirical or experimental work, are wrong. I am not dealing in this paper with the question whether pain-and-suffering damages should or should not be

⁷ Steven. P. Croley & Jon D. Hanson, *The Non-Pecuniary Costs of Accidents: Pain-and-Suffering Damages in Tort Law*, 108 HARV. L. REV. 1785 (1995) (concluding that consumers are likely to demand some level of pain-and-suffering insurance, and therefore tort law should provide some level of pain-and-suffering damages). See Patricia M. Danzon, *Tort Reform and The Role of Government in Private Insurance Markets*, 13 J. LEGAL STUD. 517, 533 (1984) (based on her observations of the market arguing that serious pain-and-suffering injuries should be awarded).

⁸ Priest, *supra* note 4, at 1546-7, 1553; Robert Cooter, *Towards Market in Unmatured Tort Claims*, 75 VA. L. REV. 383, 392 (1989) (arguing that “a rational person would insure only against that pain-and-suffering that curtailed earnings”) [hereinafter *Unmatured Torts*]; John E. Calfee & Paul Rubin, *Some Implications of Damages Payments for Non Pecuniary Losses*, 21 J. LEGAL STUD. 371 (1992).

⁹ Shavell, *supra* note 3, at 228-31 (arguing that whether an individual would demand pain-and-suffering damages depends on her post-accident marginal utility). See also, Alan Schwartz, *Proposals for Product Liability Reform: A Theoretical Synthesis*, 97 YALE L.J. 353, 362-7 (1988) [hereinafter *Proposals for Reform*]. Alan Schwartz as well as Jennifer Arlen agrees it is an empirical question, but nevertheless oppose pain-and-suffering damages in tort law. Arlen, *supra* note 3.

¹⁰ The 104th Congress has examined a number of bills for tort reform in general and non-pecuniary damages specifically. Both the House of Representatives and the Senate have passed tort-reform bills, yet no comprised legislation has been found. Parts of the bills came together in the ‘Common Sense Products Liability and Legal Reform Act of 1995’. This act was vetoed by President Clinton and was then sustained by the congress. See Heidi Li Feldman, *Harm and Money: Against the Insurance Theory of Tort Compensation*, 75 TEX. L. REV. 1567, 1582 (1997). President Bush has recently urged Congress to impose substantial nationwide restrictions on medical malpractice cases, including a cap on pain and suffering damages of \$250,000. See Mike Allen and Amy Gddstein, *Bush Urges Malpractice Damage Limits; Plan Includes Goals Sought by Business*, WASH. POST, July 26, 2002, at A4. Bush's plan would override laws in states that have set higher limits. He demanded legislative action by late fall. Indeed, on September 26th 2002 the House passes H.R. 4600 - *The Help Efficient, Accessible, Low Cost, Timely Health Care (HEALTH) Act of 2002*. The HEALTH Act includes a cap of \$250,000 on non-economic damages in medical malpractice case and places limits on the contingency fees lawyers can charge. The measure passed the House by a 217 to 203 vote, and will be referred to the U.S. Senate. Yet, starting in

abolished on any other grounds, such as high administrative costs perceived to be associated with them, although I think they should not.¹¹

Part I of this Article presents the two major schools of thought- those who object to pain-and-suffering in tort law and those who think it is an empirical question- and criticizes the arguments supporting them.¹² It starts first with scholars who theorize that people do not demand pain-and-suffering coverage *at all*. It is worth pausing for a second in order to briefly mention some of the arguments mentioned by these scholars to support their claim of lack of demand for pain-and-suffering coverage. Several scholars take the loss of a child as the paradigmatic case of pain-and-suffering loss. George Priest and Robert Cooter point out that parents do not typically purchase insurance on the life of a minor child because “the child’s death will not affect the flow of money into the family.” John Calfee and Clifford Winston present a somewhat similar intuition and argue that parents who send their child to a swimming camp would pay a substantial amount for even a marginal reduction in the risk of death of their child, but would probably pay very little for insurance against such a risk. Alan Schwartz distinguishes between pecuniary losses and non-pecuniary losses by comparing and contrasting “replaceable” and “irreplaceable” losses: a replaceable loss should be fully compensated (because it has an equivalent commodity in the market so monetary award can make the victim whole), while an irreplaceable loss may only be, at best, partially compensable (because money can never compensate for that loss). Pain-and-suffering, Schwartz argues, is an irreplaceable loss. Schwartz has also argued that a business executive who runs recreationally and who loses a foot in an accident could substitute reading for running, which means that her post-accident need for money has decreased and therefore the executive would not want to insure against such a pain-and-suffering loss. In a similar manner Kip Viscusi wonders why one would need pain-and-suffering compensation for an extremely severe injury, for example when she is comatose. He then shifts to the case of a minor injury, such as food poisoning which interrupts a planned evening out, and wonders whether people really need extra money for that state of affairs. Part

1995, the House has passed legislation about a half-dozen times that would impose caps on malpractice awards. Each of those efforts died in the Senate.

¹¹ In a recent working paper I discuss these issues as well and argue that pain-and-suffering should not be abolished on any other ground. Ronen Avraham, *Putting a Price on Pain-and-Suffering Damages: A Critique of the Current Approaches and a Proposal for a Change* (on file with the author).

I discusses all this and much more, and makes the argument that this armchair theorizing type of approach cannot be defended.

It then continues by discussing the approach taken by Steve Shavell. While agreeing with Shavell that whether people would demand pain-and-suffering coverage is an experimental, or empirical, question as well as agreeing with Shavell's formal economic analysis of this question, I argue that Shavell's interpretation of his mathematical results has no normative grounds because it relies on assumptions that most economists do not make, especially not when dealing with an individual's decision theory. These assumptions, as will be explained in detail below, are cardinal utility and interpersonal comparability of utility. This part concludes that: a) the question of whether a "sovereign consumer" would demand full coverage for pain-and-suffering damages, partial coverage or no coverage at all, cannot be answered a priori by means of theoretical analysis; b) it is an empirical, or experimental, question that cannot be fully answered by investigating the markets; and c) once adequately articulated could receive at least some prima facie support in laboratory studies.

Indeed, scholars recognized the need for empirical or experimental studies regarding the demand for pain-and-suffering coverage. Patricia Danzon, Kip Viscusi and John Calfee & Clifford Winston are among the few who have attempted to do so.¹³ The third part criticizes the methodology of these attempts, and questions their results. It makes the argument that these studies' recommendations cannot serve as a policy making aid for denying pain-and-suffering coverage in tort law.

¹²I will not discuss the approach taken by Croley and Hanson who do a lot of armchair-theoretical work to argue that people *will* demand pain-and-suffering coverage. See Croley and Hanson *supra* note 7 (who provide also some empirical observations to support their claim). The reason I do not discuss their work is that I try to write this paper as much as possible within the conventional law and economics assumptions. Croley and Hanson argue that people's marginal utility of income is dependent, among other things, on their overall utility. A utility function which satisfy this requirement is the exponential utility function which marginal utility is equal to its overall utility. But this means that the utility function is convex in wealth, implying risk liking attitude towards wealth, which contradicts their assumption of people's risk aversion. This difficulty to formalize their otherwise interesting insight is why I ignore their approach. As I believe I am able to show within the conventional framework that indeed there is a demand for pain and suffering coverage, I reach the same conclusion they do, but without inconsistently making implicit assumptions about people's risk aversion.

¹³George L. Priest, *Can Absolute Manufacturer Liability Be Defended?*, 9 YALE J. REG. 237, 247 (1992). W. Kip Viscusi, *The Value of Life: Has Voodoo Economics Come To Courts?*, 3 J. OF FORENSIC ECON. 1, 13 (1990); Viscusi's work attempts to measure people's perception of their post accident marginal utility. See for example: W. KIP VISCUSI, *REFORMING PRODUCT LIABILITY* (1991). Calfee and Winston's study compares the difference between people's willingness to pay to prevent an accident, and their willingness to pay to insure the resulting. John E. Calfee & Clifford Winston, *The Consumer Welfare Effects of Liability for Pain and Suffering: An Exploratory Analysis*, BROOKINGS

Part three presents the methodology and results of three experimental studies I researched in order to study the demand for pain-and-suffering coverage. Most importantly, I was interested to know whether participants perceive any difference between monetary and non-monetary coverage. In my studies, participants faced four insurance decisions involving the purchase of four different types of products: padding for roller skates (\$40), a portable saw (\$100), computer monitor (\$250), and tires for a car (\$800). For each product, participants had to state the price they were willing to pay, above the price of the product, for monetary and for pain-and-suffering insurance. Before answering the questions, participants were told that they had no other rights whatsoever to a remedy for any loss as result of an accident besides the insurance coverage that they were about to buy. I then compared the demand for monetary coverage with the demand for pain-and-suffering coverage.

My results in all studies show that the vast majority of the participants (90% in Study 1, 75% in study 2 and 71% in study 3) treated the two types of insurance the same- either they buy them both or they buy neither. Moreover, on average, in all studies the majority of participants (in the state of full information¹⁴) treated both types of insurance *exactly* the same- namely, they paid *exactly* the same amount of money for both types of insurance. Of those who did not treat it the same, the vast majority preferred monetary to pain-and-suffering insurance.

The third part then concludes that there *is prima facie* evidence of *some* demand for pain-and-suffering coverage in the context of product liability. Unifying conclusion, avenues for future research and further theoretical inquiries are presented at the last part.

I. THE CONTEMPORARY THEORITICAL FRAMEWORK FOR DEALING WITH PAIN- AND-SUFFERING

The basic theoretical framework adopted in this paper is a welfarist one, which asserts that policy decisions be made solely based on their effects on the welfare of individuals in society.¹⁵ The welfare of individuals may be understood through the

PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS Vol 1993(1) at 133, which will be discussed below.

¹⁴ The studies differed with respect to their informational structure, one study was a “between” subject design and the other was a “within” subject design vis -à-vis the information subjects had about the probability of a product failure and the magnitude of loss.

¹⁵ See Louis Kaplow & Steven Shavell, *Fairness Versus Welfare*, 114 HARV. L. REV. 961, 988 (2001).

“consumer sovereignty” norm.¹⁶ Under the consumer sovereignty norm, the State should increase individuals’ welfare by responding to their preferences. Thus, if it is found through analysis that individuals have a preference for pain-and-suffering insurance, that is that they demand pain-and-suffering coverage in a hypothetical first-party insurance market (in a world without legal remedies for torts committed), then the State should respond accordingly, absent conflicting interests. This is the “insurance theory” of tort law.

There are many implications in adopting the “insurance theory” to tort law. Some of these implications will be discussed herein.

First, we should ignore all sorts of efficiency arguments. Pain-and-suffering damages could cause manufacturers to internalize the full costs of their tortious conduct and control their care level. It would also signal uninformed consumers to the full social costs of the products, thereby controlling the activity level. These are efficiency arguments, which for our purposes should be ignored.¹⁷

Second, and related, the first-party insurance externalities should also be ignored. Hanson and Logue coined the term “[f]irst-party insurance externality.” This refers to two related phenomena. It relates to the fact that insurers rarely segregate insureds into risk pools according to their risk. As a result, high-risk insureds are cross-subsidized by low-risk insureds.¹⁸ It also relates to the fact that individuals’ insurance decisions include externalities such as the cost of care-giving that family

¹⁶ See for example, R. Musgrave, *THE THEORY OF PUBLIC FINANCE* 14 (1959).

¹⁷ Recall that the deterrence implications of pain-and-suffering damages are hardly controversial. Furthermore, Geistfeld has analytically shown that once deterrence considerations are taken into account and when relaxing the assumption of perfect information by consumers, rational individuals will *always* demand some pain-and-suffering coverage. Mark Geistfeld, *Placing a Price on Pain and Suffering: A Method for Helping Juries Determine Tort Damages for Non-monetary Injuries*, 83 CAL. L. REV. 775, 797-800. Viscusi argued that “the primary rationale presumably should be that of deterrence.” The reason lies in the fact that “the linkage of pain-and-suffering at the time of injury to optimal insurance is unclear. At the time when the insurance will be paid, the pain-and-suffering related to the injury will have already been experienced. Compensation will be paid when the accident victim is healthy. In such a context, it is difficult to justify the award of pain-and-suffering based on the structure of individual utility functions after the victim’s recovery.” W. Kip Viscusi, *A Comment on Calfee and Winston*, *BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS* Vol 1993(1), at 175, 179. Viscusi seems to ignore the fact that victims may take out loans, while relying on future compensation they expect to receive in the form of pain-and-suffering damages.

¹⁸ John D. Hanson & Kyle D. Logue, *The First-party Insurance Externality: An Economic Justification for Enterprise Liability*, 76 CORNELL L. REV. 129 (1991). (“[f]irst-party insurers rarely and imperfectly adjust premiums according to an individual consumer’s decisions concerning exactly what products she will purchase, and how carefully she will consume them....This failure by first-party insurers to adjust premiums according to consumption choices gives rise to a first-party insurance externality.”). *Id.*, at 136.

members and volunteers have to bear, the psychological effects of disability on the family of the disabled, society members, etc.¹⁹

Third, we should avoid an alternative, paternalistic, approach that objects to understanding the individual's welfare as satisfying their preferences. Under the alternative approach, an efficiency-oriented policymaker should not check whether people's ex-ante perception is that accidents would increase or decrease their welfare (more specifically, their post-accident marginal utility), but whether their *actual* welfare has increased or decreased. One argument for the alternative approach is that people lack sufficient information and/or mental capabilities to make calculated decisions regarding possible pain-and-suffering losses.²⁰ Perhaps a more radical version of this argument would be that the neoclassical notion of "preference satisfaction" should not serve as the measuring tool for designing tort law, because well being and preference satisfaction can diverge.²¹ Thus, according to this radical view, society should consult people's desires, but respond to them only to the extent that it would actually increase their well-being.²²

Fourth, we should ignore the corrective justice rationale concerning tort law. As demonstrated below, a major argument in the insurance theory is that individuals would never demand pain-and-suffering coverage for accidents in which their post-

¹⁹Ellen Smith Pryor, *The Tort Law Debate, Efficiency, And the Kingdom of the III: A Critique of the Insurance Theory of Compensation*, 79 VA. L. REV. 9, 139-142 (1993).

²⁰ See also, *id.* at 91. Laboratory-studies (in which participants are asked for their preferences) elicit non-informed, in fact ignorant people's, preferences and thus should not serve as an aide for the policymaker. Field-studies (in which different markets are observed to see whether there is a demand for pain-and-suffering damages) could not provide the answer because in addition to people's inherent ignorance with respect to pain-and-suffering there are different forms of supply-side market failures (like moral hazard and adverse selection) that prevent pain-and-suffering damages from emerging in real markets. See, Croley and Hanson, *supra* note 7. In addition as Viscusi admits there are methodological problems with eliciting people's State-dependent utility functions from market evidence.

²¹ Thomas Scanlon, *Preference and Urgency*, 72 J. OF PHIL. 659 (1975); Amartya K. Sen, *Rational Fools: A Critique of the Behavioral Foundations of Economic Theory*, 6 PHIL. & PUB. AFF. 317 (1977); John Broome, *Choice and Value in Economics*, 30 OXFORD ECON. PAPERS 313 (1978); Allan Gibbard, *Interpersonal Comparisons: Preference, Good, and the Intrinsic Reward of a Life*, in FOUNDATIONS OF SOCIAL CHOICE THEORY 165, 173-75 (Jon Elster & Aanund Hylland eds., 1986); See also, Feldman, *supra* note 10, at 1582. Feldman argues that the divergence is not just for children, addicts and alike, but for people in general. "It is possible that a fully informed, rational person might prefer to sacrifice some of his own well-being in return for another good, such as art, environmental conservation, or other's well being." *Id.* at 1583. Feldman warns against the circularity in claiming that whatever people desire increases their well-being. *Id.* In her view, "it might be paternalistic to disregard people's preferences when assessing their well being, doing so may also benefit them." *Id.* at 1584. In her view, "for any given person, satisfying his preferences and establishing his well being may be identical, overlapping, or wholly at odds." *Id.* at 1585. Sen has made a similar point. Amartya Sen, *Interpersonal Comparisons of Welfare*, in CHOICE, WELFARE AND MEASUREMENT 264 (1982)

²² Feldman, *supra* note 10, at 1582

accident marginal utility of money decreases. This is because under that state-of-the-world they would require fewer funds. Consider, for example, the case of a victim of severe burns, where her post accident marginal utility of money has decreased. If this person has a non-pecuniary loss of \$50,000, insurance theory advises that the victim would receive less than the full \$50,000. In this case, the very injury that is wrongful and that we seek to redress under principles of corrective justice is itself the insurance theory's justification for reducing compensation even further.²³

Again, we should ignore each of these problems and adopt, as legal economists do, the most basic insurance theory for pain-and-suffering losses. The next part of this paper explores several leading approaches taken by legal economists.

A. The approach taken by Scholars who deny pain-and-suffering damages in tort law.

1. The approach taken by Alan Schwartz

Alan Schwartz developed a theoretical background showing why the relevant theoretical framework needs to be based on the question of what an (hypothetical) "optimal contract" between a "sovereign consumer" and her first-party insurer should be. In his classic paper, Schwartz analyzed the "consumer sovereignty norm" as a basis for policymaking. Based on this framework, Schwartz set forth a list of proposals for reforming tort law. One of his main proposals is that tort law should *not* provide pain-and-suffering damages.²⁴

In his detailed analysis, which was designed to provide the theoretical support for his list of proposals, Schwartz makes a fundamental error which renders his entire analysis indecisive.²⁵

²³ Pryor, *supra* note 18, at 137-39.

²⁴ In his introduction, Schwartz argues that "tort recoveries for pain-and-suffering and the like should be abolished." *Proposals for Reform*, at 356. Schwartz goes on to argue that "courts...should deny strict liability for nonpecuniary harm for three reasons." *Id.* at 411. One of the reasons he offers is that "denying liability will result in consumers purchasing the appropriate amount of insurance." *Id.* Both the conclusion and the argument for it contradict his views as expressed in the main parts of this article. As one of his conclusions, Schwartz argues that "firms should be strictly liable only for pecuniary harm." *Id.* at 414 and that there is a need for "eliminating strict liability for non-pecuniary losses." *Id.* at 415.

²⁵ His language in this section is much less decisive than his language in the list of proposals for reform. For example, when analyzing the "optimal contract" that a well-informed consumer will demand, Schwartz argues that this contract would "*probably* not compensate him for nonpecuniary harm." (Italic added). *Id.* at 361. When summarizing the insurance decision Schwartz argues that "it is unlikely, *though not certain*, that this contract would require any insurance against ...pain-and-

Schwartz's starting point is a basic economic theory that "consumers will insure against risks whose materialization would increase their marginal utility for money."²⁶ This occurs either because consumers have a lower post-accident wealth, i.e., when they suffer the loss of a valuable asset, whether a tangible item or future income; *or* because they would have greater post-accident need for money.²⁷ The former represents a "replaceable" monetary loss, which can be wholly remedied with sufficient monetary compensation. The latter represents only a "substitutable" loss, usually a non-monetary loss, which may never be completely replaced. However, the loss could be somewhat mitigated by monetary compensation.

The degree of required coverage for a substitutable loss depends on the nature and value of the substitute. Schwartz admits that the ex-ante demand for pain-and-suffering damages is an empirical question which is dependent upon whether the victim's post-accident marginal utility increases or decreases as a result of the loss.²⁸

Until this point, Schwartz's approach is not significantly different from the approach taken by other economists, like Steve Shavell for example. However, unlike Shavell (whose approach will be discussed below), Schwartz adopts the "no demand for pain-and-suffering insurance view." The reason is that he believes that people will not demand pain-and-suffering coverage *even in cases where the post-accident marginal utility increases*. Schwartz argues that scholars failed to recognize "income effects" which enter the equation and change the individual situation. Specifically, his argument is that "accidents make people poorer in a utility sense" and thus their post-accident demand for normal goods and services will decrease.²⁹ Anticipating this, Schwartz argues that informed consumers will purchase less than full coverage for non-pecuniary losses, even with respect to losses that increase the marginal utility of money.³⁰

suffering..." then he goes on to say that "the appropriate default rule, then, *probably* should allocate the risk...of incurring nonpecuniary harms to consumers." *Id.* at 367 (italics added).

²⁶ *Id.* at 363.

²⁷ *Id.* at 362.

²⁸ For example, Schwartz argues with respect to pain-and-suffering losses, that "whether people actually want the ability to console themselves ...[by consuming consoling goods], and so will buy insurance to permit such consolations, or whether people would choose just to suffer is an empirical issue." *Id.* at 364.

²⁹ *Id.* at 366.

³⁰ *Id.*

Unfortunately, this is the *only* argument Schwartz provides to support his surprising conclusion. This argument is flawed.³¹

First, Schwartz's argument is not part of the neoclassical framework, despite his efforts to make it so. Equating a decrease in wealth with a decrease in health and imputing to the latter "income effects" is wrong. A decrease in health has nothing to do with income effects, but more with the unknown nomenclature of "health effects."³²

Second, by merely assuming that a decrease in the utility reduces consumption of goods and services, Schwartz does not derive his conclusion from basic premises (as economists usually do), but rather initially assumes what he desires to prove. Schwartz has neither a sound theoretical framework nor empirical evidence to support his assumption.³³

Third, there is no reason *not* to apply the same "income effects" to monetary losses. The argument would be that informed consumers, anticipating the income effect, will purchase less than full coverage for *pecuniary* losses even though these losses increase the marginal utility of money. If that were so, Schwartz should oppose full *monetary* compensation as well. Since he does not seem to do that, he is not only wrong, but also inconsistent.³⁴

2. The approach taken by George Priest & Robert Cooter

Both Priest and Cooter have independently written about the question of pain-and-suffering damages in tort law. Both argue that tort law should not (in general) provide pain-and-suffering damages since people would never buy pain-and-suffering

³¹ Other scholars have already observed the fallacy in this argument. See the footnotes below.

³² Ellen Pryor has made the same point. See Pryor, *supra* note 18, at 103 n.41. Hanson and Logue also criticized Schwartz for making this argument, but for different reasons. Hanson and Logue showed a neglected second, offsetting income effect, due to a liability rule requiring that manufacturers internalize, on deterrence grounds, non-pecuniary losses. See *Id.* at 185-6.

³³ Indeed as Feldman argues, "Schwartz's thesis about "income effects" depends upon doubtful psychological premises regarding the connection between nonpecuniary loss, total utility, and the marginal utility of money." Feldman, at 1576.

³⁴ Moreover, what economists call "income-effects" cannot go hand in hand with the assumption that utility from wealth and utility from health are independent of each other, or additive separable. But this is exactly the assumption that economists made in their model where they derived the results that the demand for pain-and-suffering insurance depends on the post accident marginal utility. Another problem with Schwartz's approach is, although he is aware that the mismatch between product prices and product real risks is due to market imperfections, he argues that risk information would have to be disseminated to consumers in order to provide optimal incentives for purchases of risky products.

insurance in a first-party insurance market. Their first argument to support this view is that because we do not observe individuals' voluntarily purchasing pain-and-suffering coverage in the insurance markets, the State should not provide it in tort law.³⁵

However, as Priest himself admits, and as will be discussed below, the first-party insurance market suffers from several "supply-side" impediments to providing pain-and-suffering coverage. For example, the fact that the market does not supply us with \$10 laptops does not mean that there is no demand for such a product. Rather, there is a problem supplying it. Inherently, insurance markets are regulated and thus imperfectly competitive. In addition, they suffer from problems of moral hazard and adverse selection, especially with respect to non-pecuniary losses. The convention is that if there are flaws that prevent the market from providing something, the policymaker should intervene and provide what the market cannot. It is flawed logic to admit that there are market failures and still claim that the fact there is no pain-and-suffering coverage in the market demonstrates that there is no demand for such coverage.³⁶ The relevant question, therefore, is whether there is a demand for pain-and-suffering coverage in a *hypothetical* insurance market in which consumers are assumed rational and fully informed.³⁷

Priest's and Cooter's next claim is that even when assuming away any supply-side impediments, rational individuals will not demand pain-and-suffering coverage. Priest and Cooter reach this conclusion in several ways. First, they presuppose that non-monetary losses do not generally increase an individual's post-accident marginal utility for money. Thus, they arrive at the conclusion that individuals will never purchase indemnity against these losses. However, as other economists have admitted,

However, in most circumstances there seems to be no efficient way of communicating risk levels to consumers. Calfee and Rubin, at 402.

³⁵ Margaret Radin argued that what precludes purchase of insurance may not be irrationality but rather incommensurability. ("If it is empirically true that consumers do not insure themselves against their own pain and suffering, the best interpretation of their failure to insure may be not that they are maximizing how much they value their money over different possible states of their health, but rather that they are affirming the incommensurability between pain and suffering and dollars. Perhaps the purchase of pain and suffering insurance would signify to people that their own pain and suffering is a commodity replaceable with money. Perhaps people reject this conception of their own pain and its connection to themselves.") Margaret Jane Radin, *Essay: Compensation And Commensurability*, 43 DUKE L.J. 56, 70. This argument is beyond the scope of the Article.

³⁶ Again, there is also the problem of consumers not having perfect information about the products. As Viscusi admits individuals are not fully aware of the risks they are facing and thus do not make optimal insurance purchasing decisions. Viscusi, *Reforming Product Liability*, at n.7. As mentioned above I ignore consumers' imperfect information.

³⁷ Indeed, this is the question that Steve Shavell and W. Kip Viscusi ask. See the discussion in Part B below.

it is not clear whether optimal insurance should provide people with pain-and-suffering coverage. This is because it is not clear *a-priori* whether pain-and-suffering losses increase, decrease, or have no impact on, an individuals' post-accident marginal utility for money.³⁸ Priest and Cooter simply assume that which they desire to prove.

Priest then raises a distributive justice justification for not having pain-and-suffering damages in tort law.³⁹ In his view, tort law, which is essentially third-party insurance, "requires low-income consumers to subsidize high-income consumers".⁴⁰ This occurs because manufacturers must lump consumers into undifferentiated risk pools, charging consumers the same premiums regardless of their income. Since high-income consumers impose a higher expected loss (because the future loss-of-income component is larger), low-income consumers cross-subsidize them. This is a regressive result.

While this might well be true, it is not clear how it relates to pain-and-suffering damages. Priest responds by saying that pain-and-suffering damages cause this regressive result because they correlate with the consumer's income.⁴¹ But Priest does not provide any empirical support for this claim.⁴² Moreover, even if there were sound empirical evidence showing that jury awards pain and suffering damages on the basis of the victim's income, from a normative perspective this seems wrong. Why should victims' income have any effect on the pain and suffering awards they receive

³⁸ Cooter, however, restricts this no-demand claim to "minor accidents." Cooter claims that in major accidents, if the pain-and-suffering loss is "serious" then it might "curtail earnings" and thus justify compensation as a "regular" monetary loss. Cooter's analysis is problematic on two grounds. First, the important distinction is between major and minor losses, and not whether it is a monetary or a non-monetary loss. As he admits, a rational individual will not insure even against a small *monetary* loss (because of high administrative costs for small claims as well as for controlling moral hazard). *Id.* Second, there is no reason to assume that any large non-monetary loss curtails individual's earnings. For example, if someone negligently severely scars Cooter's face, Cooter might suffer only a negligible monetary loss yet still a large non-monetary loss. Cooter, *Unmatured Torts*, at 392. Priest, in his turn cannot possibly mean what he says. Priest claims that insurance is a mechanism of *equalizing* utility from money over different States of the world, which leads him to the conclusion that there is no room for pain-and-suffering coverage (and thus for pain-and-suffering damages in tort law). If at all, insurance should be seen as a mechanism for *maximizing* utility from money (which is tantamount to *equalizing the marginal* utility from money) and not of equalizing it.

³⁹ Priest and Cooter also suggest an additional intuition to support their conclusion. Their argument, which builds on the lack of life insurance for children, will be discussed in section 3 (a) below.

⁴⁰ Priest, at 1559.

⁴¹ *Id.*

⁴² One may even argue, if at all, that it is negatively correlated with individuals' income because life teaches us that in awarding pain-and-suffering damages, a jury can express charity towards a poor victim whose life has been hard enough even before the accident.

for their injury? Therefore, since none of Cooter's and Priest's arguments are valid, their view cannot serve as an aid in the making of public policy.

3. Intuition

Economic models aside, there still remains the issue of intuition. Indeed, scholars have tried to persuade the legal academia that pain-and-suffering coverage is unwarranted by appealing to their intuition. This part surveys these intuitions, explores their nature, and offers alternative intuitions to consider. The last section presents an intuition concerning another prevalent doctrine in compensation law that cannot be easily reconciled with the scholars' intuition regarding pain-and-suffering losses.

a. People do not insure their children's lives.

The lack of demand for insurance on children's lives is perhaps the most prevalently cited intuition that supporters of the elimination of pain-and-suffering damages discuss.⁴³ For example, Priest and Cooter support their claim of lack of demand for pain-and-suffering coverage by pointing out that parents do not typically purchase insurance on the life of a minor child. They reason that "the child's death will not affect the flow of money into the family."⁴⁴ As prevalent as it is, this observation, even if correct, could not serve as a valid argument for the lack of demand for pain-and-suffering coverage for the following reasons.

Priest and Cooter draw their conclusion based on their observation of the market, despite their understanding that observing the market is problematic. This is due to a variety of failures within the market (which were discussed above). Specifically, in regard to our case, what Priest and Cooter overlook is that there might be other forces that prevent a substantial market for children's life insurance from

⁴³ See for example, STEVE SHAVELL, *ECONOMIC ANALYSIS OF ACCIDENT LAW* 134 (1987) and more recently, Louis Kaplow & Steve Shavell, *Economic Analysis of Law*, N.B.E.R. working paper 6960 <http://www.nber.org/papers/w6960> at 8. Calfee and Winston bring this intuition to demonstrate the deadweight loss associated with pain-and-suffering damages. See Calfee & Winston, *supra* note 12, at 13.

⁴⁴ *Id.* at 1546; See also, Cooter, *Unmatured Tort*, at 394. Shavell argues that both the pecuniary and the non-pecuniary components of awards for the death of children is often zero. *Id.* at 134 n.14. This might lead one to the conclusion that as the total loss associated with the death of children is zero, parents

emerging. As Croley and Hanson demonstrate, social norms may serve to impede the supply-side development of such markets. Simply put, there are social norms against being in a position in which a person may receive a benefit from the death of a child, regardless of whether the death results in a monetary or non-monetary loss.⁴⁵

Unlike Cooter, Priest admits that if the child were an adult providing financial support to the parents, it would make sense to purchase insurance on her life. Despite Priest's admission, even this type of insurance is not regularly observed in the market. This provides further evidence that markets do not operate as the economic theory in this case seems to predict. Moreover, Priest apparently neglects the fact that most minor children eventually become adults who most likely will support their parents, if needed. Thus, according to Priest's own logic, parents *should* purchase insurance on the life of their minor child even to merely cover their lost monetary support when they grow old. In fact, US courts, in determining damages in child mortality cases, tend to assess the future support parents would have received from their children upon aging.⁴⁶

should not be compensated at all, as they have not lost anything valuable. However, Shavell does seem to *support* the awarding of damages for the death of children. *Id* at 134.

⁴⁵ Consider a question that a neighbor might ask you: "So now, when your kid has died and you got a million dollars, are you REALLY sad?" Even Croley and Hanson, not to mention Viscusi, seem to not realize that the social norms may prevent the emergence of even *monetary insurance* on your beloved ones. Viscusi, *Sounding Rationale*, at 156.

⁴⁶ In wrongful death actions where the victim was a child, courts and/or legislatures guide juries to calculate the "pecuniary value" of the child by considering what the parents would otherwise have received in their expected later years from their (then) adult children. This is calculated in terms of what it would cost to obtain comparable care from nurses and comparable advice and counseling from advisers and therapists. See *Green vs. Bittner*, 424 A.2d 210 (N.J. 1980). Indeed, one may argue that children may be, in addition to anything else, a good insurance mechanism for the costs associated with aging. While this is conventional wisdom in some non-western societies, where in such societies the children, or at least the older child, traditionally take care of the parents' needs when they age, it is less obvious in modern western societies. First, in modern western societies one can purchase long-term care insurance so the need for support upon aging could be taken care via the insurance market. Yet, in a recent paper Meier argued that it may be irrational for young people to purchase long-term care insurance. Volker Meier, *Why the Young do Not Buy Long-Term Care Insurance*, 18 J. RISK & UNCERTAINTY 83 (1999). In addition, aging people need care, which is comprised of many expenses *not* covered by long-care insurance. Indeed, in 1993 there were only 3.4 million private policies sold, which accounts for five to six percent of the elderly. Edward C. Norton, *Long Term Care*, HANDBOOK OF HEALTH ECONOMICS (VOLUME 1B) 978. A second reason why in western societies it is less likely that children serve as an economic investment against aging is that, one might argue, the cost of raising children in a western society is much higher than the expected costs associated with aging and therefore it does not make sense to view children as an insurance mechanism for aging. Saving the cost of raising them would have been financially wiser, or at least so goes the argument. But that the cost of raising children is much higher than the expected costs associated with aging is not necessarily true. Focusing again on just part of the cost associated with aging, nursing home care costs about \$55,000 a year. General Accounting Office. "Long-Term Care Insurance: Better Information Critical to Prospective Purchasers." Sept. 2000: GAO/T-HEHS-00-196:1. As the average stay is around three years, aging parents will need about \$330,000, only for that purpose. The cost of raising a child, assuming no inflation within the children's lifetime, is about \$165,000, in 2000 dollars, for a middle-

Moreover, upon careful examination, life insurance for children could be justified by economic reasons. One such reason would be to preserve a child's insurability. A child's insurability is preserved because the underwriting process is fairly minimal at such an early age. Beyond basic questions on an application form, no medical exam is performed.⁴⁷ A parent can then purchase additional policies when the insured child reaches certain ages.⁴⁸ Because these additional policies can be purchased several times over the insured's life, a policy with a small initial face amount can turn into several policies that could become a substantial part of the insured's life insurance portfolio.⁴⁹ Importantly, if at the time of the additional purchases the insured child became totally disabled the parent will still be able to purchase the additional policies.⁵⁰ Thus, the insured's family (either her parents or her spouse or kids, if any) is afforded much higher protection than it might otherwise receive, such as if the insured has become totally disabled and therefore uninsurable

income family. Lino, Mark. 2001. Expenditures on Children by Families, 2000 Annual Report. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. Miscellaneous Publication No. 1528-2000. <http://www.usda.gov/cnpp/Crc/Crc2000.pdf>. Medicaid pays just part of these costs and only for days 21 to 100. The chances of needing long-term care are more than 2 in 5. (Compare to the chances of needing to use one's homeowner's insurance which are 1 in 88 and the chances of having an auto accident which are 1 in 47.) Robert Dawson, "Long-Term Care Insurance: A Product for Today," *Journal of the American Society of CLU & ChFC* Sept. 1999: 72. If these numbers are correct, assuming, as the common law does, that children *will* support their parents when they age, it may be beneficial, after all, from a purely self-interest economic perspective, to have children. Some may object to this entire line of analysis refusing to believe that parents possibly make such 'cold blooded' calculations regarding their economic benefit of raising children. Yet, it is enough for our purposes to assume that parents act 'as if' they take all this into account. Indeed, it is conventional in health economics literature to think about different forms of interactions between aging, children and insurance. See for example Norton, *Long Term Care*, *id.* at 979, who describes different such studies one of which argues that people do not buy long care insurance because it reduces the price to the children of institutionalizing a parent, relative to the cost of giving personal attention.

⁴⁷ Unless conditions are raised on the application which attract the underwriter's attention. See for example a policy application for an infant with the Northwestern Mutual Life Insurance Company (on file with the author) which contains standard medical treatment questions, but requires no medical examination.

⁴⁸ The amount of these additional policies is specified at the time of application. For example, a policy with the Northwestern Mutual Life Insurance Company on an infant issued in 1995 with an initial face amount of \$25,000 allows additional policies to be purchased on the policy anniversaries occurring closest to the insured's 22nd, 25th, 28th, 31st, 34th, 37th, and 40th birthdays.

⁴⁹ For example, in the policy at note ???, *supra*, the owner of the policy may purchase additional policies with a \$20,000 face amount on each specified policy anniversary dates. If this option is exercised every time it becomes available, this would result in \$140,000 of additional coverage, so the initial \$25,000 policy could eventually reach a face amount of \$165,000. The only underwriting that occurs when the additional purchase option is exercised is that the premium amount is adjusted based on the insured's cigarette smoking habits if the initial policy was purchased before the insured's eighteenth birthday.

⁵⁰ And the premium will be waived for these new policies – essentially, the insured is able to receive additional coverage for free if they have become disabled since the first policy was issued.

since the first policy was issued. There could be other economic reasons that justify life insurance on children.⁵¹

Indeed, despite all the impediments, one *is* able find a demand for this type of insurance.⁵² Children's life, or accident, insurance is especially prevalent when there is no fear of moral hazard as schools' filed trips' accident insurance.

Calfee and Winston present a somewhat similar intuition. They argue that parents who send their child to a swimming camp would pay a substantial amount for even a marginal reduction in the risk of death of their child, but would probably pay very little for insurance against such a risk.⁵³ Although Calfee and Winston are probably correct in their intuition (indeed their empirical work, for whatever it is worth, confirms this), the example itself is irrelevant to whether there exists a demand for this type of pain-and-suffering coverage. The reasoning is that the same intuition applies to monetary losses as well. Elementary economic principles teach us that even risk-neutral individuals would pay to reduce risks of even monetary losses for which they might not otherwise insure.⁵⁴ The same logic applies for risk-averse individuals. Accordingly, people are willing to pay more to efficiently prevent losses than to insure against them. This is true regardless of the nature of the loss. As an alternative example of this type of intuition, consider the case in which a farmer would pay more to efficiently prevent the theft of his milking cow than to insure against her theft.⁵⁵ Here, the loss is monetary and Calfee and Winston's intuition would still apply.⁵⁶

⁵¹ There may be some tax benefits for such life insurance.

⁵² Croley and Hanson argued that 14 percent of all ordinary life insurance policies are for the lives of children under the age of fifteen, and the average benefits from those policies is \$22,000. *Id.* at 1880. At n.302 they provide couple of examples. E.g., Student Accident Insurance (1989-1990) (underwritten by the Equitable Life Assurance Society), Athletic Accident Insurance Program (1989) (underwritten by the All American Life Insurance Company).

⁵³ Calfee & Winston, *supra* note 12, at 134.

⁵⁴ Consider the following example. Suppose that a house is worth \$300,000 and there is a 1:1000 chance (0.1%) that it would burn down in a fire. Further, suppose that a smoke detector reduces expected loss by \$100.00 and that a sprinkler system reduces the expected loss by another \$100.00. If the smoke detector costs \$90.00, and the sprinkler system \$110.00, a rational risk-neutral person will purchase a smoke detector system and not a sprinkler system. However, a rational risk-neutral person would have no incentive to buy insurance that offered \$100,000 in compensation for a premium of \$100.00 (which is the minimum the insurance company would be required to offer). The point here is that a rational risk-neutral person will undertake all risk reduction activities *up to* the point where the incremental benefit of the activity is equal to the incremental cost.

⁵⁵ The reason is that if there are cost-justified precautions that the farmer does not take, then insurance companies would charge much higher premiums; this is the problem of moral hazard.

b. What would you need the money for anyway?

Viscusi appeals to our intuition by discussing why one would need money for an extremely severe injury, for example when she is comatose. He then shifts to the other extreme, and delves into a case of a minor injury, such as food poisoning which interrupts with a planned evening out. Viscusi wonders whether people really need extra money for that state of affairs.⁵⁷

We must first observe that Viscusi presents two extreme injury cases (very minor and extremely acute). He then attempts to extrapolate from that presentation in order to analyze cases in the middle of the spectrum. This logic is flawed. There is no logical reason to assume that even if people did not demand pain-and-suffering coverage both for minor and extremely severe injuries, they would not demand it for ordinary ones as well.

Second, Viscusi's example of a minor pain-and-suffering loss is appealing precisely because the loss is minor and not because it is one of pain-and-suffering. It would be equally appealing if we replace the example of minor food poisoning with a minor monetary loss such as losing the theatre tickets for that evening. Most people would probably not have insurance for such a loss, even if it increases their marginal utility of money. If Viscusi's example involved a major pain-and-suffering loss such as facial burns, it is not so obvious that one would not prefer to receive funds in that situation.

Third, Viscusi's example of a comatose victim is intuitive, not because it is a pain-and-suffering loss (indeed, it is not clear that one suffers at all in such a situation), but because the loss is so acute. To be sure, the same intuition applies when one considers purchasing medical insurance, a form of monetary coverage. Individuals might purchase health insurance to cover medical costs for every possible health risk, save for the event of a coma.⁵⁸ Individuals may well think that they prefer

⁵⁶ The insurance company, too, for reasons related to moral hazard would prefer that cow owner spend her first dollars on prevention before she purchase insurance.

⁵⁷ He asks "do you live it up in order to compensate for the welfare loss you have suffered or do you skip the planned evening out, saving the money until you are well?" Kip Viscusi, *Pain and Suffering: Damages in Search of a sounder Rationale*, 1 MICH. L. & POL. REV. 141, 156 (1996) (Hereinafter Viscusi *Sounder Rationale*).

⁵⁸ Feldman argues that courts should compensate comatose plaintiffs not only for their medical expenses but also with a sum of money to increase the plaintiffs' mental state, thereby increasing their capacity to flourish. Heidi Li Feldman, *Harm and Money: Against the Insurance Theory of Tort Compensation*, 75 TX L.R. 1567, 1593.

to have more money in the present than in the event of being in a comatose state, despite the possibility that money would be required to sustain their life.

c. A pain-and-suffering loss is irreplaceable and, therefore, should not be compensated.

Building on Philip J. Cook and Daniel A. Graham's observations and theories, Alan Schwartz distinguishes between pecuniary losses and non-pecuniary losses by comparing and contrasting "replaceable" and "irreplaceable" goods.⁵⁹ A replaceable good is one that has an equivalent commodity in the market. Here, a monetary award can make the victim whole. An irreplaceable good is one that has only a substitute commodity in the market. In this case, although money can almost never fully compensate for the loss, it can perhaps mitigate it. In summary, a replaceable loss should be fully compensated, while an irreplaceable loss may only be partially compensable.⁶⁰

However, the test to determine whether an asset can be replaced is either under-inclusive or over-inclusive.⁶¹ If the replaceability test is applied to the original loss as a whole (such as a paralyzed body or a loss of mental and functional capacity), then even the costs associated with basic medical care cannot be viewed as pecuniary under the replaceability test. This is because the medical treatment is often not completely restorative.⁶² The test is then rendered under-inclusive.

Nevertheless, this result cannot be the intention of legal economists, as they all support compensation for basic medical expenses. In contrast, if the replaceability test were applied in such a way that restoration itself was the equivalent commodity to the injury, then much expenditure that traditionally was not considered pecuniary (i.e. recreation and physical therapies, psychological counseling, professional retraining,

⁵⁹ The distinction is based on Philip J. Cook & Daniel A. Graham, *The Demand for insurance and Protection: The Case of Irreplaceable Commodities*, 91 Q.J. Econ., 143 (1977).

⁶⁰ Shavell acknowledges that the question of irreplaceability depends on technological progress in medical care: "[C]ertain types of injury that at one time might have resulted in permanent loss of health or in disfigurement might today be largely remediable and thus involve mainly pecuniary losses (costs of medical care and forgone income)." Shavell at 133.

⁶¹ Pryor, *supra* note 18 at 128-130.

⁶² As Feldman observed, "[a] fake arm, an assistant, or any other surrogate for the victim's lost limb is just a substitute, and not a return to actual *status quo ante*." Feldman, at 1580.

etc.) would then be viewed as pecuniary.⁶³ This would appear to most legal economists as over-inclusive.

One might think that to overcome this ambiguity, it would be possible to follow Schwarz's approach. Schwartz has suggested that the optimal degree of compensation for non-pecuniary loss would depend on the individual's preferences for substitutes. For example, a business executive who runs recreationally and who loses a foot in an accident might be forced to switch to other forms of recreational activities which entail that her post-accident demand for money (and thus her post-accident marginal utility) has increased. Alternatively, she could substitute reading for running, which means that her post-accident need for money has decreased. In the first case, Schwartz argues, the executive would want to insure against a pain-and-suffering loss, whereas in the second she would not.⁶⁴

Observe that this 'functional approach' does not support eliminating pain-and-suffering damages (as Schwartz ultimately advocates), but rather it becomes dependent on individual preferences.⁶⁵ One problem with this approach is that it makes the question of national policymaking dependent on citizens' lifestyles and routines. This approach sends the wrong signals to individuals, i.e. the more they inflate the costs associated with their alternative activities, the more compensation they are entitled to from the defendant. Schwartz provides the victims with two inappropriate incentives, i.e. the development of extravagant lifestyles, and second,

⁶³ Pryor at 130-1. As Pryor correctly observes, when several possible substitute rehabilitative choices are available with respect to a given loss, the problem intensifies. *Id.* at 132-6.

⁶⁴ *Id.* at 364. In the latter case, she might even demand a cessation of insurance, Schwartz argues. *Id.*

⁶⁵ An approach like Schwartz's was termed "functional" by the English commentator A.I. Ogus back in 1972 because it attempts to assess the physical arrangements which can make a victim's life more endurable. A.I. Ogus, *Damages for Lost Amenities: For a Foot, a Feeling or a Function?*, 35 MODERN L. REV. 1 (1972). Ogus has suggested that there are three theoretical approaches to the problem of pain-and -suffering loss. The "conceptual" approach, or the "diminution of value" approach, which treats each faculty as a proprietary asset with an objective value, independent of the individual's own use or enjoyment of it. This was the ancient tariff system, which prevailed in ancient Babylonian and Jewish law, up to the days of King Alfred, when a thumb was worth 30 shillings. Modern compensation law sees such a solution unobscure. The "personal" approach values the injury in terms of the loss of human happiness by the particular victim. Then, the "functional" approach accepts the personal premise of the "personal" approach, but attempts to assess the compensation required to provide the injured person "with reasonable solace for his misfortune." *Id.* The functional approach is not without merit. It was adopted in 1978 by the Supreme Court of Canada in three decisions, widely referred to as "the trilogy." *Andrews v. Grand & Toy Alberta LTD*, [1978] 83 D.L.R. (3d) 452; *Arnold v. Teno*, [1978] 83 D.L.R. (3d) 609; *Thornton v. Board of School Trustees of School District No. 57*, [1978] 83 D.L.R. (3d) 480. The Court explained that this approach provides a rationale as to why money is considered compensation for non-pecuniary losses. "Money is awarded because it will serve a useful function in making up for what has been lost in the only way possible, accepting that what has been lost is incapable of being replaced in any direct way." *Andrews*, 83 D.L.R. (3d) at 89.

the opportunity to report inflated subjective damages which cannot be verified by the courts.

A second problem with the functional approach is that it increases the unpredictability and causes high administrative costs, the two main problems with the current tort system.⁶⁶ As was observed by the Canadian Supreme Court, there are infinite numbers of alternative activities that could be thought as improving the lot of the victim.⁶⁷ The more the awards meet the specific circumstances of the individual case, by taking into account her substitute pleasures, the less predictable these awards are, and the higher the administrative costs associated with determining them.⁶⁸

A third problem with the functional approach is that under a consistent application of the approach some absurd results might emerge. For example, there will not be compensation for past pain and suffering.⁶⁹ And, second, victims' damages should be decreased to reflect the *savings* resulting from having to give up their high expenditure hobby.⁷⁰

Lastly, the experience with the functional approach is not a happy one. In Canada, where the Supreme Court has explicitly adopted the functional approach, most judges have continued to apply the traditional 'diminution of value' approach to their assessments. Indeed, for all these reasons, in its recommendation for a reform in

⁶⁶ In another paper I discuss the main problems with the current tort system. Ronen Avraham, *Putting a Price on Pain-and-Suffering Damages: A Critique of the Current Approaches and a Proposal for a Change* (on file with the author). It is enough to mention here that the advantages of a predictable tort system include both efficiency and fairness consequences.

⁶⁷ "[T]he claim of a severely injured plaintiff for damages for non-pecuniary loss is virtually limitless. This is particularly so if we adopt the functional approach and award damages according to the use which can be made of the money. There are an infinite number of uses which could be suggested in order to improve the lot of the crippled plaintiff. Moreover, it is difficult to determine the reasonableness of any of these claims. There are no accurate measures available to guide decision in this area." *Lindal v. Lindal*, [1981] 129 D.L.R. 263, 271 (emphasis added).

⁶⁸ One might argue that victims should therefore be compensated for the *reasonable* substitute activities. Yet, as the citation in the previous footnote indicates, there is no reasonable way for courts to decide what reasonable substitute pleasures would be. *Id.*

⁶⁹ On first blush, as some have observed, there is something anomalous in providing victims with funds for substitute pleasures that act as a solace for what has already been experienced. See for example the Australian High Court Justice Windeyer who argued that "It may be that giving damages for physical pain, that is wholly past, not continuing, and not expected to recur, is simply an anomaly, for there can be no solace for past pain." *Skellton v. Collins*, [1966] 114 C.L.R. 94. Yet, no one has ever defended the proposition that there should not be compensation for past pain and suffering. To state one reason, it will provide incentives for defendants to prolong the trial.

⁷⁰ This approach was explicitly adopted by all Lords Justices in *Fletcher v. Autocar and Transporters Ltd*, yet is rarely cited and probably for good reasons generally ignored. 2 QB 322 (1968). Lord Denning MR and Lord Diplock, in the majority, and Salmon LJ, dissenting all agreed on this point.

the compensation for pain and suffering damages, the Law Commission in the UK has rejected the functional approach and preferred the traditional approach.⁷¹

In sum, and in viewing the entire picture, we try here to distinguish between pecuniary and non-pecuniary losses. The problem is that from a practical point of view, simply calling a loss non-pecuniary does not solve any problem; nor do the distinctions between a replaceable (or substitutable) loss and an irreplaceable (or non-substitutable) loss, or between losses that increase or decrease the marginal utility. Those distinctions *raise* issues concerning the various relationships between money and pain but do not solve them.⁷²

d. A counter intuition.

Consider the doctrine that states that tort law should compensate victims for their loss of income. This prevalent doctrine is undesirable for two distinct reasons. First, since manufacturers cannot distinguish between consumers with different income levels, below-average-income consumers cross-subsidize above-average-income consumers. This adverse selection problem leads to inefficiency in consumers' incentives to buy the products, and then handling it with due care. Second, this cross-subsidization is regressive.⁷³ Despite its undesirability, hardly anyone has argued that tort law should provide compensation to victims without the loss-of-income component.⁷⁴

⁷¹ See The Law Commission, DAMAGES FOR PERSONAL INJURY: NON-PECUNIARY LOSS (1999), <http://www.lawcom.gov.uk/library/lc257/lc257.pdf> at paragraph 2.7.

⁷² Viscusi admits that even absent evidence on preferences after injuries, one possible rationale for pain-and-suffering damages is that various expenditures like an elevator or a ramp in a victim's house are needed to promote individual's welfare. Viscusi, *Sounding Rationale* at 151. However, Viscusi does not see it as pain-and-suffering damages but as rehabilitation expenses that are part of the existing tort system. *Id.* For him, pain-and-suffering damages are compensation for "general consumption purposes" and not for anything designed to address the consequences of an injury. *Id.* Similarly, Schwartz argues "any medical and other tangible costs associated with mental distress constitute compensable pecuniary harm under the rule argued for here." *Proposals for Reform*, at 367 n.24. In that case, there might be less disagreement between scholars than what was originally thought.

⁷³ Calfee and Rubin recognize this fact but neglect it. *Supra* note 8, at n.41. But see Logue and Hanson, who claim that manufacturers do distinguish between high-income and low-income consumers by marketing the same product in different packing. *Supra* note 23.

⁷⁴ But see Atiya who argued that first-party insurance should replace tort law altogether, among other things, for this reason. See PATRICK S. ATIYA, *T HE DAMAGE LOTTERY* (1997).

B. The approach taken by Scholars who think that the demand for pain-and-suffering coverage is an empirical question.

1. The approach taken by Steven Shavell

a. Introduction

In Steven Shavell's analysis of what constitutes socially optimal insurance coverage for non-pecuniary losses, he observes that such losses can alter individuals' need for money. Some losses result in individuals valuing money to a lesser extent "because spending money is less pleasurable and more difficult." Other losses will result in individuals attaching a higher value to money, "because of the desire to obtain household help, special transportation services and the like." He thus concludes that "[t]he amount of insurance coverage against non-pecuniary losses that an individual will wish to purchase will clearly depend on whether such losses will affect the utility he would derive from receiving additional money." Shavell argues that based on expected utility maximizing insurance policy, one will only arrange for coverage against non-pecuniary losses if such losses would result in a higher evaluation of money by the individual.⁷⁵

Intuitive as this approach may seem, the conventional wisdom among contemporary economic theorists is that this approach does not rest on sound normative grounds. The following section reveals a number of theoretical problems in this approach.

b. Ordinally measurable, cardinally measurable, comparable, and non-comparable utility functions.

i. Introduction⁷⁶

⁷⁵ STEVEN SHAVELL, ECONOMIC ANALYSIS OF ACCIDENT LAW 228-9 (1987).

⁷⁶ The introduction is far from being a comprehensive description of utility theories. To the contrary, it is a sketchy presentation of the relevant components that are needed for the development of the argument in this part. Readers who are interested in more rigorous history of utility theory can turn to the following sources and the references they cite. George Joseph Stigler, *The Development of Utility Theory*, 58 J. POL. ECON. 307 (1950) reprinted in *UTILITY THEORY; A BOOK OF READINGS* 168 (A.N. Page ed., 1968); Robert Cooter & Peter Rappoport, *Were the Ordinalists Wrong?* 22 J. ECON. LIT. 507 (1984); Herbert Hovenkamp *The Limits of Preference-Based Legal Policy*, 89 NW. U. L. REV. 4 (1994).

The early conception of utility in economic thought can be characterized in the following ways: First, for the purposes of understanding markets, it was believed that rational individuals act in ways which maximize their utility functions, thereby acting in ways which maximize their number of “utils.” Second, utility itself was perceived as a physical attribute, one subject to the laws of quantity. It represented a measure of hedonic satisfaction, overall happiness, or well-being. This measure was then used in determining how much one prospered from a specific outcome.⁷⁷ It was perceived as something quantifiable; just as knowing how many hairs one has on his body allows us to know how hairy he is, so too it was believed that knowing how many “utils” one has enables us to know how happy an individual is. Third, the mainstream hypothesis was that the utility an individual derives from an outcome steadily increases yet in a decreasing rate, implying a concave utility function.⁷⁸ Lastly, for purposes of understanding social policy, utility was perceived as something that can be compared across individuals, just as number of hairs can.⁷⁹ Indeed, for all these reasons much effort was exerted in the 19th century to try and measure individuals’ utility functions.⁸⁰ These efforts, however, proved fruitless.

Modern utility theory began late in the 19th century when Vilfredo Pareto introduced his concept of utility functions. This new concept went on to influence all four of the characteristics noted above.⁸¹ The main points of his argument were as follows: First, he showed that it was enough to use individuals’ indifference curves between bundles or states to analyze their choices in the markets. Today, it is

⁷⁷ JEREMY BENTHAM, *THE PRINCIPLES OF MORALS AND LEGISLATIONS* (1789), and JOHN S. MILL, *UTILITARIANISM* 9-14 (E.P. Dutton ed., 1951) (1863), are traditionally thought to be the first to bring the notion of ‘utility’ in a similar sense to the forefront of discussion. They did so in England at the beginning of the 19th century. Some of Bentham’s known propositions are: 1) Each portion of wealth has a corresponding portion of happiness, 2) of two individuals with unequal fortunes, he who has the most wealth has the most happiness, and 3) the excess in happiness of the richer will not be so great as the excess of his wealth. BENTHAM, at 103.

⁷⁸ See for example: JEVONS, *THE THEORY OF POLITICAL ECONOMICS* 173 (3d ed. 1879).

“It is almost self evident that the [marginal, RA] utility of money decreases as person’s total wealth increases.”

⁷⁹ Indeed, as Roemer notes “[w]hen Bentham wrote that the social goal should be to achieve ‘The greatest happiness for the greatest number,’ his principle of utility, he clearly conceived of utility as something the summation of which it is meaningful to perform across individuals.” JOHN E. ROEMER, *THEORIES OF DISTRIBUTIVE JUSTICE* 14 (1996).

⁸⁰ The Weber-Fechner law is a psychological rule stating that noticeable increment of pleasure to any stimulus is proportional to the stimulus. Many references to the Weber-Fechner law can be found in psychology and psychophysics literature. This law was construed as proof of the concavity hypothesis, identifying stimulus with income and sensation with pleasure. Stigler at 88. Maurice Allais is the only economist today who holds similar views about the notion of utility. See *EXPECTED UTILITY HYPOTHESIS AND THE ALLAIS PARADOX* 3-11 (Allais and Hegen eds., 1979).

commonly accepted that individuals' indifference maps represent *ordinal* preferences over different states such that the more preferred states are associated with higher curves. For Pareto's theory to work, it is sufficient that preferred states be associated with higher numbers, regardless of the intensity of preference or the magnitude of those numbers.⁸² Second, Pareto reversed the causal link between choices and utility functions. He showed that it is not that rational people make choices in order to maximize their utility functions, but rather that rational people's choices could be characterized *as if* they maximize their utility functions. Utility functions, therefore, are nothing more than the economists' representation of people's preference orderings over alternative states. Third, it was shown that there is no need to assume that people express diminishing marginal utility from resources in order to represent their ordinal choices.⁸³ Lastly, he showed that for purposes of social policy there is an optimality

⁸¹ PARETO, MANUEL D'ECONOMIE POLITIQUE (1906). Relevant parts of the second edition from 1927 are reprinted in UTILITY THEORY; A BOOK OF READINGS 168 (A.N. Page ed. 1968).

⁸² For example, suppose that an individual prefers bundle A to bundle B, one possible way to represent this preference under Pareto's ordinal utility functions would be that $U(A)=7$ and $U(B)=3$. Another way would be that $U'(A)=49$ and $U'(B)=9$. Nothing else could be inferred from these two representations, U and U' , except that both represent the preference ordering in which bundle A is preferred to bundle B. How strong the preferences are in each case, is not part of the information embedded in the numbers. Interestingly, Pareto himself labeled them as "I", attempting to rid utility of any interpretive meaning. (Gross & Tarascio, *Pareto's Theory of Choice*, HISTORY OF POLITICAL ECONOMY 30(2) at 171 (1998) (hereafter- *Pareto*)).

⁸³ About three decades later, in 1934, John Hicks and R.G.D Allen offered "A reconsideration of the theory of Value." John Hicks & R.G.D. Allen, *A reconsideration of the theory of Value*, ECONOMICA N.S 1934 at 52-76, 192-216. They substituted the concept of marginal utility with marginal rate of substitution, which is an ordinal concept. Marginal rate of substitution is the negative of the slope of an indifference curve at some point: $MRS = -d(Y)/d(X)$ (at $U=U_1$). The assumption of diminishing marginal rate of substitution is equivalent to assuming a convex set (or that the utility function is quasi-concave). The assumption is needed to ensure that the second derivative in a constraint maximization problem is negative- namely that the extreme point is indeed a maxima. The economic interpretation is that an individual prefers balanced bundles of commodities to bundles that are heavily weighted toward one commodity. In contrast, the assumption of diminishing marginal utility means that the extra utility obtained from slightly more of bundle X, while holding the amount of all other commodities constant, continues at a decreasing rate. Both the diminishing marginal utility (DMU) and the diminishing marginal rate of substitution (DMRS) seem to be based upon the same intuition; that of an individual becoming relatively satiated with a good the more s/he consumes it. The two concepts, however, do differ in several regards. As will be shown below, MRS is an ordinal property whereas MU is not. A key difference between the von-Neumann-Morgenstern and Bernoulli theories on the one side, and the Pareto ordinal utility theory on the other is the transformation they can legitimately be subject to. Whereas marginal utility is dependent on the particular scale used to measure utility, hence the concept is not measurable in any unique way, marginal rate of substitution is not and therefore is an ordinal property. Thus, the assumption of DMRS is not equivalent to the assumption of DMU. An individual can have a DMRS but either constant, increasing, or decreasing marginal utility. To illustrate this point consider the following utility function: $U(X,Y)=XY$. The marginal utility from X is $MU_x=Y$ which is a constant rate (that is, no matter how much more we add from X, we always increase our utility by Y units). But the marginal rate of substitution for this utility function is $MRS_x=Y/X$, which is a decreasing rate. Next consider an increasing transformation of the original utility function. $U(X,Y)=X^2*Y^2$. here $MU_x=2X*Y^2$, which is increasing with X, but the $MRS_x=Y/X$, which is decreasing with X. Lastly, consider another transformation of the original utility function:

concept, known as a Pareto optimal, which does not require any interpersonal comparison.⁸⁴

In sum, in contrast to the old conception of utility functions as absolutely measurable and fully interpersonally comparable, which people (expressing diminishing marginal utility from resources) seek to maximize, Pareto introduced pure ordinal measurable and non-comparable utility functions, which helped in understanding markets and contributed to the social choice literature.⁸⁵ Furthermore, there is no place for the diminishing marginal utility assumption in this new concept.⁸⁶ Indeed, the old concept was abandoned.⁸⁷

$U(X,Y)=\ln(X) + \ln(Y)$. Here the $MU_x=1/X$ is decreasing, and the $MRS_x=Y/X$ is also decreasing. As the example shows, whereas the MRS has not changed with the transformations of the original utility function, the marginal utility has changed from constant to increasing and then to decreasing marginal utility. This example shows that MRS is an ordinal property whereas the MU is not. One might object to this argument and argue that a person with convex preferences shows a preference towards diversification, and therefore is risk averse. This, however, would be the same mistake of mixing notions from different theories. The fact that one prefers one parcel of 2 acres of land in Ann Arbor, over 2 parcels of 1 acre each, does not necessarily mean she is risk liking. Analytically, such a preference has nothing to do with her behavior under risk. Another way to see this distinction is to recognize that if we are willing to assume, as is the standard assumption in economic analysis of portfolios, that the individual cares about the mean and variance of a prospect and therefore gains from diversification, under the EUT framework this could be represented by a quadratic utility function. Yet in quadratic function the marginal utility eventually becomes negative. This is an unacceptable implication in economic analysis, if we perceive the utility in its Bernoullian sense. See *Hirshlifer* at 71.

⁸⁴ About three decades later, in the late 1930s, Nicholas Kaldor and John Hicks developed another criterion which was intended to overcome the impracticability of the Pareto criterion for policy analysis. The problem with the Pareto criterion was that most changes fell into the category of ‘changes that improved the welfare of some people yet injured the welfare of others,’ implying indeterminate welfare effects. Under the “potential” Pareto criterion, also known as “Kaldor-Hicks criterion,” a change increases welfare if the gains to the gainers from the change exceed the losses to the losers. It is irrelevant whether those who profit from the deal actually compensate those who lose because the Kaldor-Hicks criterion is only concerned with the overall amount of wealth, not with how it is distributed. Nicholas Kaldor, *Welfare Propositions of Economics and Interpersonal Comparisons of Utility*, 49 *ECON. J.* 1939 at 549. John Hicks, *The Foundations of Welfare Economics*, 49 *ECON. J.* 1939 at 696.

⁸⁵ For an economist who seems to hold the classical views on utility see Yew -Kwang NG, *Utility, Informed Preference, or Happiness: Following Harsanyi’s argument to its logical conclusion*, 16 *SOCIAL CHOICE WELFARE* 1999 197, 213.

⁸⁶ Friedman and Savage criticized the “strong introspective belief in diminishing marginal utility” years after Pareto showed it was unnecessary. People do, however, share the intuition that a dollar for the poor means more than a dollar does for the rich. Why else would a poor man walk in the rain while a rich man takes a cab? This intuition served as the thesis for justifying progressive taxation in the beginning of the 20th century. F. Y. Edgeworth, *The Pure Theory of Taxation*, 7 *ECON. J.* 1897, 550. Could that be explained without resorting to the assumption of diminishing marginal utility? Friedman and Savage provided intuition to explain how rich people would spend more than poor people to avoid any given amount of pain or discomfort even when it is assumed that they have increasing marginal utility from goods. “It is only necessary to suppose that the avoidance of pain and the other goods that can be bought with money are related goods and that, while the marginal utility of money increases as the amount of money increases, the marginal utility of avoiding pain increases even faster.” See Friedman Milton and L.J Savage *The Utility Analysis of Choices Involving Risks*, *J. POL. ECONOMY* 1948 56, 279 *reprinted in* *UTILITY THEORY; A BOOK OF READINGS* 234, 239 (A.N. Page ed. 1968) (Hereinafter Friedman and Savage 1948). Savage sees the whole idea of diminishing marginal utility in

An important corollary of Pareto's new concept is that the classes of utility functions that can describe people's preferences are infinitely large. The reason is that as the specific numbers associated with the indifference curves do not matter, any particular utility function which describes a particular preference ordering could be subject to any increasing transformation and still fully represent individuals original preference ordering.⁸⁸ In contrast, under the old conception of utility, utility functions could not be subjected to any type of transformation.⁸⁹

Not until the 1970s did economics reach a stage where it showed analytically that between the 19th century conceptions of utility functions (as absolutely measurable and fully interpersonal comparable which therefore could not be subject to any type of transformation) and the Paretian conception of utility functions (as only ordinally measurable and interpersonal non-comparable which therefore could be subject to any increasing transformation) exist intermediate conceptions of utility

the domain of certainty as "nonsensical." "The law of diminishing marginal utility has been very popular, and few who have considered utility since Bernoulli have discarded it, or even realized that it was not necessarily part and parcel of the utility idea." Savage, *supra* sec 5.6. Savage uses conventional tools of consumer theory to understand the discrepancy between the value of a dollar to the poor and that of a dollar to the rich. He explains "that the rate of exchange between circumstances producing physical discomfort and money depends on the wealth of the person involved." *Id.* at 96.

⁸⁷ There were several reasons for abandoning the old concept. First, economists could not provide meaningful interpretations to quantifying the amount of utility associated with choice. More specifically it was not clear what it means to argue that a bottle of juice would give us twice as much utility when compared with an extra cucumber than a chocolate bar would. Economists doubted whether utility and its units have any independent meaning other than being what people maximize. See for example Jevons, as cited by Stigler, *supra* note 2, at 69 "I have granted that we can hardly form the conception of a unit of pleasure or pain, so that the numerical expression of quantities of feeling seems to be out of question." Second, the only operation that could elicit measurable utility is an operation that is strongly based on person's self report. Introspection analysis was not considered to be a satisfying method to provide reliable and comparable data. Third, there was no need to stick with the old concept when the new concept could explain individuals' behavior in a better fashion. Indeed, half a century later Arrow and Debreu presented their general equilibrium theory where they showed that it was possible to describe the economics of the market using only the concept of indifference curves of individuals, without measuring utility or making any interpersonal comparisons of utility. K. Arrow and G. Debreu, *The Existence of an Equilibrium for a competitive economy*, *ECONOMETRICA* 1954 22, 265.

⁸⁸ For example, suppose that an individual prefers bundle A to bundle B, one possible way to represent this preference under Pareto's ordinal utility functions would be that $U(A)=7$ and $U(B)=3$. But then any increasing transformation of the utility function would also represent the same preference ordering. For example, if we power the utility function so that $U'(A)=49$ and $U'(B)=9$, the new function, U' , represents the same preference order as the original U .

⁸⁹ Or, more accurately put: besides the identity transformation. Once we are interested in the exact amount of satisfaction (measured in units of 'utils') the number has intrinsic significance; we cannot transform it and expect it to remain meaningful. Under the old conception, if an individual receives 7 utils from bundle A and 3 from bundle B, it means, among other things, that she would give up bundle A for 3 bundles of B. Yet once we transform her utility function and, for example, we power it so that $U'(A)=49$ and $U'(B)=9$, then it would not be true anymore that the individual would be willing to part with her bundle in return for 3 bundles of B. The transformation changed some of the cardinal information that was embedded in U , and is therefore illegitimate.

functions. Most of these intermediate conceptions are considered by most economists to be purely theoretical in the sense that their basic assumptions are non-realistic. These intermediate conceptions vary with respect to two of their basic assumptions. First, the extent at which the utility was considered to be measurable. As will be explained below, the type of measurability determines the type of transformation these utility functions could be legitimately subjected to. Second, whether utility is assumed to be interpersonally comparable.

ii. Measurability, information and transformations.

Starting with the measurability property, modern economists have shown that at least in theory, utility functions could be assumed to be *cardinally measurable*, a notion which lies between a pure ordinally measurable utility and an absolutely measurable utility.⁹⁰ A cardinally measurable utility function conveys more information than that which is presented by an ordinal utility function but less information than that which is conveyed by an absolutely measurable utility function. An ordinal utility function conveys information only with regard to whether bundle A is preferred over bundle B. An absolutely measurable utility function conveys information as to how happy an individual is from possessing these bundles.

The following is an example of a cardinal utility function. Consider a family of utility functions where differences in utility levels between states are assumed to be meaningful for each individual but where absolute levels of utility are meaningless.⁹¹ This family of utility functions is characterized by the fact that they convey meaningful information (beyond the ordinal preference ordering of the bundles) about individuals' *relative preference* for the bundles. In this family, if a utility function is concave in relation to a certain amount of bundles, then its cardinal property means that this individual expresses a diminishing marginal utility from the bundles: the "bang" she gets from an extra bundle decreases as her overall number of bundles increases. I call this family of cardinal utility functions 'Bernoulli utility functions.'

⁹⁰ I follow John Roemer's taxonomy. See JOHN E. ROEMER, THEORIES OF DISTRIBUTIVE JUSTICE 15-19 (1996).

⁹¹ Consider the case where $U(A)=7$, $U(B)=3$, and $U(C)=1$. If utility differences are assumed to be meaningful, then it can be said that our individual would prefer the move from bundle B to bundle A then to move from bundle C to bundle B.

after the 18th century mathematician Daniel Bernoulli who is most famously associated with this family of utility functions.⁹²

Another example of cardinal utility functions is presented as follows. Consider the family of von-Neumann-Morgenstern utility functions, named after the 20th century mathematicians John von-Neuman and Oscar Morgenstern.⁹³ This family of utility functions is characterized by the conveyance of meaningful information (beyond the ordinal preference ordering of the bundles) about individuals' preferences for lotteries over these bundles.⁹⁴ In this family, if a utility function happens to be concave in relation to a number of bundles, then its cardinal property means that this individual is risk averse: she prefers some sure number of bundles over a lottery for these bundles, fixing the expected number of bundles in both cases constant.

Cardinal utility functions could be subject to fewer types of transformation than ordinal utility functions. The intuition is simple: the less information the utility function is assumed to convey (the closer it is to pure ordinally measurable utility function), the less we fear that different types of transformations would change the information embedded in the original preference relation. Indeed, we already saw that ordinally measurable utility functions could be subject to the largest group of transformations, that is, any increasing transformation, as opposed to absolutely measurable utility function which cannot be subject to any type of transformation whatsoever.

⁹² Although Bernoulli proposed an absolutely measurable utility function and not just a cardinal one, his heritage is associated with this family of utility functions. Daniel Bernoulli (1700-1782, a Swiss mathematician, was a professor of physics and philosophy in Basle, Switzerland) is thought to be the first to suggest a hypothesis about people's utility function. In the early 1710s Nicolas Bernoulli (1687-1759), a professor of law at the University of Basle, Switzerland, submitted five problems to the French mathematician Pierre Remond Montmort (1678-1719). The last of these problems was a coin toss game known as 'the St. Petersburg paradox.' In 1738 Daniel Bernoulli, provoked by his cousin Nicolas Bernoulli's coin toss game, hypothesized that people maximize some concave function of wealth. See Bernoulli at 209. The exact function proposed by Bernoulli was $U(x)=b*\text{LOG}[(a+x)/a]$, where x is the expected income, b is some constant and a is the minimum wealth that an individual derives from it when utility equals zero. As Bernoulli himself admitted, however, Gabriel Cramer (1704-1752, a Swiss mathematician famous for his contribution to linear algebra) had developed a similar solution several years before Bernoulli. The difference being that Cramer had suggested two solutions, one of which was a utility function that is the square root of wealth. *Id.* at 211. Although Bernoulli proposed an absolutely measurable utility function and not just a cardinal one, his heritage is associated with this family of utility functions.

⁹³ JOHN VON NEUMANN & OSCAR MORGENSTERN, *THEORY OF GAMES AND ECONOMIC BEHAVIOR* (1944, 3d ed. 1953). Amazingly, the Expected Utility Theory is just a small part, a means for another end, of Von Neumann & Morgenstern's *Theory of Games*. The Expected Utility Theory is described in merely thirty pages of the 630 pages compiled in the 3rd edition.

⁹⁴ For example, if in the family of von-Neumann-Morgenstern utility functions $U(A)=7$, $U(B)=3$, and $U(C)=1$, then it could be meaningfully said that our individual prefers a lottery where she can get

Both the Bernoulli utility functions and the von-Neumann-Morgenstern utility functions are cardinally measurable because they convey new information on individuals' preferences beyond the ordinal preference ordering. Both families of cardinal utility functions are subject to the same intermediate type of transformation, the affine transformation.⁹⁵ But this fact is coincidental. A key point here is to realize that these two functions convey entirely different information. The Bernoulli family of cardinal utility functions conveys information regarding *relative preference* of bundles in risk free situations. On the other hand, the family of von-Neumann-Morgenstern utility functions conveys information regarding preference for *lotteries* over bundles in risky situations.⁹⁶ To emphasize, the von-Neumann-Morgenstern utility is not measurable in the sense that it is correlated with any significant economic quantity, such as quantity of satisfaction. Rather, the *differences* of utility between outcomes A, B and C are numerically meaningful only for the purpose of describing

bundle A and bundle C with 50% chance each over bundle B for sure ($50\% \cdot (7+1) > 3$). We call this individual risk lover.

⁹⁵ An affine transformation transforms a utility index to another index that is only different in scale and origin. In other words, any point U on the original index corresponds to a point F in the new index so that $F = a \cdot U + b$, where 'a' and 'b' are constants and 'b' is positive. This transformation is sometimes loosely called "linear transformation." Yet, a linear transformation is a special subset of affine transformations in which 'b' is equal to zero. Indeed, a special feature of affine transformations is that it leaves the proportions of utility differences unchanged after the transformation. This property keeps the concavity of the function alive. For example, suppose the affine transformation is of the form $F = 3 \cdot U + 2$, then if $[U_1(X) - U_1(Y)] < [U_1(Y) - U_1(Z)]$, then indeed $F_1(X) - F_1(Y) < F_1(Y) - F_1(Z)$ because $[3 \cdot U_1(X) + 2] - [3 \cdot U_1(Y) + 2] < [3 \cdot U_1(Y) + 2] - [3 \cdot U_1(Z) + 2]$.

⁹⁶ This insight was recognized by many theorists: "Thus, Von Neumann & Morgenstern utility should not be interpreted as measuring strength of preference under certainty, being quite different in this regard from neoclassical cardinal utility." Schoemaker on page 533 cites *Stigler* (1950); "It is *not* the purpose of the Neumann-Morgenstern utility index to set up any sort of measure of introspective pleasure intensity." Baumol, *The Cardinal Utility Which is Ordinal*, ECONOMIC JOURNAL 1958 68, 665; "Even today, the distinction between $V(x)$ (neoclassical utility) and $U(x)$ (Von Neumann & Morgenstern utility) is often unrecognized. Textbooks in economics and management science occasionally discuss the Von Neumann & Morgenstern function as if it only measured intrinsic pleasure under conditions of certainty. For example, a concave $U(x)$ might erroneously be interpreted as implying that equal increments in money (under certainty) contribute to utility at a decreasing rate. Of course, $V(x)$ is confused here with $U(x)$." *Schoemaker* at 535. "The connotation notwithstanding, the (EUT) utility function does not measure the decision maker's well being." EDI KARNI, DECISION MAKING UNDER CERTAINTY, THE CASE OF STATE DEPENDENT PREFERENCES 115 (1985). Savage, when dealing with utility in the domain of risk wrote: "...the now almost obsolete economic notion of utility in riskless situation, a notion still sometimes confused with the one under discussion". SAVAGE, THE FOUNDATION OF STATISTICS sec. 5.6 (2d ed. 1972). "The most enduring interpretational problem of the Von Neumann-Morgenstern theory has been the extent to which it embodies a notion of comparable preference differences either between pairs of outcomes or between pairs of probability distributions on outcomes." *Fishburn* at 133, he adds that: "Bernoulli's...main proposition, the riskless intensity view of outcome utility, has no place in their (Von Neumann & Morgenstern, RA) theory." *Fishburn* at 135. Robbins L, author of: Robbins L, *An Essay on the Nature and Significance of Economic Science* (1937 [1932]) (Hereinafter *Robbins*) was the most influential scholar to deny the existence of measurable Bernoulli utility. Harsanyi is the most prominent scholar to accept it. Harsanyi John, *Cardinal Utility, Individualistic Ethics, and Interpersonal Comparisons of Utility*, JOURNAL OF POLITICAL ECONOMY 1955 63, 309.

preferences in the domain of risk.⁹⁷ For many years the debate as to whether a von Neumann-Morgenstern utility function was a risk free Bernoulli utility function was a “sizzling” controversy. The debate has long been decided and as Camerer summarizes “It’s not a riskless value function.”⁹⁸

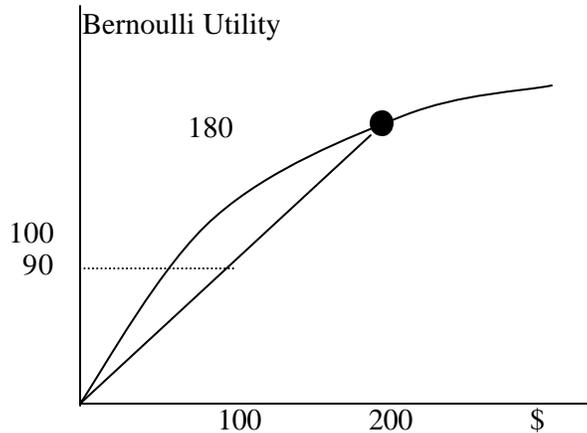
iii. Risk Aversion.

An important consequence of this analysis is that the notion of risk aversion has completely different meaning in these two theories. Nineteenth century economists dealt with risk aversion by *assuming* a concave psychological reaction to wealth, known as the principle of diminishing marginal utility. If individuals’

⁹⁷See *Theory of Games supra* note 90, at 18. Von Neumann & Morgenstern’s contribution was *not* that they developed a reliable technique to measure the Bernoulli utility. As was shown above Von Neumann & Morgenstern’s index represents something different. “Many have interpreted the Von Neumann & Morgenstern experiment as a more precise or practical, though indirect, approach to the results of the Jevonsians Experiment: i.e., basically to the result of the subjective calculation of satisfaction...[I]n general the two operations do not produce even approximately the same results. ...Thus we can state: The Von Neumann & Morgenstern and Jevons-Marshall operations do not measure the ‘same thing’.” *Ellsberg* at 550-551. True, the von-Neumann-Morgenstern utility represents a person’s *ordinal* preferences over the outcomes of riskless situations; yet it is *cardinal* only with respect to people’s preferences over lotteries of the outcomes. Ellsberg summarizes that “[i]t would be “cardinal” (“measurable”) only to the extent that the numerical operation of forming mathematical expectation on the basis of these numbers would be related to observable behavior, so as to be empirically meaningful.” *Ellsberg* at 539. Indeed, Von Neumann & Morgenstern themselves never had any intention, nor do their axioms allow, to apply their Expected Utility Theory to the dimension of certainty, as is noted by Ellsberg. See *Ellsberg* at 556 (Ellsberg indicates that Morgenstern himself told him that.) Ellsberg modestly argues several times over the course of his paper that Von Neumann & Morgenstern exaggerated when describing the scope of the measurability property of their index. See *Ellsberg* at 551-2. Allais, is less forgiving. “In their Theory of Games Von Neumann & Morgenstern asserted that it is possible to determine cardinal utility by the observation of the choices made among random prospects. But this assertion was completely false since it confused two distinct effects, the curvature of cardinal utility and the preference for risk or security.” Allais, *Cardinal utility- History, Empirical findings, and applications, an overview ???*. Perhaps a comparison of the meaning of utility differences between the theories could be helpful. In Pareto ordinal utility theory if $v(A)-v(c) = 2[v(B)-v(C)]$ (assuming $v(A) > v(B) > v(C)$) this does not mean that A is twice as good as C than B is. However, when dealing with Bernoulli’s utility theory, this is precisely what that means. In the context of Von Neumann & Morgenstern’s Expected Utility Theory: $u(A)-u(c) = 2[u(B)-u(C)]$ means that a lottery that gives either A or C, each with probability 0.5, is indifferent to B for sure, but does not mean anything about the intensity of preference for the sure outcomes. See *Kreps* at 77. To see it one should move $u(C)$ to the left side of the equation and get: $\frac{1}{2}[u(A)+u(C)] = u(B)$. Indeed, Luce & Raiffa mention this confusion as one of the fallacies in understanding von-Neumann-Morgenstern utility theory. “**Fallacy 3** Suppose that $A > B > C > D$ and that the utility function has the property that $u(A)-u(B) > u(C)-u(D)$, then the change from B to A is more favorable than the change from D to C.” LUCE & RAIFFA, *GAMES AND DECISIONS* 32 (1957), (hereafter *Luce and Raiffa*); See also, Mass-Collel at 174 for the same conclusion.

⁹⁸ *Handbook* at 619. For an opposite view see Harsanyi, *Essays on ethics, social behavior, and scientific explanation*, (1976) (hereafter *Harsanyi*). Hirshlifer and Riley seem also to agree with Harsanyi. See *Hirshlifer* on pages 12-29. Ken Binmore is another scholar who seems to believe that there is a strong connection between strength of preferences for some outcomes under certainty and individual’s von-Neumann -Morgenstern utility function over lotteries over these outcomes.

Bernoulli utility from dollars is continuously-diminishing, in the sense that the first \$100 provide them with 100 utils whereas the second \$100 only with 80, then people would prefer \$100 for sure to a 50% chance to get \$200 because the latter provides them, on average, only with 90 utils. This type of preference is tantamount to risk aversion.



Observe that the Bernoulli utility curves, from which risk-behavior predictions are implicitly derived, were not established from any observed behavior under risk, and did not depend on any sort of rational consistency in that behavior, but rather are assumptions based on people's psychological reaction to wealth⁹⁹.

In contrast, the von-Neumann-Morgenstern framework views the utility function as a representation of individuals' choices under risk, not a presumption about their psychological satisfaction. Thus, risk aversion is a preference which is not different in principle from a preference between the music of Wagner and Beethoven.¹⁰⁰ It is *represented* in a concave von-Neumann-Morgenstern utility function and not explained by it. Moreover, according to von-Neumann-Morgenstern's framework, risk aversion is derived without necessarily assuming diminishing marginal "bang" from sure consequences.¹⁰¹ Thus, the prevailing

⁹⁹ See KEN BINMORE, *GAME THEORY AND THE SOCIAL CONTRACT* CH. 4 (VOL. I 1994)

⁹⁹ *Ellsberg* at 535.

¹⁰⁰ See Binmore, *supra* note 24, at 269.

¹⁰¹ When explaining risk aversion under von-Neumann-Morgenstern's theory Kenneth Arrow wrote: "The utility assigned are not in any sense to be interpreted as some intrinsic amount of good in the outcome (which is a meaningless concept in any case). Therefore, all the intuitive feelings which led to the assumption of diminishing marginal utility are irrelevant, and we are free to assume that marginal utility is increasing." K. Arrow, *Alternative approaches to the theory of choice in risk taking situations*,

conception that wealthy decision-makers make more risky choices, which is based on the principle of diminishing marginal utility, is not part of von-Neumann-Morgenstern's expected utility theory. It is an extra assumption, which from an empirical perspective is not necessarily true.¹⁰²

iv. Interpersonal comparability

With respect to the other assumption, whether utility is assumed to be comparable amongst all individuals, modern economists have shown that, at least in theory, utility functions could be ordinally measurable and yet *fully* comparable. This means that the analyst believes that it is meaningful to argue that individual 1 is better off in state X than individual 2 in state Y.¹⁰³ In this case, if we want to be able to

ECONOMETRICA 19(4) 404, 425 (1951). Remarkably, when Von Neumann & Morgenstern introduced the Expected Utility Theory, some 20th century economists rejected their framework because by accommodating risk taking behavior it violates the principle of diminishing marginal utility. What these economists failed to realize was that, as mentioned above, this principle was not part of Von-Neumann & Morgenstern's theory at all. See references in Friedman and Savage, *supra* note 85, at 239. Even Friedman and Savage, while mocking others for rejecting Von Neumann & Morgenstern's EUT for this reason, could not capitulate to the principle of diminishing marginal utility, and found a way to combine it together with Von Neumann & Morgenstern's EUT. *Id.* Several years later, Friedman and Savage seem to retract from this approach. See Milton Friedman and L.J. Savage, *The Expected Utility Theory and the Measurability of Utility*, J. POL. ECONOMY 60, 463 (1952). A few years later Savage wrote that: "One thing that should be mentioned before this chapter is closed is that the law of diminishing marginal utility plays no fundamental role in the Von Neumann & Morgenstern theory of utility, viewed either empirically or normatively." Savage, *supra* note 85, at 104.

¹⁰² The intuition for the prevailing conception would be that if the utility curve is concave, then rich people, being on the more moderate right side of the curve face the more linear parts of the curve. Implied then, is a risk neutral attitude. Nicholson summarizes it: "Intuitively, one might assume that the willingness to pay to avoid a given fair bet would decline as wealth increases, since diminishing marginal utility would make potential losses less serious for high wealth individuals. Such an intuitive answer is not necessarily correct, however, because diminishing marginal utility also makes these gains from gambles less attractive. So the net result is intermediate." NICHOLSON, MICROECONOMIC THEORY at 225. As Arrow has shown, based on von-Neumann-Morgenstern expected utility theory people can have increasing, or decreasing, risk aversion with wealth (absolute or relative). For example, IRRA (increasing relative risk aversion) implies that people may be more risk averse to risks that are proportionate to their wealth as their wealth increases. KENNETH ARROW, THE THEORY OF RISK AVERSION (1965) reprinted in ARROW, ESSAYS IN THE THEORY OF RISK BEARING (1971). Arrow's analysis in in state-independent expected utility theory. In state-dependent expected utility theory, which is considered to be the case where pain-and-suffering loss is involved, entails a much more complicated analysis of risk aversion than that of state-independent expected utility theory. See Karni, *supra* note 95.

¹⁰³ That is, that $U_1(X) > U_2(Y)$. Usually it is referred to as interpersonal comparability of utility levels. See for example John Harsanyi, *Interpersonal utility Comparisons*, in THE NEW PALGRAVE DICTIONARY OF ECONOMIC 955, 956 (Vol. 2 1988). Kenneth Arrow eventually admitted that such comparisons are not entirely meaningless in Kenneth J. Arrow, *Extended Sympathy and the Possibility of Social Choice*, 67 AM. ECON. REV. 1977 at 219. The idea is that one can put herself in someone else's shoes in order to see things from her point of view. In this way interpersonal comparisons are reduced to less problematic intrapersonal ones by appealing to one's own preference as to possible states of herself. See also, Binmore, *supra* note 24, at 285-296. Nevertheless, economists and philosophers remain skeptic about this possibility, at least when dealing with preference-based theories

continue comparing different individuals' utilities even after we make transformations, we must transform everyone's utility function by the same transformation.

Modern economists have also shown that utility functions can be cardinally measurable and *unit* comparable. This could mean, for example, that utility differences between states are meaningful *and* comparable amongst all individuals, but that absolute levels of utility for individuals can never be ascertained.¹⁰⁴ Here only increasing affine transformations are allowed for all individuals.¹⁰⁵

For our purposes, it is important to note that it is conventionally accepted in economic theory of individual choice under risks to consider the normative framework as consisting of the family of von-Neumann-Morgenstern utility functions, in which utility functions are *cardinally measurable* and *interpersonal non-comparable*.¹⁰⁶ Starting with the latter, most economists and many philosophers reject interpersonal comparability.¹⁰⁷ Following Robbins, economists concluded that Adam could not compare Eve's pleasure with his own because he knows only his own mind

of well being. For economists, see for example, Richard Craswell, *Incommensurability, Welfare Economics, and the Law*, 146 U. PA. L. REV. 1419, 1448 (1998). For philosophers see, for example, HOUSMAN & MCPHERSON, *ECONOMIC ANALYSIS AND MORAL PHILOSOPHY*, 86 (Cambridge University Press, 1996).

¹⁰⁴ For example, $U_1(X)-U_1(Y) > U_2(X)-U_2(Y)$ meaningfully asserts that individual 1 is in a better position than individual 2 when both parties move from state Y to state X. Usually it is referred to as interpersonal comparability of utility differences. *Id.*

¹⁰⁵ More generally, a pure ordinalist is free to reject all types of interpersonal comparisons or, alternatively, to admit comparability of utility levels (but not of utility differences). A cardinalist is also free to reject all types of interpersonal comparisons, or to admit both. He cannot, however, admit comparability of utility levels while rejecting comparability of utility differences. *Id.* at 957; *See also*, John Weymark, *A Reconsideration of the Harsanyi-Sen Debate on Utilitarianism*, in *INTERPERSONAL COMPARISONS OF WELL BEING* 255, 300-303 (Elster & Roemer eds., 1991).

¹⁰⁶ As Roemer explains, von-Neumann-Morgenstern utility function provides no information about intensity of preferences. If we have a population of individuals, each of whom has some preference ordering over lotteries and "we are given no meaningful way of making interpersonal comparisons- if the conception of utility does not include a way of comparing welfare levels interpersonally, there is no way we can deduce such interpersonal comparability by mathematical manipulation. The information is simply not there to be had." Roemer, *supra* note 78, at 142.

¹⁰⁷ See for example: "most economists think interpersonal welfare comparisons are nonsense." Robert A. Pollak, *Welfare Comparisons and Situation Comparisons*, 50 J. ECONOMETRICS, 1991, at 31; Daniel Hausman, *The Impossibility of Interpersonal Utility Comparisons*, 104 MIND 473, 475 (1995) ("Most economists believe that interpersonal comparisons of utility are untestable, evaluative or even meaningless"); JACK HIRSHLIFER, *PRICE THEORY AND APPLICATIONS* 59 (1976) ("Economists today generally believe that summation of the utilities of different people is meaningless . . ."); RICHARD POSNER, *ECONOMICS OF JUSTICE* 79 (1983) ("The 'interpersonal comparison of utilities' is anathema to the modern economist, and rightly so, because there is no metric for making such a comparison."). For philosophers, see Joseph Raz, *THE MORALITY OF FREEDOM* 328 (1986); but see Amartya Sen, *Interpersonal Comparisons of Welfare*, in *CHOICE, WELFARE AND MEASUREMENT* 264 (1982) and John C. Harsanyi, *Cardinal Welfare, Individualistic Ethics, and Interpersonal Comparisons of Utility*, 63 J. POL. ECON. 309, 319-21 (1955) for the opposite view. Although Robbins is traditionally

and not that of Eve.¹⁰⁸ One cannot compare the utility rich Adam derives from figs to that which poor Eve derives from figs by simply counting their daily consumption of figs. Adam may consume more simply because he is richer, yet Eve may still derive more utility from each fig. Moreover, if Adam cares only for apples then, even if the market is legitimized, the rate at which apples and figs are exchanged tell us little about the utility Adam and Eve derive from their consumption. This is because markets reflect the exchange-value, not the use-value. That is, markets are driven by the relative scarcity of the goods traded.¹⁰⁹

Even more important, in this context however, is the exact way in which von-Neumann utility functions are assumed to be cardinally measurable: they convey information about individuals' choices under risk. Yet, Steven Shavell interpreted the von-Neumann-Morgenstern family of utility functions as conveying information regarding relative differences in utility between different states of the world, *in addition* to conveying information about preference ordering under risk. That is, he assumed that all utility functions belonging to the family of von-Neumann-Morgenstern utility functions also belong to the family of Bernoulli utility functions. The result is that Shavell essentially assumed interpersonal comparability of both the von-Neumann-Morgenstern *and* the Bernoulli utility functions.

2. Shavell's deviations from the conventional normative framework.

a. Bernoulli vs. von-Neumann-Morgenstern utility functions.

The easiest way to show that Shavell made the implicit assumption that individuals' utility functions are cardinally measurable in the Bernoullian sense is to examine how his analysis would work without such an assumption.

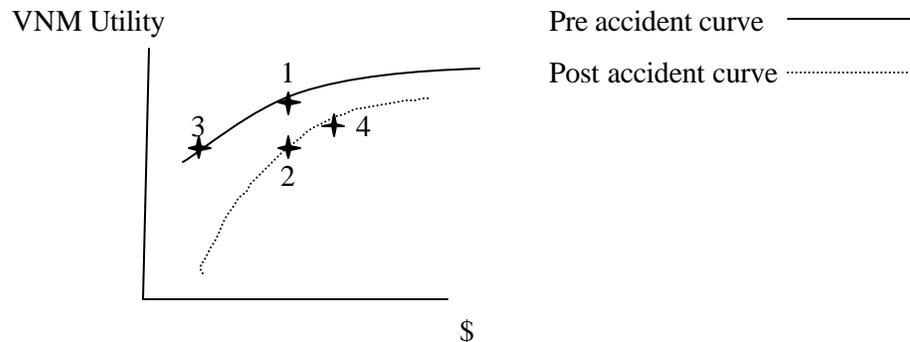
associated with the interpersonal critique, the problem was recognized as early as 1892. See Arthur T. Hadley, *The Theory of Dynamic Economics*, 7 POL. SCI. Q. 562, 562 (1892) (book review).

¹⁰⁸ Inspired by the philosophy of Carl Popper, Robbins, a positivist, believed that economics was entitled to call itself a science only if it could separate fact from value. Falsifiability was the criterion for characterizing a proposition as scientific. What could not be falsified, such as the proposition that Adam obtains more utility than Eve from an additional fig was simply not part of economic science.

¹⁰⁹ Binmore, *supra* note 24, at 283-5.

Following Kenneth Arrow, Shavell applied a state-dependent framework.¹¹⁰ According to this framework, individuals' von-Neumann-Morgenstern utility functions change when their health changes. The reason is simple: in the pre-accident state of the world, the individuals' preferences are represented by some type of von-Neumann-Morgenstern utility function, but then once they are injured, their preferences change and are then represented by a completely different von-Neumann-Morgenstern utility function. (By completely different, I mean one that is not an affine transformation of the original utility function.) It is then assumed that the individual would purchase insurance coverage *as if* maximizing her expected utility over both states of the world, both pre-accident and the post-accident. Put differently, an individual's total utility is assumed to be a weighted sum of two components: her utility in the pre-accident state of the world and her utility in her post-accident state of the world.¹¹¹ The individual is assumed to act *as if* she maximizes the weighted average of these two components. This means that she would purchase insurance in a way that equates her marginal von-Neumann-Morgenstern utility over both states of the world. This is because maximizing utility always means equating the margins of all its components.

What does the fact that our individual equates her marginal von-Neumann-Morgenstern utility over both states of the world imply? If the post accident von-Neumann-Morgenstern utility function is locally steeper than the original utility function, then the individual will purchase insurance; if the post-accident von-Neumann-Morgenstern utility function is more moderate, she will not. The next graph demonstrates this point.



¹¹⁰ Kenneth Arrow, *Optimal Insurance and Generalized Deductibles*, SCANDINAVIAN ACTUARIAL JOURNAL 1-42 (1974).

The graph represents an accident with no monetary loss at all. As a result of the accident, the individual's utility is lower; she has moved from point 1 to point 2. Before the accident occurred, the individual contemplated whether to purchase insurance against such a loss. Purchasing coverage is represented by a move left along the pre-accident utility function from point 1. In this specific example, the individual's post-accident utility function is assumed to be steeper. Anticipating a steeper post accident utility function, the individual would move left (purchase more coverage) up to the point where the pre-accident marginal utility is equal to the post-accident marginal utility; this happens at point 3. At point 3, the individual's marginal utility (represented by the slope of the pre-accident curve) is equal to the marginal utility at point 4 (represented by the slope of the post accident curve). This is the point at which an individual's total von-Neumann-Morgenstern utility is maximized.¹¹²

So far the analysis does not deviate from conventional thought in economic theory and is in reality a state -dependent extension of the von-Newman-Morgenstern expected utility theory and not of the Bernoulli theory. The problem is not in the mathematical result, which states that rational individuals will purchase insurance only if their post accident von-Newman-Morgenstern utility function is steeper than their original utility function. Rather, the problem is found in the economic interpretation Sha vell gives to this result.

Shavell argued that the individual's "bang" from the next dollar has increased but under a pure von-Neumann-Morgenstern framework it *cannot* be said that a steeper post accident utility function means that the individual's demand for money has increased.¹¹³ In order to make such an assumption one must first assume, contrary to conventional thought amongst economic theorists, that the individual's utility function not only belongs to the von-Neumann-Morgenstern family of utility

¹¹¹ This assumption (that utility is additively separable across different states of the world) will not be disputed in this paper, although it is not self-evident that it holds true.

¹¹² Had the individual purchased more coverage (and thus moved even further left than point 3) she would not have maximized her total utility because she would have lost more units in her pre-accident state than she would have gained in her post-accident state.

¹¹³ If at all, it could only be said that the individual in the post-accident state of the world is more risk averse. Risk aversion is defined, by the Arrow-Pratt index, as the negative of the ratio of the first derivative to the second derivative. Roughly speaking, it represents the degree of concavity (or steepness) of the utility function. But even under this interpretation it is not clear why anticipating to be more risk averse in the future leads one to purchase more coverage today. Furthermore, the relevant theoretical framework to analyze this problem is that of state-dependent expected utility theory. As Karni showed, the analysis completely changes once shifted from state-independent to state-dependent expected utility theory. EDI KARNI, *DECISION MAKING UNDER CERTAINTY, THE CASE OF STATE*

functions,¹¹⁴ but also, at the same time, belongs to the Bernoulli family as well. Only if the utility function is Bernoullian can one meaningfully conclude an increase in post accident “bang” from the next dollar. By making this assumption, Shavell has stripped his results from carrying the normative weight associated with von-Neumann-Morgenstern’s expected utility theory.¹¹⁵

b. Interpersonal comparability revisited.

A key feature of state-dependent utility theory is that the pre-accident and post-accident utility functions are different. Different utility functions, however, mean that the preferences of the individual have dramatically changed. In that case, the individual’s problem in allocating resources between both states of the world is equivalent to the policy maker’s problem (in the welfare economics literature) in allocating resources between two different individuals. In both cases resources are divided between two entities that have different preferences. Just as one cannot meaningfully maximize a utilitarian social welfare function (with heterogeneity of individuals) without assuming interpersonal comparability, it would be illegitimate to meaningfully maximize a state-dependent utility function without assuming something tantamount to interpersonal comparability. This is a controversial assumption that economists try to avoid, at least in individual’s preference-based decision theories. It is especially bothering in the pain-and-suffering context, because the economic analysis assumes that individuals spend their money on insurance premiums to accurately equate their state-dependent marginal utility of income in the pre- and the post-accident states of the world. Even those who believe that some

DEPENDENT PREFERENCES (1985); See especially pages 52-58 for state-dependent health insurance. Karni is careful not to confuse von-Neumann-Morgenstern utility theory with the Bernoulli theory.

¹¹⁴ This assumption is necessary because otherwise it is legitimate to assume that the individual maximizes the weighted average of the pre-accident utility and the post accident utility.

¹¹⁵ Ole Hagen described six logically possible positions on the relationship between Bernoulli utility theory and von-Neumann-Morgenstern’s utility theory. Shavell’s approach matches that in which “One could accept the existence of both of a cardinal utility in the classical sense (operating in riskless contexts) and the von-Neumann-Morgenstern utility index as describing actual behavior. This would imply either that they were identical or that they were independent or that the effects operating besides utility in the classical sense transformed this into a new function having the von-Neumann-Morgenstern characteristics.” In contrast, the approach most economists take is that “One could deny the existence of classical cardinal utility and accept the existence and descriptive power of a von-Neumann-Morgenstern utility index.” Ole Hagen, *Introductory Survey in EXPECTED UTILITY THEORY AND THE ALLAIS PARADOX* 13, 18 (1979).

‘rough’ interpersonal comparability is non meaningful, will be unlikely to extend it to the type of comparability assumed in the pain-and-suffering context.¹¹⁶

As von-Neumann and Morgenstern themselves admitted: they “have not obtained any basis for a comparison, quantitatively or qualitatively, of the utilities of different individuals.”¹¹⁷ More importantly, the problem of interpersonal comparability is even stronger here because Shavell assumes that individuals’ utility belong not only to the family of von-Neumann-Morgenstern utility functions but also to the family of Bernoulli utility functions. He assumes that it is meaningful to simultaneously compare people’s preferences over lotteries in risky situations *and* their relative preferences over bundles in risk free situations.¹¹⁸

¹¹⁶ While it may be sensible to believe that *global* interpersonal comparability is feasible, it is probably even more sensible to believe that *local* interpersonal comparability is not. Matthew Adler, who made the distinction between global and local comparability, may be correct to argue that “[i]t is a platitude about welfare that sometimes we can compare *small* losses or gains to one person with *large* gains or losses to another, and conclude that overall welfare has improved or decreased even though the welfare-changing move is not a true Pareto-improvement or the opposite.” [Emphasis added]. Matthew Adler, *Incommensurability and Cost-Benefit Analysis*, 146 U. OF PA. L. REV. 1371, 1403 (1998). But as he himself admits, the platitude about global interpersonal comparability ‘is a platitude that “large enough” welfare changes for one person will outweigh “trivial” changes in the opposite direction for that person or another, not that any welfare change for one person is comparable with any welfare change in the opposite direction for that person or another.’ *Id.* at 1404. But when the individual contemplates about the *optimal* allocation of resources between the pre-accident self and the post-accident self, the individual must face the problem of *local* incomparability, which even Adler, who otherwise believes that interpersonal comparability is not meaningless, admits seems impossible. Thus, the fact that “[i]n everyday life we make, or at least attempt to make, interpersonal utility comparisons all the time,” as John Harsanyi argued, by itself, is not relevant to my claim here. John C. Harsanyi, *Morality and the Theory of Rational Behavior*, in UTILITARIANISM AND BEYOND 39, 49 (Amartya Sen & Bernard Williams eds., 1982); and see also John Harsanyi, *Cardinal utility in Welfare Economics and in the Theory of Risk Taking* (1955) reprinted in HARSANYI, *ESSAYS ON ETHICS, SOCIAL BEHAVIOR, AND SCIENTIFIC EXPLANATION* 3 (1976). As Housman put it, “[p]eople do, of course, make interpersonal comparisons of how well off people are and of how much worse or better off they might become. But these facts are no embarrassment to the strong negative conclusions just defended [that interpersonal comparability is unfeasible in ordinal preference-based theory of welfare, RA], since there is little reasons to believe that interpersonal comparisons people make are interpersonal comparisons of preference satisfaction. The fact that even the most distinguished economists and philosophers have had so much trouble holding consistently to the view that well being is the satisfaction of preference is evidence for this claim.” Housman, *supra* note 107, at 479. To be fair, Housman talks about interpersonal comparisons of *ordinal* utility, yet he holds the same view with any non-bounded cardinal utility. *Id.* at 485.

¹¹⁷ *Theory of Games*, *supra* note 90, at section 3.3.4.

¹¹⁸ For example, under this magnified type of interpersonal comparability problem, when $[U_1(X)+U_1(Y)]/2 > [U_2(X)+U_2(Y)]/2$ it means a) that individual 1 is better off with a 50:50 mix of bundles X and bundle Y than individual 2 with the same mix, *and* b) individual 1 is better off with a lottery of getting either bundle X or bundle Y with 50%, than individual 2 with the same lottery. Roemer distinguishes between expected utility and average utility. A von-Neumann-Morgenstern utility function is a representation of ordinal preferences over lotteries, and “averages of a function representing ordinal preferences have no interpretation in terms of average of some underlying quantity associated with those state.” Roemer, *supra* note 78. Interestingly, Robbin acknowledged the principle of diminishing marginal utility (in the sense of the value of the “bang” from the next dollar) but only as relating to individuals. To extend it to different individuals (as those who promoted the progressive

To summarize, Shavell assumes that people's utilities are cardinal (in both Bernoulli and von-Neumann-Morgenstern sense) and interpersonally comparable (in both senses). These assumptions have never been made in individual choice theory.

3. Response to Objections.

There are several possible objections to the above line of argumentation and especially to the claim that Shavell has deviated from conventional economic theory of individual's choice. The following sections will describe these objections and then respond to them.

- a. Von-Neumann and Morgenstern wrote a set of axioms which formalize Bernoulli's theory; particularly that risk aversion is equivalent to diminishing marginal utility.

This claim, that the von-Neumann-Morgenstern theory and the Bernoulli theory are equivalent is simply wrong. The two theories of utility do coincide in three important ways. First, they both use the term "utility." Just as Bernoulli defined utility's meaning, so did Von Neumann and Morgenstern. Bernoulli defined utility numerically, as the logarithm of one's monetary possessions that is independent of any consideration of probability of risk,¹¹⁹ whereas von-Neumann-Morgenstern defined utility as being that "thing" for which the calculation of mathematical expectation is legitimate.¹²⁰ As was explained above, utility has a completely different meaning in each theory.¹²¹ As economic theorists agree, "[t]he confusion with respect to utility measurability is partly due to the use of the same term 'utility'

taxation did), or to different "selves," "begs the great metaphysical question of the scientific comparability of different individual experiences." Robbins, *supra* note 95, at 137.

¹¹⁹ At least that's how von-Neumann-Morgenstern understood it. See *Theory of Games*, *supra* note 90, at 28.

¹²⁰ *Theory of Games*, *supra* note 90, at 28. Von Neumann & Morgenstern never argued that the individual makes her choice by a similar calculation but simply the implications of her behavior are examined as though she behaved in this manner. This view is later reflected in Milton Friedman's famous billiard player. Friedman claims that an expert billiard player makes his shots *as if* he knew the complicated mathematical formulas that would give the optimum directions of travel, could estimate by eye the angles, make lightning calculations from the formulas, and make the ball travel in that direction. This example was presented at least in two different papers. See *Utility Analysis* on page 260 and see also M. Friedman, *The Methodology of Positive Economics*, in *ESSAYS IN POSITIVE ECONOMICS* (Chicago 1953), reprinted in short in A. KATZ, *FOUNDATIONS OF THE ECONOMIC APPROACH TO THE LAW* 32 (1998).

¹²¹ "Note that utility, in the Von Neumann & Morgenstern context, is used to represent preferences whereas in neoclassical theory it *determines* (or precedes) preference." Schoemaker at 532.

both as a measure of subjective satisfaction and as an indicator of objective choice or preference.”¹²² In fact, as Savage has argued “[t]he confusion arises only because Von Newmann & Morgenstern use the already preempted word ‘utility’ for what I [Savage, RA] here call ‘Von Newmann & Morgenstern utility.’”¹²³

Second, Von-Newmann and Morgenstern have indeed formalized the fact (which was known even before Bernoulli) that a gamble, which includes several probabilistic payoffs, could be reduced to, or represented by, a single number, which is the weighted average of those probabilistic payoffs. Indeed, Bernoulli and his followers (such as the French mathematician Laplace) fixed the idea that a rational individual chooses the action with the highest mathematical expectation as the basic decision rule when dealing with risky prospects.¹²⁴ Yet, before von-Newmann and Morgenstern *formalized* this in an axiomatic manner, there was no normative reason to think, for example, that one should not multiply the payoffs rather than take their mathematical expectations. As Ellsberg summarizes, before von-Newmann-Morgenstern there was a “feeling that the emphasis on mathematical expectation was arbitrary and unrealistic.”¹²⁵

Third, they both used a concave utility function when dealing with risk aversion. They did this, however in entirely different ways. The Bernoulli theory *explained* risk aversion through the use of a concave utility function, whereas the von-Newmann-Morgenstern theory used concave utility function to *represent* risk aversion. There are several major implications that follow from this difference. First, under von-Newmann-Morgenstern’s framework one cannot know what causes people to behave in a risk averse manner. Based on this framework, there is no necessary dependence linking one’s receiving of a diminishing bang from their next dollar to

¹²² YEW KWANG NG, WELFARE ECONOMICS 13 (1979).

¹²³ Savage, *supra* note 85, at 98. See also Fishburn who argues that “Utility is one of the strangest words in the annals of economics and decision theory,” Fishburn, *Retrospective on the utility theory of Von Newmann & Morgenstern*, JOURNAL OF RISK AND UNCERTAINTY, 2, 127 (1989). (Hereafter *Fishburn*) and that “[n]ot a little confusion was shown when Von Newmann & Morgenstern endowed *utility* with an entirely new meaning.” Fishburn *id.* at 128. In fact Bernoulli himself did not use the term utility but “moral expectations.”

¹²⁴ Historically, it was this contribution – the notion of choosing the action that has the maximum mathematical expectation – alone, and not the notion of concave cardinal utility function of riskless wealth (as a cognitive operation over sure consequences) that served as the birthplace for Von Newmann & Morgenstern’s Expected Utility Theory.

¹²⁵ *Ellsberg* at 537. Savage wrote: “Bernoulli gives no reason for supporting that preferences correspond to the expected value of some function...Why should not the range, the variance and the skewness...of the distribution of some function join with the expected value in determining preference?” Savage, *supra* note 85, at 97.

behaving in a risk averse manner.¹²⁶ Second, under Bernoulli's framework, a person who performs risk-taking behavior is considered to be irrational, because he does not maximize his concave utility function.¹²⁷ In contrast, under von-Neumann-

¹²⁶ See *supra* citations by Savage in fn 96 and by Arrow in fn 100. As Roemer wrote "it is not hard to imagine persons...(who)..get decreasing marginal satisfaction from each unit of incremental consumption, but ..(who)..enjoy gambling....The opposite situation can also be imagined, of people who do not enjoy the uncertainty of lotteries...but they have increasing marginal satisfaction in income...." Roemer, *supra* note 78, at 151. Note, that under the old conception of utility this is not imaginable. Thus, under von-Neumann-Morgenstern's framework risk aversion behavior could be a result of a) people indeed having a diminishing bang from the next dollar, b) people misperceive low probabilities in a way that causes them to be risk averse, c) people hate to be in an uncertain situation per se, or any combination of these reasons. Indeed, risk aversion is not only an exogenous assumption in the von-Neumann-Morgenstern framework but it is also not necessarily an assumption that should be associated solely with curvature of the utility curve. Rather, risk aversion could well be consistent with some intrinsic perception of probabilities. Since the expected utility is the sum of outcomes multiplied by their probabilities, there is no reason to pick one component of the product and not the other. Just as outcomes could be distorted when perceived in our minds, so could probabilities. Distortions in perception, whether of outcomes or probabilities, could have been (hard wired) in our brains through evolution. In other words, assuming the independence axiom holds, risk preferences may well be consistent with different explanations other than just diminishing appreciation of money. Indeed, a unified approach was originally suggested by Karl Menger in the 1920s. Menger suggested compounding the intuitions about the distortions of both the payoffs and the probabilities. People not only undervalue large returns (diminishing marginal utility) but also undervalue small and high probabilities (those that are close to 1). In fact, people treat very small probability as impossible. Only medium probabilities are valued in a way that corresponds to the mathematical expectation. Menger, *The role of uncertainty in Economics*, (printed in 1934) reprinted in *ESSAYS IN MATHEMATICAL ECONOMICS, IN THE HONOR OF OSCAR MORGENSTERN* 211, 212-3 (Shubik ed., 1967). Interestingly Menger's work was most influential upon two different schools of thought. First, to Von Neumann & Morgenstern who admitted that they were inspired by his work. ("we were greatly stimulated by the splendid paper on the St. Petersburg paradox by Karl Menger.") Oscar Morgenstern, *Some reflections on utility*, in *EXPECTED UTILITY THEORY AND THE ALLAIS PARADOX* 175, 181 (1979). Second, to Kahneman and Tversky who in constructing the *Prospect Theory* formalized the non-linearity of the probabilities.

¹²⁷ Indeed, Marshall and other 19th century economists, who believed that the principle of diminishing marginal utility was indisputable, disputed risk-seeking individuals' *rationality*, or morality. *Ellsberg* at 536. The problem of morality arises due to the solution economists supplied to solve the discrepancy between the theory and their observation of actual risk seeking behavior in the real world. This was to assume that people derive utility from the activity of gambling itself, even when they lose. This was considered immoral. "[I]t may be remarked that when we say [fair, RA] gaming is a sure way to lose utility [in the long run, RA], we take no account of the utility – that is, the pleasure attaching to pursuit of gaming itself; we only regard the commercial loss or gain. If a person with a certain income prefers to run the risk of losing a certain portion of it at play...it must no doubt be conceded that the political economist, as such, can make no conclusive objection." Jevons, *supra* note 77, at 173-4. For a more comprehensive proof that neoclassical economists indeed solve the discrepancy in this way see Schlee, *Marshall, Jevons, and the Development of the Expected Utility hypothesis*, *HISTORY OF POLITICAL ECONOMY* 24(3) at 740-1 (1992) (Hereafter *Schlee*). Certainly, the enjoyment of gambling for its own sake is not part of von-Neumann-Morgenstern's framework because in their framework a person has no preference between a simple lottery and a compound lottery, provided they have the same probabilistic payoffs. Interestingly, some scholars have rejected the Bernoulli utility theory altogether because of its impossibility to represent rational risk taking behavior. Perhaps the most famous economist that raised this objection is Sir John Hicks, who admitted that Bernoulli theory was "certainly more satisfactory than the crude view which bases everything on the money expectation," thought that the existence of gambling at unfair odds implied that "it is improbable that it contains the whole truth"; specifically "when the scheme [probability distribution] includes a small chance of a very large gain, 'rational conduct' (based on the law of diminishing marginal utility) would estimate the value of this chance as very small indeed. Practice, however, does just the reverse." *The Theory of*

Morgenstern's framework risk behavior is an external assumption about people's preferences and has nothing to do with their rationality. The only qualification of rational behavior based on von-Neumann-Morgenstern's expected utility theory is that people act in a consistent way. One who does so is considered to have acted *as if* they chose the highest mathematical expectation of gambles.¹²⁸

b. Shavell's illegitimate interpretation of Bernoulli's theory nevertheless contains a strong intuitive appeal and does not detract from the legitimate results he derived.

According to this objection, Shavell's intuitive interpretation can help spread his results among legal scholars who cannot follow his mathematical derivations. The objection states that even if Shavell's interpretation of his mathematical result is illegitimate, one can ignore this interpretation and focus solely on his correct results.¹²⁹

Shavell's interpretation indeed helped spreading his mathematical results. In fact, one might argue that these results have become too widespread. The problem occurs because legal scholars have focused solely on the interpretation and not on the mathematical results. This interpretation has no normative grounds, however because it relies on assumptions that most economists do not make, especially not when dealing with an individual's decision theory. Cardinality of the differences in the "bang" people receive from their wealth, and interpersonal comparability between

Uncertainty and Profit, *ECONOMETRICA* 11 May 170, 181 (1931). For other economists that took this route see *Schlee*, at 740-1.

¹²⁸ "Bernoulli's theory is mostly a descriptive model, even though the expectation principle at the time may have enjoyed much face validity normatively," *Schoemaker* at 531. Fascinating enough, Bernoulli never proved his hypothesis that the utility is a logarithm function of wealth, nor did he address the issue of how to measure utility, or explain why the mathematical expectation as the reduction-mechanism for a gamble would be rational. Bernoulli simply showed that modifying the then conventional wisdom would better explain people's actual behavior; today he would have been classified as a behavioral economist.

¹²⁹ Indeed, it seems that Shavell recognized that his interpretation was problematic. In the second footnote in Chapter One, Shavell tells us that the convention in economic theory is that "utilities are to be understood as numbers selected by the analyst to represent a party's underlying preferences" and that given this definition of utility, "parties make choices *as if* they were bent on maximizing some numerical magnitude, but *not* because they are in fact doing that." He further explains, that to argue that this party maximize their utility "is a statement only about an analyst's construct." In Chapter Eight Shavell argues that risk aversion is equivalent to diminishing marginal utility, but in a footnote he tells us that this interpretation is made "because it seems to have strong intuitive appeal to readers who think of utility as objective and measurable." But then he says that those "readers who have studied the axiomatic foundations of expected-utility theory will consider such interpretations problematic, however, because for them the utility-of-wealth function is wholly notional; it is constructed by the analyst to reflect preferences over uncertain prospects."

both von-Newmann-Morgenstern and Bernoulli functions, are two, perhaps three, additional assumptions that Shavell has never justified. In fact, most economists doubt that they could be justified, again, at least not in the case of an individual's decision theory.¹³⁰

As was shown above Allan Schwartz, George Priest and Robert Cooter have advocated eliminating pain-and-suffering damages in tort law entirely, or significantly limiting it. This position was presumably based on mainstream normative theory, that of von-Newmann-Morgenstern's expected utility theory. The problem is that in reality the basis for advocacy of elimination of pain and suffering damages was actually the Bernoulli theory, one which lacks any such normative grounds.¹³¹

More importantly, the Bernoullian interpretation has consequences for scholars who do empirical work. Recall that according to the legitimate interpretation people would buy insurance coverage only if their post-accident von-Newmann-Morgenstern marginal utility was steeper than that of their pre-accident marginal utility. This, however, does not necessarily have anything to do with whether they have a steeper post-accident Bernoulli marginal utility than their pre-accident one. Unfortunately, at least one scholar has attempted to explore the 'wrong' post-accident marginal utility in order to gain insights about pain-and-suffering damages in tort law.¹³²

C. Conclusion

This part surveyed the major paradigms in the law and economics literature regarding the desirability of pain-and-suffering coverage. My approach sides with Shavell (and other scholars, such as W. Kip Viscusi) who argue that an individual's demand for pain-and-suffering coverage is an empirical issue that cannot be determined *a priori*. But even then, an important insight here is to realize that the Shavellian-like argument that people would only arrange for coverage against non-pecuniary losses if such losses would result in a higher evaluation of money by them is problematic on pure normative grounds because it deviates from the widely

¹³⁰ In fact, it is considered by Sen and others to be simply a fallacy. See John Weymark, *A Reconsideration of the Harsanyi-Sen Debate on Utilitarianism*, in INTERPERSONAL COMPARISONS OF WELL BEING 255 (Elster and Roemer eds., 1991).

¹³¹ See for example Allan Schwartz's approach.

¹³² See the discussion below of the work of W. Kip Viscusi.

accepted Von Neumann-Morgenstern expected utility paradigm. Furthermore it misled other scholars, such as George Priest, Allan Schwarz, and Robert Cooter, to essentially adopt the functional approach, which as was argued above, encourages individuals to develop extravagant lifestyles, and to inflate subjective damages, which cannot be verified by the courts.¹³³

As I find this approach unsatisfactory, the remaining issue, therefore, is the best way to explore whether there is indeed a demand for pain and suffering damages.

¹³³ See *supra* text around note 64.

II. THE CONTEMPORARY EMPIRICAL & EXPERIMENTAL FRAMEWORKS FOR DEALING WITH THE DEMAND FOR PAIN-AND-SUFFERING

A. *The approach taken by Patricia Danzon*

Patricia M. Danzon's point of departure is that "for a serious injury that affects the utility of wealth, optimal compensation could be more or less than the monetary loss" depending on whether the injury increases or decreases the marginal utility of wealth.¹³⁴ Danzon further searches for empirical evidence concerning the demand for first-party insurance. Danzon analyzes the data and concludes, "The tort norm of full coverage of all pecuniary loss plus pain and suffering far exceeds the coverage people are prepared to pay for, given the choice."¹³⁵ In other words, she seems to claim that people perceive injuries in general to decrease their ex-post marginal utility of wealth.

In general, collecting evidence from the market is problematic. The market for non-pecuniary loss insurance is somewhat thin because of "supply-side" rather than "demand-side" market failure. For example, consider the problem of asymmetric information, which can cause both ex-ante and ex-post moral hazard problems. Pain-and-suffering is subjective in nature, and thus difficult to observe and verify. This is what makes it non-contractible.¹³⁶ Asymmetric information also leads to adverse selection. Individuals who know that they are at higher risk to suffer non-pecuniary losses would find insurance for such losses a relatively good deal. This notion would force premiums upward, as such high-risk individuals may adversely reflect upon insurance pools. This sort of adverse selection can cause voluntary insurance markets to fail. Unfortunately, non-pecuniary adverse selection would be harder for insurers to combat through risk-classification than other types of adverse-selection. This is precisely because non-pecuniary losses are subjective and so difficult (perhaps impossible) to observe ex-ante.

¹³⁴ Patricia M. Danzon, *Tort Reform and the Role of Government in Private Insurance Markets*, 13 J.L.S 517- 521 (1984) (Hereinafter: *Tort Reform*). As for the optimal damages for deterrence purposes, Danzon believes it is the value of the injury implied by the victim's willingness to pay for prevention, provided that she has optimal insurance. But this is backwards. The optimal damages, for insurance purposes, should be determined by the victim's willingness to pay for insurance, assuming optimal prevention.

¹³⁵ *Id.* at 524.

¹³⁶ One way to overcome the impediments caused by the ex-post moral hazard problem is to market insurance coverage with scheduled coverage amounts. In a recent working paper I discuss the advantages and disadvantages of schedules. Ronen Avraham, *Putting a Price on Pain-and-Suffering Damages: A Critique of the Current Approaches and a Proposal for a Change* (on file with the author).

Danzon responds by arguing that the tort system of damage recovery has no advantage over private insurance in combating adverse selection and moral hazard and therefore whatever the market cannot handle, courts cannot either. Danzon further argues that the administrative load on liability insurance policies (which is relevant when a tort system is in place) is higher than on first-party insurance, another reason to not preferring the tort system.¹³⁷ All of this has proved to be incorrect.

With respect to Danzon's first argument, Croley and Hanson have shown that the tort system is better in combating both adverse selection and moral hazard. First, lawyers' fees serve as an analogue to the first party insurance market's copayment by preventing plaintiffs from counting on full recovery. Second, bearing the burden of proof on the question of causation suppresses plaintiffs' incentives to take excessive risk because it makes more difficult the demonstration that the defendant, rather than the plaintiff, caused the harm in question. Other suppressors include different defenses, such as assumption of risk, contributory negligence and comparative negligence, which might eliminate, and more likely reduce, the amount of compensation that risk-taking plaintiffs will receive in damages, whereas first-party insurers typically do not discount insureds' benefits according to any comparative fault rule. Third, the court has different procedural filters to examine the relevance, probative worth, and prejudicial effect of the plaintiff's evidence so that juries evaluate only evidence that survived these filters. Forth, the fact that tort-provided insurance is mandatory renders adverse selection problems less significant in the tort context. Fifth, manufacturers seem to be able to better segregate consumer-insureds than private insurers can.¹³⁸

With respect to Danzon's second argument, the reason why the administrative load on third-party insurance is higher than on first-party insurance is most probably due to the pain-and-suffering loss component. This results in expensive litigation.¹³⁹ However, this fact should serve first as a motive to simplify the compensation system (as will be discussed below), rather than abolishing indemnification coverage for pain-and-suffering damages.¹⁴⁰

¹³⁷ *Id.* at 524-526.

¹³⁸ Croley & Hanson, *supra* note 7, at 1903.

¹³⁹ Mark Geistfeld, *Implementing Enterprise Liability: A Comment on Henderson and Twerski*, 67 N.Y.U. L. REV. at 639-642 (1992).

¹⁴⁰ Danzon could also be criticized for ignoring consumers' risk misperceptions. Danzon's response is that there is no evidence for consumers' risk misperception. But the truth is that there is a lot of evidence to support consumers' risk misperception. In fact, Allan Schwartz concluded that one of the

Interestingly, even if Danzon were correct that insurance markets are a better place to estimate the demand for pain-and-suffering damages, a close look at her findings reveals that, despite all impediments, if anything, her findings demonstrate such a demand.

Danzon finds that about 20 percent of the labor force has private long-term disability income protection. This coverage is limited to 60-70 percent of the pre-disability salary.¹⁴¹ Is it really surprising that people may demand coverage only up to 70 percent of their pre-disability income? Even putting coinsurance payments, as a mean to combat moral hazard, to one side, one should remember that these insurance awards are tax-exempt and therefore anything above that would be considered excess insurance.¹⁴² But why is it that only about 20 percent of the labor force has private long-term disability income protection? Danzon admits that consumers base their demand for disability insurance in light of existing pension plans, Social Security Disability and Workers Compensation. As she herself admits, 45% of the labor force has private pension coverage which provides coverage in the event of early disability. Social Security Disability provides coverage which amounts to about 40 percent for those who earn above the minimum taxable income and up to 86 percent for those earning the minimum wage.¹⁴³ It is estimated that annual disability benefits paid by Social Security and Workers Compensation are about eight times those paid by

hottest debates is whether consumers over estimate risks. (Schwartz Alan, *The Case Against Strict Liability*, 60 *FORDHAM L. REV.* 819 (1992) and *Proposals for Reform*), underestimate risks, as Latin has concluded Latin Howard, *'Good' Warnings, Bad Products, and Cognitive Limitations*, 41 *UCLA L. REV.* 1193 (1994), or both like Kysar and Hanson have concluded. (Kysar and Hanson argue that consumers can be manipulated to either under estimate or over estimate risks depending on the manufacturers' objectives. Jon D. Hanson and Douglas A. Kysar, *Taking Behavioralism Seriously: Some Evidence of Market Manipulation*, 112 *HARV. L. REV.* 1420 (1999); Jon D. Hanson and Douglas A. Kysar, *Taking Behavioralism Seriously: The problem of Market Manipulation*, 74 *N.Y.U. L. REV.* 630 (1999); Jon D. Hanson and Douglas A. Kysar, *Taking Behavioralism Seriously: A Response to Market Manipulation*, 6 *ROGER WM. U. L. REV.* 259 (2000). As mentioned above, I ignore consumers' imperfect information.

¹⁴¹ *Id.* at p 522-523. Disability insurance protects for wage loss in cases of a disability. These plans include offset provisions against Social Security Disability Income (SSDI) coverage to prevent excess coverage.

¹⁴² Danzon seems to understand this point as she asserts to make the same policy recommendation when she recommends providing individualized "compensation for wage loss up to 70 percent of pre-disability, pre-tax earnings (full replacement of after tax earnings)." *Id.* at 533. Other studies show that disability insurance in fact covers about 60% of after-tax income. *SEE* C. SOULE, *DISABILITY INSURANCE: THE UNIQUE RISK* (4th ed, 1998). But less than full coverage (deductibles or co insurance) is a well-known tool to incentivize people to recover from their disability and return to work, that is, to combat ex-post moral hazard. So even this data, if correct, does not prove there is no demand for such coverage.

¹⁴³ Danzon at 523.

private insurers.¹⁴⁴ In addition, one should add tort law as a means for providing coverage, including pain-and-suffering coverage. In most states, the jury is prohibited from receiving evidence of compensation or coverage from other sources (“the collateral source rule”). Thus, to the extent there is any reduced demand in Danzon’s findings about the private markets, it only reflects an adjustment to the existing law. If parties understand that they are insured through these other means, their incentives to purchase insurance through the private market are reduced.¹⁴⁵

Danzon further reports that private insurance markets indicate a low willingness to pay for medical care.¹⁴⁶ But as she this time admits this might reflect, for similar reasons to those stated above, a rational adjustment to public programs.¹⁴⁷

Interestingly, Danzon reports that 57% of the labor force has accident insurance, which is the only private insurance that “bears some resemblance to compensation for pain and suffering,” because these policies are not a replacement of specific expenses but rather pay a pre-specified sum in the event of an injury. Danzon is correct, given that all of the pecuniary elements of those losses tend already to be covered under other types of policies, such as life insurance and health insurance policies.¹⁴⁸

Taken together, Danzon findings seem to imply that the best explanation for whatever demand she found is that people feel that tort law does not sufficiently compensate them for pain-and-suffering losses. Danzon’s findings do not reveal a lack of demand for pain-and-suffering coverage. In fact, it might indicate exactly the opposite.¹⁴⁹ Indeed, and in light of her analysis somewhat surprisingly, Danzon herself eventually recommends including pain-and-suffering damages in tort law.¹⁵⁰

¹⁴⁴ U.S. Dep’t of Commerce, Bureau of the Census, Statistical Abstract of the United States 382, 387 (1998).

¹⁴⁵ A similar point was made in Bovbjerg, Sloan and Blumstein, *Valuing Life and Limb in Tort: Scheduling “pain-and-suffering,”* 83 NW U. L. REV. 908, 935 (1989) (Hereinafter: BSB). “Informed consumers know that pain-and-suffering is compensable in tort cases; they are already covered when someone else is to blame for their injury. Given that they thus have a limited need for such coverage, its absence is not proof of its lack of value.” *Id.* at 933.

¹⁴⁶ Specifically she argues that 48% of the population under 65 has no private major medical insurance. Interestingly, Danzon reports that 36% of major medical plans have unlimited maximum benefits. Danzon finds it as a low percentage but, given the risk of ex-post moral hazard, I find it high. Danzon at 523-4.

¹⁴⁷ *Id.*

¹⁴⁸ *Id.* at 524; see also Croley & Hanson, *supra* note 7, at 1885-92 for the same point. Yet, Danzon argues that the total contribution of less than 1 percent of total contribution to health benefits indicate a relative low demand for such insurance. *Id.*

¹⁴⁹ It is interesting to note that, in her policy recommendations, Danzon adopts a view that does not reflect her own conclusions. Danzon’s analysis might falsely cause one to understand her argument that tort awards in general should not raise the level of the victim’s monetary loss. In her conclusions,

B. The approach taken by Kip Viscusi

If markets are a bad place to explore the demand for pain-and-suffering coverage, then we must determine a proper forum to do so. Some will argue that non-market evidence shows that people demand pain-and-suffering damages. For example, different consumers groups, like consumers unions, citizen action groups, consumer federations, etc., have fought against capping pain-and-suffering damages in tort law.¹⁵¹ Others have claimed that modern jurisprudence (courts and legislatures) has recognized non-economic losses. These campaigns reflect a social desire for such personal injury losses to be compensable.¹⁵² Critics of these approaches argue that public choice theory demonstrates that these bodies do not necessarily reflect the citizens' preferences, but rather reflect equilibrium among the self-interested actors, such as plaintiff lawyers, within these bodies.

The last possible source of information is laboratory studies. In these controlled environments, individuals are asked to perform different tasks, answer questions, etc. From their responses, the researchers draw conclusions regarding the research questions. Indeed, several legal economists have advocated or relied on laboratory studies to investigate the question of the demand for pain-and-suffering coverage.¹⁵³

Viscusi is the most prominent economist who attempted to systematically investigate the question of pain-and-suffering damages in tort law. He based this investigation upon the insight that pain-and-suffering damages raise a conflict

Danzon recommends providing individualized "compensation for wage loss up to 70 percent of pre-disability, pre-tax earnings (full replacement of after-tax earnings);" and "a schedule of compensation for pain-and-suffering for serious injuries only." *Id.* at 533.

¹⁵⁰ The only constraint she puts on pain-and-suffering damages is that they should be paid solely for *serious* injuries. Danzon builds on the theory that serious injuries increase victims' post-accident marginal utility. But Danzon never defines what a serious injury is. If she means that a serious injury is any injury that increases a victim's post-accident marginal utility, she is being tautological and her recommendation cannot serve as a policy aid. Moreover, according to a conventional insurance theory, non-serious injuries should not be covered regardless of whether the losses are monetary or non-monetary. This is because of the relatively high administrative costs associated with non-serious injuries and the inability to control moral hazard and adverse selection. Therefore, insurance should not cover non-serious losses, whether they are monetary or non-monetary. Danzon's recommendation to restrict pain-and-suffering damages to serious injuries is not helpful.

¹⁵¹ Croley & Hanson, *supra* note 7, at 1842-4.

¹⁵² BSB at 935. In a similar manner Croley and Hanson argued in addition that other non-market evidence such as high jury awards and everyday experience, also support the claim that there is a demand for pain-and-suffering damages in tort law. *Id.* at 1831-41, 1844-5.

¹⁵³ BSB at 934-35. Despite this methodology being the cornerstone of social sciences, there are still people, especially economists, who are skeptical of insights taken from the laboratory. For further illustration, see the discussion in footnote 219 below.

between deterrence and insurance objectives. Viscusi is unique in his steady attempts to use empirical methods to evaluate the magnitude of optimal pain-and-suffering damages as a function of the chosen objective.¹⁵⁴

Unlike Priest, Cooter and Schwartz, Viscusi recognizes that the demand for pain-and-suffering coverage cannot be determined *a priori*, and depends on the nature of the injury; more specifically on the impact of the accident on people's marginal utility of income.¹⁵⁵ In particular, he argues, "if ill health does not alter the marginal utility of income, for any given income level, then full insurance is optimal. If ill health lowers (raises) the marginal utility of income for any given income level, less (more) than full income insurance is desirable,"¹⁵⁶ where "full insurance" means insurance for monetary losses. Recognizing that there is no theoretical basis for determining the shape of the utility function, Viscusi designed several empirical studies in an attempt to check for people's actual utility functions.¹⁵⁷

Based upon his empirical studies, Viscusi concludes that as an empirical matter, except for minor injuries (which increase people's marginal utility), people will not choose to purchase coverage for pain-and-suffering losses (because severe

¹⁵⁴ "There is no unique value of life; the appropriate value depends on whether our concern is with accident prevention or compensation." W. KIP VISCUSI, REFORMING PRODUCT LIABILITY 89 (1991). When deterrence is the main objective Viscusi thinks that the relevant measure is the "deterrence value" in which people are asked to reveal their risk-dollar tradeoff, namely the price they are willing to accept in order to subject themselves to a risk. For example Viscusi checked the risk premium workers receive for bearing an extra risk. W. Kip Viscusi & William N. Evans, *Utility Functions That Depend on Health Status: Estimates and Economic Implications*, 80 AMERICAN ECON. REV. 353 (1990). (Hereinafter Viscusi and Evans I). But, as Viscusi admitted, for this premium to reflect workers' attitude towards risk the market must be competitive. Clearly, blue-collar workers do not enjoy a competition for their labor. Nevertheless, in a later paper Viscusi claimed that "[e]vidence on worker risk perceptions suggests that subjective risk beliefs are strongly correlated with objective measures of the industry risk level." Viscusi, *Souder Rationale*, at 145. (In other studies, it is the price they are willing to pay to eliminate a risk. For example, in Evans and Viscusi II, Viscusi asked consumers how much they would pay to manufacturer to eliminate some risks in their products). The rationale behind the willingness-to-accept measure is that from a deterrence perspective it does not matter whether the potential injurer compensates ex-ante all those who are subject to a risk with an amount equal to the expected risk or, alternatively, whether she pays the actual victim the full loss; in both cases there is one statistical loss. From an insurance standpoint however, it matters a great deal whether we deal from an ex-ante or from an ex-post perspective. Compensating potential victims for the ex-ante risk they face makes all potential victims whole from a standpoint of their expected well-being. In contrast, compensating ex-post the actual victim, say, a paraplegic, will not, in most cases, restore his well-being before the accident. *Id.* at 91.

¹⁵⁵ *Id.* at 89.

¹⁵⁶ Viscusi and Evans I at 354.

¹⁵⁷ Viscusi admits that without knowledge of the shape of the utility functions economic inquiry is limited to "local rate of tradeoff between risk and money" and thus attempts to estimate people's utility functions based on their tradeoffs. *Id.* at 367.

losses decrease their marginal utility). Thus, Viscusi argues, that from an optimal insurance perspective, less than full compensation for workers' injuries is desirable.¹⁵⁸

Viscusi's work is definitely impressive in scope. Unfortunately, as will be shown below, because of its many drawbacks it cannot serve as a policy guide.

1. Drawbacks in the design of the study

Viscusi is aware that in order to evaluate the "insurance value" of pain-and-suffering, the relevant reference point is not the actual demand for pain-and-suffering coverage, but rather the amount of insurance the individual would select if economic markets were perfect, including accurate information by the consumers.¹⁵⁹ This is because, among other things, individuals are not fully aware of the risks hidden in different products. Nevertheless, much of Viscusi's own empirical work relies exactly on the way lay (uninformed) people perceive the risks in different contexts.¹⁶⁰

Moreover, despite his awareness of the inability of people to accurately process law probabilities, in designing his studies Viscusi uses low probability risks.¹⁶¹ For example, in Viscusi and Evans II, he used a 0.0015 chance of an injury. In fact, in later and less influential papers, Viscusi designed different studies in order

¹⁵⁸ *Id.* at 370. He summarizes that the appropriate levels of pain-and-suffering awards vary depending whether the objective is to make the victim whole, provide optimal insurance, provide optimal deterrence, or foster some other objective. Viscusi, *Souder Rationale* at 169. In another place he concludes that the best that can be achieved is to find a middle ground and sacrifice some of the deterrence objective by limiting the level of compensation and thus limiting the degree of the over-insurance, implied from the analysis of the insurance objective. *Id.* at 92.

¹⁵⁹ *Id.* at n.7. And see also "Market evidence regarding the failure of insurance firms to offer pain-and-suffering insurance may not be conclusive since the presence of pain-and-suffering and its severity may be difficult for the insurer to monitor, thus creating problems of moral hazard." W. Kip Viscusi, *The Consumer Welfare Effects of Liability for Pain and Suffering: An Exploratory Analysis, Comments and Discussion*, in BROOKINGS PAPERS ON ECONOMIC ACTIVITY MICROECONOMICS, Volume 1993(1) 175.

¹⁶⁰ To give just two examples, in a study with Magat and Huber, the authors interviewed people at a mall to elicit choices among residential areas that pose different risks of chronic disease (a nerve disease and a cancer of the lymph system) and dying in a car accident. From people's paired choices between the different residential areas, the authors inferred people's utility. In another study with Evans, the authors asked consumers how much they would pay to obtain a specified reduction in the risk of injury from a risk of 15 injuries per 10,000 bottles of toilet bowl cleaner and of insecticide. From the responses the researchers attempted to elicit people's utility functions. Viscusi and Evans II. Note however that not all of Viscusi's studies rely on lay people's demand for insurance. In a study with Evans, the authors asked chemical workers to reveal their required wage increase needed to compensate them for working with some hazardous chemicals. From their responses, the authors elicited their post-injury marginal utility. Viscusi and Evans I.

¹⁶¹ FISCHOFF B. ET AL., ACCEPTABLE RISK (1981).

to correct exactly this research error after getting what he called “implausible” results.¹⁶²

It is important to note that these *early* studies of Viscusi were the ones most often cited by the legal academia. As they are based on shaky methodological grounds, as Viscusi himself admitted in later studies,¹⁶³ any conclusions based upon this method are dubious.¹⁶⁴

2. Drawbacks in the interpretation of the findings.

Viscusi’s work has some major inconsistencies between the conclusions he draws from his empirical studies, and his general analysis of the question of pain-and-suffering damages in tort law. For example, when providing an intuition for why pain-and-suffering damages are *not* required, Viscusi asks us to imagine that we planned to spend an evening out somewhere but food poisoning prevented us from going out. To demonstrate how absurd it is to have pain-and-suffering insurance for such an event, Viscusi asks us: “Do you live it up in order to compensate for the welfare loss you have suffered or do you skip the planned evening out, saving the money until you are well?”¹⁶⁵ But food poisoning, in relation to the other chemical risks presented in Viscusi’s own work, is a minor injury. Based upon his empirical findings, Viscusi argues that only minor injuries increase people’s marginal utility of income (and thus only minor injuries presumably deserve pain-and-suffering damages).¹⁶⁶ Viscusi’s

¹⁶² Frank A. Sloan, W. Kip Viscusi, Harrell W. Chesson, Christopher J. Conover, & Kathryn Whetten-Goldstein, *Alternative Approaches to valuing intangible health losses: The Evidence for Multiple Sclerosis*, J. HEALTH ECON. 475, 489-90 (1998) (hereinafter - *Alternative Approaches*).

¹⁶³ In later papers, Viscusi admits that a potential approach of building upon responses to questions involving low probabilities is that “the valuations will be distorted by the perceptual biases, thus affecting the estimate of the implicit value of the health outcome.” Wesley A Magat, W Kip Viscusi, Joel Huber, *A Reference Lottery Metric for Valuing Health*, 42 MANAGEMENT SCIENCE 1118, 1119 (1996) (herein after *Valuing Health*); See also, *Alternative Approaches* at 479. In this paper Viscusi et al attempted to correct for people misperception of low probabilities.

¹⁶⁴ In fact even in 2002 Viscusi’s *early* studies are still cited as shown in a survey forthcoming in Handbook of Public Economics where Kaplow and Shavell referred to Viscusi and Evans I (a study from 1990), and to this study only, as their empirical evidence for the claim that there is no evidence for demand for pain-and-suffering coverage. See Louis Kaplow & Steve Shavell, *Economic Analysis of Law*, NBER working paper 6960 <http://www.nber.org/papers/w6960> at 8. Calfee and Winston refer to this study as a proof that losses reduce marginal utility in most important kinds of injury. Calfee & Winston, *supra* note 12, at 137.

¹⁶⁵ Viscusi, *Souder Rationale* at 156.

¹⁶⁶ Viscusi, *Pain-and-Suffering* at 156.

absurd example for why one does not need pain-and-suffering insurance contradicts his own findings.¹⁶⁷

This is not the only example of a contrast between Viscusi's own findings and Viscusi's analysis. Viscusi, also, objects to capping pain-and-suffering damages where his own empirical findings suggest exactly that. One of the reasons that Viscusi objects to capping pain-and-suffering damages is because it creates inequity across injury groups.¹⁶⁸ Indeed, victims of brain damage, para/quadruplegia, and cancer will be most affected by capping pain-and-suffering damages. But Viscusi himself concludes from his own empirical work that individual will not demand insurance for severe accidents because these accidents lower their marginal utility.¹⁶⁹ And based on *his* own work it makes sense to limit the amount of pain-and-suffering damages for severe injuries. Viscusi, therefore, provides the policymaker with advice that contradicts his own work.

Not only does each of his findings (that minor injuries increase people's marginal utility and that major injuries decrease it) contradict his analysis, but also it is hard to imagine a story that could reconcile both of these findings. Imagine how individuals' marginal utility would behave under Viscusi's findings. We first start with a case of a minor injury, which, according to Viscusi's findings, increases people's marginal utility above their status quo level and thus requires a pain-and-suffering coverage. The more severe the injury is, as long as it is still minor, the higher the marginal utility becomes and the higher the pain-and-suffering damages the injury deserves.¹⁷⁰ Then, suddenly, at some point, as the injury gets even more severe, the marginal utility, which has been increasing up to that point, drops back even below its pre-accident state, because according to Viscusi's findings that severe injuries lower people's marginal utility below the status quo level. Then, as the injury gets even more severe, the marginal utility falls even more, implying a lower amount

¹⁶⁷ I will return to the example itself below.

¹⁶⁸ "Capping pain-and-suffering awards might increase the degree of inequity in the manner in which pain-and-suffering awards are set, because victims with major injuries would be limited in making their claims while those with minor injuries would be unaffected." *Id.* at 107. Indeed the data show that most severe injuries are already under compensated. Viscusi objects to capping damages also because it will have little impact because the lion's share of the pain-and-suffering damages is generated by small claims, not by the few at the extreme. *Id.* at 107.

¹⁶⁹ Viscusi, *Pain and Suffering*.

¹⁷⁰ Viscusi claims that minor injuries behave like monetary loss, and therefore the higher the loss the higher the coverage it requires.

of damages to be paid to victims.¹⁷¹ Viscusi never provides an explanation or an intuition that could explain this strange trend.

In sum, it seems then that the distinction Viscusi tries to draw between minor and major injuries lacks any internal consistency. Perhaps more fundamentally, as will be shown below, this distinction has no basis in Viscusi's own findings.

3. Drawbacks in analyzing the data.

Viscusi has so many studies that it would be tedious to scrutinize them all here. Thus, I chose his two most influential studies, which he conducted with Evans. These studies serve as the a major basis for Viscusi's conclusion that major injuries decrease individuals' marginal utility and minor injuries increase it.¹⁷² These studies also served as major evidence in law and economic literature to demonstrate that "victims would often not elect to insure against non-pecuniary losses because these losses would not create a need for money, that is, raise their marginal utility of wealth."¹⁷³ Unfortunately, these studies cannot support the conclusions the authors drew from them.

In Vicusi & Evans I, chemical workers were asked to reveal their required wage increase needed to compensate them for working with some hazardous chemicals. From their responses, the authors elicited their post-injury marginal utility.¹⁷⁴ The authors found that for TNT and Asbestos, people's post-injury utility as well as marginal utility is lower. For chloroacetophenone, (a type of a tear gas) the authors found that the marginal utility is higher.¹⁷⁵ The authors explained this finding in that this chemical is just an eye irritant, and it "does not inhibit one's ability to derive utility from additional expenditure." But they never explained why it *increases* one's ability to derive utility from additional expenditure.

¹⁷¹ For a similar argument see Richard Watt and Francisco J. Vazquez, *Optimal Accident Compensation Schemes*, (working paper, on file with the author).

¹⁷² The authors concluded that less than full compensation for worker's injuries is desirable. In particular, they argue that 85% replacement is optimal if insurance is provided on an actuary fair basis and 68% if insurance is provided at the current degree of loading. Viscusi and Evans I at 370-1.

¹⁷³ See Kaplow & Shavell, *supra* note 163, at 8. As already mentioned, in a survey forthcoming in Handbook of Public Economics Kaplow and Shavell referred to Viscusi and Evans I, and to this study only, as their empirical evidence for the claim cited in the text.

¹⁷⁴ Note that this is an indirect approach. Viscusi and Evans did not ask them how much they would need in case they would be injured but their willingness to accept to be exposed to a higher risk of injury.

It is worth mentioning that when the authors imposed ‘additional structure’ on the data by assuming a logarithmic utility function, which is tantamount, in their view, to assuming diminishing marginal utility from money, the differences across the chemicals were muted.¹⁷⁶ Be that as it may, even without this ‘additional structure’ it is hard to reconcile the authors’ conclusion with their findings. Specifically, it is not clear why Viscusi and Evans chose to describe chloroacetophenone as “just an eye irritant” which causes only minor injuries.¹⁷⁷ As official data by the U.S. Department of Labor reveals, it is not only an eye irritant but also a respiratory and skin irritant. Moreover, it can in fact cause severe injuries and even death.¹⁷⁸ Given that the participants were chemical workers, it can be reasonably assumed that they were aware of the devastating consequences that chloroacetophenone can cause. Second, TNT, on the other hand, seems to be less dangerous than one might initially think. Chemical manufacturing use TNT as an intermediate in the production of dyestuffs and photographic chemicals. At high air levels (above the level permitted today in the workplace) workers involved in the production of TNT experienced anemia and abnormal liver tests. After long term exposure to skin and eyes some people developed skin irritation and cataracts, respectively. There is no information that TNT causes birth defects in people.¹⁷⁹ I will return to Viscusi and Evans’ classification below.

In Viscusi and Evans II, consumers at a shopping mall and hardware store were asked how much they would pay, above the product price, to obtain a safer product. Subjects were presented with two fictitious products and their prices - \$10 for insecticide and \$2 for toilet bowl cleaner. Then, subjects were asked about their willingness to pay to eliminate a risk of 15 injuries per 10,000 bottles of toilet bowl cleaner and of insecticide. From the responses, the researchers attempted to elicit

¹⁷⁵ Interestingly, the authors found that the overall post-injury utility (to distinguish from marginal utility) was *increased* yet that was not found to be statistically significant at the 5% level.

¹⁷⁶ Viscusi and Evans I at 363-7.

¹⁷⁷ Viscusi and Evans I at 361.

¹⁷⁸ According to the U.S. Department of Labor, Occupational Safety and Health Administration, it is an eye and respiratory irritant and that burning and irritation of the skin can occur especially if the skin is moist. Its use as a riot-control agent has caused several deaths. Moreover, overexposure can cause permanent partial opacity. Severe inhalation exposure causes pulmonary edema, which may have delayed onset. See

<http://www.osha-slc.gov/SLTC/healthguidelines/a-chloroacetophenone/recognition.html#healthhazard>.

For the purposes of the studies the more important factor is the participants’ *perception* of the injuries. However, the participants were all chemical workers who presumably are informed about the real hazards in these chemicals.

people's utility functions. The authors found that in most cases there was an *increase* of the marginal utility.¹⁸⁰ The authors explained this by stating the fact that "all injuries considered tend to have relatively minor health effects" and thus they "do not alter one's utility function."¹⁸¹ It is not clear, however, why they consider these injuries to be less serious than those at Viscusi and Evans I. As the authors themselves reported, insecticide is a "fairly severe hazard" which can cause, among other things, seizures and hospitalization for up to several weeks.¹⁸² Similarly, toilet bowl cleaners which, when mixed with products containing bleach, can form chloramine gasses which can cause "lung damage and other potential serious conditions," and are "the leading cause of poisoning among adults, except for suicide and other intentional drug overdoses."¹⁸³ Note, that unlike in Viscusi and Evans I, there are no questions of "real" risks but only of perceived risks because the products presented to the respondent were fictitious.¹⁸⁴

To summarize this point, in each of these studies alone, and definitely when taken together, there is no basis in the data for the conclusion that major injuries decrease individuals' marginal utility and minor injuries increase it. The distinction the authors made between minor and major injuries seems artificial. When viewed together, and it is a question whether studies that are so different can be analyzed together, these studies cannot be reconciled. One study shows that some injuries decrease people's marginal utility, while the other shows that other injuries may increase it, there being no reasonable distinction between the severities of the injuries in each of the studies.¹⁸⁵

¹⁷⁹ See a fact sheet by Massachusetts Military Reservation at <http://www.groundwaterprogram.org/comminv/facts/tnt.htm>

¹⁸⁰ William Evans & W. Kip Viscusi, *Estimation of State-Dependent Functions Using Survey Data*, 73 REV. ECON. & STAT. 94, 101 (1991) (Hereinafter Evans & Viscusi II).

¹⁸¹ *Id.* at 102.

¹⁸² *Id.* at 96.

¹⁸³ Evans and Viscusi II is based on data reported in W. Kip Viscusi, Wesley A. Magat and Joel Huber, *An investigation of the Rationality of Consumer Valuations of Multiple Health Risks*, 18 RAND J. ECON. 465, 471 (1987).

¹⁸⁴ Evans and Viscusi II at 96.

¹⁸⁵ A deeper look at Viscusi and Evans II can further teach us on how the formulation of the model influences the results. One of the issues the authors were interested in was whether the data supports a move on the non-state-dependent utility function or a change of the function itself. Recall that in Viscusi and Evans I, the authors investigated whether people's perception of their post accident marginal utility is increased or decreased relative to their pre-accident state. Interestingly, Viscusi claimed that an increase of the post-accident marginal utility supports the monetary-equivalent approach at which the loss is tantamount to a shift left along the (non-state dependent) utility curve, whereas a decrease of the post-accident marginal utility supports the state-dependent approach at which the loss is tantamount to a shift down to a flatter state-dependent utility function. But this is incoherent.

Further support for this point could be found when analyzing questionnaires that I distributed in a faculty meeting at Northwestern University law school in December of 2002. I asked the faculty to rank the riskiness of the same five chemicals that Viscusi and Evans used in their studies. The thirty-two faculty members who chose to fill-in the questionnaires ranked the chemicals in the following order (the more risky chemical first): Insecticide, Asbestos, Chloroacetophenone, TNT, and Toilet bowl cleaner.¹⁸⁶ As can be readily seen, the results show no support for Viscusi and Evans' assertion that TNT and asbestos are more dangerous than the other chemicals.¹⁸⁷

If at all, Viscusi's studies and logic must lead to the conclusion that pain-and-suffering damages *are* desired. Viscusi's studies, as well as other empirical studies which measure people's valuation of life and limb (the "value of life" work) show, unequivocally, that people value the loss of life and limb more than the compensation they receive through different private and public coverage plans. To mention two examples out of many, one survey elicited values of \$50,000 (1971 dollars) for the

Viscusi could have taken the increase in the post-accident marginal utility also support a state-dependent utility function in which the loss is tantamount to a shift done to a *steeper* post-accident state-dependent utility function. Evans & Viscusi II at 94. It is Viscusi's own formulation, and not his findings, which does not allow for the alternative explanation. The same happened in Viscusi and Evans I. The authors assumed a logarithmic utility function. But in a logarithmic function, the utility and the marginal utility are both governed by a single parameter so that there is always a link between whether the total utility decreased as a result of the injury and whether the marginal utility has dropped. Thus, it is enough that the participants' responses imply that injuries decrease their post-accident utility (which is always the case), for the results to imply *ipso facto* a lower post accident *marginal* utility, which is what the authors wanted to prove. Interestingly, in an earlier study the authors were aware of this problem. Viscusi and Evan I at 364. To summarize this point, Viscusi's own formulation of the statistical analysis of the data dictated, rather than exposed, the findings.

¹⁸⁶ The ranking was done in two ways. First, the faculty was asked to put the five chemicals in order of riskiness and, second, to grade their risk on a 1 to 7 scale. There were no major differences between the two methods. In addition, about half of the respondent received a Fact Sheet which provided a one paragraph description of every chemical. The descriptions were drawn from Viscusi's own studies and from some official websites mentioned at footnotes 178 and 179. There were no differences between the informed and the uninformed groups in the way they ordered the chemicals. However, there was a difference in their risk grading. The uninformed group seemed estimate insecticide and chloroacetophenone higher than the informed group. Yet, this did not influence their overall ordinal ranking.

¹⁸⁷ One may argue that law faculty does not know much on riskiness of chemicals and therefore their responses should be taken with a grain of salt. To the extent this is true, my point becomes even stronger. Viscusi himself based his policy recommendations on exactly such studies. Asking people in the mall does not strike me as better, for policy making purposes, than asking faculty in a law school, holding everything else constant. To the extent that asking faculty in a law school questions about riskiness of different chemicals cannot serve for policy making purposes, whether they are provided with a Fact Sheet or not, so is asking people in the mall such questions. The point that I make in the main text, however, is that even when one assumes that such studies are valuable, Viscusi's assertions that TNT and asbestos may cause severe injuries and the other chemicals only minor injuries are unfounded.

loss of an eye, hand or leg, which far exceeds conventional economic losses.¹⁸⁸ Viscusi himself published studies where he found that the value people place on their lives was 4.3 million dollars.¹⁸⁹ Again, these figures are not in accordance with court judgments. Probably the best explanation for this phenomenon, in maintaining the consumer sovereignty norm, is that people do, in fact, value life and limb above monetary value.¹⁹⁰

C. The approach taken by John Calfee and Clifford Winston

John Calfee and Clifford Winston attempted to study the demand for pain-and-suffering coverage in an original and refreshing way. Unlike Viscusi, who attempted to infer the optimal value of pain-and-suffering compensation from estimates of individuals' utility functions, Calfee and Winston confronted participants directly with the pain-and-suffering coverage question. As Calfee and Winston emphasized, they were not simply interested in the demand for pain-and-suffering coverage. Rather, their main goal was to "assess the disparity (if any) between consumers' willingness to pay for insurance versus prevention."¹⁹¹

Their point of departure was the conventional wisdom that losses that decrease the marginal utility of wealth do not require compensation. The novelty in their study was the unusual way they chose to identify this type of losses: "[i]f the loss decreases the marginal utility of wealth, consumers will be willing to pay more for prevention than for insurance." Calfee and Winston's main goal, therefore, was to examine whether people indeed pay more for prevention of the accident than for insurance

¹⁸⁸ BSB, *supra* note 150, at 934-5.

¹⁸⁹ For example in a study by Moore and Viscusi the authors found that workers receive \$43.40 in additional annual wages (in 1981 dollars) for each additional death per 100,000 workers, and thus estimated at \$4.34 million the cost that this group associated with the loss of one life. Michael J. Moore & W. Kip Viscusi, *Doubling the Estimated Value of Life: Results Using New Occupational Fatality Data*, 7 J. POL'Y ANALYSIS & MGMT 476 (1988). This reasoning makes the assumption that the price which a group places on the statistical death of one of its members is equal to the price an individual places on her own life when confronted by a fatal risk. This in its turn requires the assumption that people are linear in their probability preferences, an assumption known to be empirically false. Whether it is a change from .99999 to 1.0000 or a change from .00001 to .00002 matters. The "assumption of linearity is clearly false; individual valuations of changes in risk will vary with the background risk that is modified." Lewis A. Kornhauser, *The Value of Life*, 38 CLEV. ST. L. REV. 209, 215 (1990); *see also*, Graham Loomes, *Probability vs. Money: A Test of Some Fundamental Assumptions of Rational Decision Making*, 108 ECON J. 477 (1998).

¹⁹⁰ Assuming that the methodology of these studies is valid.

¹⁹¹ Calfee & Winston, *supra* note 12, at 192.

against its non-monetary consequences. They argue that if people paid more for prevention, it would mean that pain-and-suffering coverage is undesired. Therefore, there would be no justification for pain-and-suffering damages in tort law because (under strict liability in a contractual relationship) such damages serve as an unwarranted insurance coverage.

To demonstrate this theoretical claim Calfee and Winston ask us to imagine parents who consider sending their child to a summer camp. The authors argue that the parents would pay a substantial amount for a marginal *reduction* in the risk of death of their child but would pay very little for *insurance* against the same risk. This, in their view, proves the loss of a child in a summer camp is a loss which decreases the marginal utility of wealth, and which, therefore, renders the insurance coverage for such a loss undesirable.¹⁹²

Calfee and Winston's methodology employed the contingent valuation method to elicit preferences for pain-and-suffering insurance and prevention in situations involving possible injury, or loss of life, to participants, or their children, from a product, or service. There were total of 10 such "situations." Each situation involved two scenarios ("scenario a" and "scenario b") that "were essentially identical except that one offered prevention and the other offered insurance."¹⁹³ For example, in scenario 3a (the prevention scenario of situation 3) participants were asked to imagine they needed to buy a car and to decide about certain accessories. These included engine size, whether to have an air-conditioner, and whether to have a safety package (which halves the chance of a child sustaining crippling injuries that would make it impossible for her to walk). The price of the car varied depending on the items chosen. In scenario 3b, (the insurance scenario of situation 3) there was no safety package but instead participants were offered the opportunity to purchase an insurance policy that would pay money if a child had a crippling accident and would never be able to walk. This coverage would be in addition to payments for medical expenses. Again, the price of the car varied depending on the items chosen.¹⁹⁴

¹⁹² *Id.* at 134. "[A]ssuming the probability of loss to be 0.0001, \$100 of the camp fees would be the implicit insurance premium on a damage award of \$1,000,000...but because the insurance is worth much less than its actuarial value, most of this price increase will be a burden on consumers." *Id.* at 134-5.

¹⁹³ *Id.* at 140.

¹⁹⁴ *Id.* at 158-9.

The design of the study was a between-subject design where separate samples were created for the prevention scenario and the insurance scenario so that each participant addressed either scenario, but never both.

After conducting their study, Calfee and Winston concluded that “[c]onsumers...were usually willing to pay more for prevention than for insurance” and that consequently “awarding payments for pain-and-suffering...has the effect of forcing consumers to purchase large insurance policies whose values...are less...than their actuarial cost.”¹⁹⁵

Calfee and Winston’s study suffers from several methodological drawbacks, which cast doubt on the validity of their results. More fundamental is the fact that their theoretical framework, upon which they designed their study, is incorrect. Therefore, even if their empirical results were valid, these results could not lead to the conclusions that Calfee and Winston reached. The following sections present the main drawbacks and conclude that Calfee and Winston’s study cannot serve as a policymaking aid.

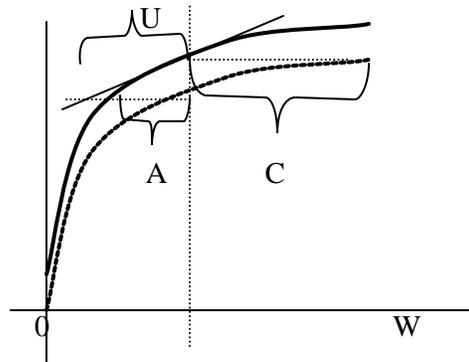
1. Drawbacks in the theoretical framework.

While it is true that consumers will be willing to pay more for prevention than for insurance when the loss decreases the marginal utility of wealth, it is equally true that consumers will be willing to pay more for prevention than for insurance even if the loss *does not change* the marginal utility of wealth at all. Moreover, this is sometimes true, even when the loss *increases* the marginal utility of wealth. Therefore, even if Calfee and Winston’s main results (that consumers were willing to pay more for prevention than for insurance) were valid, it can tell us almost nothing about the nature of the loss.

Perhaps the easiest way to see this point is by looking at a graph that Calfee himself drew in another article, with Paul Rubin. In that article, Calfee and Rubin showed that in cases of pure non-monetary loss (where there is no monetary loss at all), if there is just a downward shift of the utility function, the optimal insurance is

¹⁹⁵ *Id.* at 154.

zero, the optimal prevention costs is A ¹⁹⁶, the marginal prevention costs is U , and the full compensation is C , where $0 < A < U < C$. Consider the following chart:



The optimal prevention cost, A , is the maximum amount one would be willing to pay to avoid the downward shift of her utility curve. Advance spending of such an amount (normalized for the probability of loss) would bring one to the same level of utility she would have if the loss occurs (because such amount was not spent). The optimal insurance is the amount spent to equalize the marginal utility of wealth between the two situations. As the graph represents a pure non-monetary loss, the marginal utility of wealth in a given period has not changed. This demonstrates that the optimal insurance coverage is zero. As the graph indicates, the main point here is that people will pay more for prevention than for insurance, i.e. $A > 0$, even when the marginal utility of wealth has not changed.¹⁹⁷ Moreover, it is not too difficult to show that even for losses that *increase* the marginal utility of wealth, the amount that consumers will be willing to spend on prevention, in most cases, will be larger than the amount for insurance.¹⁹⁸

Thus, Calfee and Winston presumably showed that participants in their study were willing to pay more for the prevention of the injuries than for insuring against the pain-and-suffering consequences. This mere fact, however, cannot tell us whether these were injuries that have decreased, increased, or have not changed the marginal utility of wealth.

¹⁹⁶ For probability 1, and assuming the individual is not insured.

¹⁹⁷ This would be true even if one considers the marginal prevention costs, U , instead of A .

¹⁹⁸ For increased post-accident marginal utility of wealth type of accidents, unless the post accident curve is extremely steep, the amount for prevention will exceed the amount for optimal insurance.

One may argue that even if their study does not disclose anything about the nature of the post-accident utility function, it does tell us that people prefer prevention of the accident to insurance against its pain-and-suffering consequences. Moreover, so goes the argument, this should be sufficient when considering the elimination of pain-and-suffering damages. This would be a hasty conclusion.

As was explained above, as long as prevention costs are efficient, i.e. that the costs for a reduction of a risk are lower than the reduction in its expected loss, people will always prefer to spend their first dollars on prevention rather than on insurance. This would be true even if the loss was monetary and people were not at all averse to the risk. According to fundamental principles of economics, risk-neutral individuals would pay to reduce risks of even monetary losses for which they would not purchase insurance.¹⁹⁹ In fact, insurance companies prefer that individuals spend their first dollars on prevention before they buy insurance to cover monetary losses.²⁰⁰

In sum, when people need to allocate their money between prevention and insurance, their first priority is to pay for prevention and then to purchase insurance. Insurance is relevant only after all cost justified prevention is provided. The fact that people prefer to efficiently prevent losses than to insure against them is true not only for most types of post-accident utility functions in the case of non-monetary loss, but also for monetary loss as well. If one were to adopt Calfee and Winston logic, one would have to recommend eliminating not only insurance for non-monetary losses but also insurance for monetary loss. For this reason alone, Calfee and Winston's study could not serve as a policymaking aid.²⁰¹

¹⁹⁹ Consider the following example. Suppose that a house is worth \$300,000 and there is a 1:1000 chance (0.1%) that it would burn down in a fire. Further, suppose that a smoke detector reduces expected loss by \$100 and that a sprinkler system reduces the expected loss by another \$100. If the smoke detector costs \$90 and the sprinkler system \$110, a rational risk neutral person will purchase a smoke detector system and not a sprinkler system. However, a rational risk-neutral person would have no incentive to buy insurance that offered \$100,000 in compensation for a premium of \$100 (which is the minimum the insurance company would require to be willing to offer). The point here is that a rational risk neutral person will undertake all risk reduction activities *up to* the point where the incremental benefit of the activity is equal to the incremental cost.

²⁰⁰ For reasons related to moral hazard.

²⁰¹ Had Calfee and Winston designed their study such that in addition to the scenarios of prevention and pain-and-suffering insurance, there would be a scenario for monetary insurance as well, they would have discovered that participants preferred prevention to monetary insurance as well. One might argue that the previous critique is tempered by the fact that Calfee and Winston's study was a between-subject design. Thus, one can argue that responses about prevention were not tainted by responses about insurance. Participants' low demand for insurance cannot be explained, so goes the argument, by their high demand for prevention because they never had the opportunity to express their demand for prevention. It is not clear that this critique is valid at all. Participants might express low demand for insurance because they assume that all costs justified preventative measures have been already taken.

2. Drawbacks in the methodology.

This section exposes several major methodological flaws that cast doubt on the validity of Calfee and Winston's results. But for the last one, all of these flaws have not been mentioned before in the literature.

a. The design of the scenarios drove the results.

Using, for example, scenarios 3a and 3b, the design can be shown to have driven the results. In scenario 3b (the insurance scenario), Calfee and Winston were careful enough to explain to the participants that the insurance coverage they were considering buying was *in addition* to payments they would receive for the medical expenses associated with their children's severe injury. This could be a good way to characterize pain-and-suffering payments.²⁰² Thus, presumably the participants in scenario 3b focused on whether to purchase coverage against the pain-and-suffering loss (and not the monetary loss) associated with automobile accidents that leave their child unable to walk.

Unfortunately, this is not the situation in scenario 3a. In scenario 3a, participants needed to consider whether to purchase a safety package that would halve the chances of their child sustaining crippling injuries. When making this decision, however, participants cannot avoid taking into account not only the pain-and-suffering loss but also the medical expenses they might incur as a result of the car accident. In scenario 3a (as in some other prevention scenarios), participants were *not* asked to ignore the monetary expenses associated with the car accident.²⁰³ As a result, rather than comparing the willingness to pay for prevention and the willingness to pay for insurance of a non-monetary loss, they compared the willingness to pay for prevention of a mixed (monetary and non-monetary) loss with the willingness to pay for insurance against a non-monetary loss. However, the mixed loss is always larger

Participants in the insurance scenario were not told anything on the possibility of preventing or reducing the risk they were offered to insure against. On the other hand, it seems that each participant answered several prevention scenarios and several insurance scenario so therefore, it is not clear how participants perceived the relationship between prevention and insurance.

²⁰² But see the discussion below on the problems in understanding what this really means.

²⁰³ And even if they were asked to do this, I have doubts that it would have provided us with valid results. Mark Geistfeld has offered a similar approach to this one as a way to instruct the jury for calculating pain and suffering damages. In a recent working paper I discuss in more detail this

than the purely non-monetary loss. All else equal, participants are almost always expected to pay more to prevent a large loss than to indemnify against a much smaller one.²⁰⁴

b. A selective way to estimate the value of life bypassed undesired results.

Several of the scenarios in Calfee and Winston's study (like scenarios 3a and 3b above) did not contain explicit probabilities. In order to place a value on life, Calfee and Winston used the participants' responses in situation 7 in which explicit probability of injury allowed a direct calculation of the value of life for prevention purposes and for insurance purposes. Interestingly, Calfee and Winston selectively chose the value of life elicited from the *prevention* scenario (scenario 7a) and applied it in calculating the value of life in several other *insurance* scenarios. They did this in order to "avoid absurd conclusions."²⁰⁵ If, alternatively, Calfee and Winston had chosen to infer the value of life from the equivalent *insurance* scenario 7b, and not from the prevention scenario, they would have reached the conclusion that, for example, participants in scenario 1 would be willing to spend \$7,800 on insurance and only \$3,900 on prevention. This result contradicts their hypothesis. Indeed, they chose not to do so.²⁰⁶

approach. Ronen Avraham, *Putting a Price on Pain-and-Suffering Damages: A Critique of the Current Approaches and a Proposal for a Change* (on file with the author).

²⁰⁴ Even if it were a pure monetary loss, and even if they were not risk averse at all.

²⁰⁵ *Id.* at 147. A possible way to understand Calfee and Winston's design is that it is not a pure between-subject design. Rather, it might be that every participant faced some prevention scenarios and some *other* insurance scenarios. Still, the critique in the text would hold.

²⁰⁶ *See id.* at 147 n.20, where the authors attempted to defend their choice. Reading their study leaves the reader with an impression that the authors made some other arbitrary choices that cannot be justified. For example, as the authors admit, "the value of prevention in scenario 5a, which involved a disability of only three months due to headaches and nausea, was arbitrarily chosen to be \$10,000." (end of paragraph in origin, RA). Nevertheless, the authors were not able to bypass *all* their absurd results. For example, responses in the prevention scenarios in situations 7, 8, and 9 (a vaccine against a dangerous virus) provided incorrect signs for less pain and fewer shots. This means that subject preferred to pay *extra* dollars to get a version of the vaccine that require *more* shots than the alternative version and were willing to pay extra *dollars* to get a version of the vaccine which is *more painful* than the alternative version. *Id.* at 150. This is especially worrisome once one recalls that scenario 7a was used to elicit participants' value of life to be exported to situation 1. If subjects in situation 7 got it all wrong, how can one use their estimation of the value of life at all?

c. The conclusion that participants were willing to pay for insurance less than its actuarial value is process-driven.

Consider situation 1, in which participants were asked to imagine they were considering buying a car.²⁰⁷ In scenario 1a (a prevention scenario in which the participants considered buying a car with or without a safety package), the participants were told that the safety package halves the chance of the participants (themselves, and not of their child as in situation 3) having a fatal accident. Then, in scenario 1b (an insurance scenario in which the participants considered buying a car with or without an insurance policy), the participants were told that the insurance policy would pay money to their family if they had a fatal accident while driving the car. Calfee and Winston found that participants were willing to pay \$3,900 for halving the risk of their death and only \$316 for buying a \$100,000 insurance coverage. Calfee and Winston assumed that the amount participants were willing to spend on preventing the loss to life was the correct amount. Based on these figures, they then inferred, the participants' implicit probability of death. This probability data was then exported to the insurance scenario in order to calculate the actuarial value of the insurance. Indeed, Calfee and Winston found that the actuarial value of the insurance was higher than the \$316 in premium that the participants were willing to pay.²⁰⁸

Why did Calfee and Winston presuppose that the amount paid for prevention was correct? They never say. It is easy to show that one could reach exactly the opposite conclusion and argue that people were willing spend on *prevention* in lesser amounts than its real value. Indeed, Calfee and Winston could have taken the opposite approach and inferred the probability of death from the amount that participants were willing to spend on *insurance* and then export this probability to the prevention scenario. If they had done precisely that, they would have discovered that people were willing to spend only \$3,900 on prevention whereas its "real" value was \$5,600.²⁰⁹

²⁰⁷ Calfee and Winston used Situation 1 as their representative situation to explain their calculations. *Id.* at 146-8.

²⁰⁸ Here is how it works. First, as already mentioned Calfee and Winston imported from scenario 7a the value life, which was \$1,772,000, to scenario 1a and 1b. Second, they divided the \$3,900 (the willingness to pay for prevention by participants in scenario 1a) by \$1,772,000 to find that half of the risk of dying is 0.0022. Third, they multiplied 0.0022 by 2 to find that the full risk of dying from an automobile accident is 0.0044. Fourth, they multiplied \$100,000 (the insurance coverage) by 0.0044 (the risk of dying from an automobile accident) to find that the actuarial value of the insurance policy is \$440. Fifth, they found that participants' willingness to pay for a \$100,000 coverage (\$316) was lower than its actuarial value (\$440). *Id.* at 146-8.

²⁰⁹ Here is how it works. First, they could divide \$316 (participants' willingness to pay for a \$100,000 coverage) by \$100,000 (the insurance coverage) to find that the risk of death is 0.00316. Second, they

Thus, the conclusion that those participants were willing to pay less for insurance than its actuarial value is process-driven.

d. The study exceeds the intellectual capabilities of layperson participants.

Consider, for example, the task of participants in situation 1. Participants were required to rank 13 accessory packages, each with four different features (engine size, whether there is an air-conditioner, whether there is a safety package (or insurance policy), and the total price). This is a difficult task for professional economists, let alone laypersons.²¹⁰ Moreover, it is not clear how many of these features contributed anything to the study. Had participants been asked to rank cars by price, and whether they have a safety package (the prevention scenario) or an insurance payout (the insurance scenario), presumably it would have been possible to reach a conclusive result regarding the demand for prevention versus the demand for insurance. As Viscusi recognized, this survey “places such severe demands on respondents that they may be unable to give meaningful answers to the survey questions.”²¹¹

In sum, these methodological flaws, as well as other unmentioned flaws (some of which were mentioned by Viscusi in his comment to Calfee and Winston’s study),²¹² cast doubt upon the validity of the whole study, even if its theoretical framework were valid. Based on their results, the authors estimated the consumer burden from over-insurance to be in the range of billions of dollars.²¹³ The flaws presented here, as others which are not, significantly alter the author’s estimation.

could multiply 0.00316 by \$1,772,000 (the value of life by participants in scenario 7a) to find that the “real” prevention value was \$5,600. Third, they could find that participants’ willingness to pay for prevention of a loss of \$1,772,000 (\$3,900) was lower than its real value (\$5,600).

²¹⁰ Viscusi, *A Comment*, at 184.

²¹¹ *Id.* at 191.

²¹² For a list of other methodological flaws, *see* Viscusi, *id.* at 182-191. For the Authors’ response, *see id.* at 192.

²¹³ See for example, *id.* at 152, where the authors use the \$440 actuarial value of the policy in scenario 1b to estimate the annual burden from automobile accidents at 4.7 billion dollars. As was discussed above the result is process driven.

D. Summary

This part has surveyed three approaches that were taken to deal with measuring the demand for pain-and-suffering coverage. These are the approach taken by Danzon, Viscusi, and the approach taken by Calfee and Winston. My research does not reveal other approaches for dealing with this problem.²¹⁴

As was shown at length, all approaches suffer from many theoretical and methodological problems that render them useless for any policymaking process. Despite the significant differences between these approaches, they all reach a somewhat negative conclusion regarding the demand for pain-and-suffering coverage. This conclusion should be reconsidered.

The next part presents an approach, which contracts the questions of the demand for pain-and-suffering coverage in a different way. Like Calfee and Winston, I have not attempted to estimate individual utility functions, as Viscusi did. Rather, I confronted the participants with the direct question regarding their demand for pain-and-suffering damages. In contrast to Calfee and Winston, however, I have not explored whether there is a significant difference between participants' demand for pain-and-suffering coverage and their demand for prevention. Rather, I have explored whether there is a significant difference between participants' demand for pain-and-suffering coverage and their demand for monetary coverage.

²¹⁴ But for one early study by Jeffrey O'Connell and Rita Simon. See *infra* text around note 274.

III. EXPLORING THE DEMAND FOR PAIN-AND-SUFFERING COVERAGE – THE SUGGESTED APPROACH.

The previous parts revealed the theoretical difficulties and the empirical flaws in the approach of contemporary scholars. This part presents an alternative theoretical approach as well as an alternative empirical methodology to investigating the demand for pain-and-suffering coverage in tort law.

A. *The Theoretical Framework*

1. Introduction.

How can we know whether to provide pain-and-suffering coverage in tort law? One possible way is a democratic alternative in which the government designs a referendum and leaves such decisions up to its constituents. This approach has been previously applied to a wide variety of issues including environmental issues, student vouchers, and minimum wage mandates.²¹⁵ Yet, this democratic alternative has its drawbacks: lengthy debates on the framing of the questions, funds invested by interest groups, thereby hurting the democratic process, and more.²¹⁶ A second possible way

²¹⁵ California raised its minimum wage to \$5.75 by passing a referendum in 1996 (Proposition 210, available at <http://www.lao.ca.gov/initiatives/1996/prop210.html>). See, *Minimum Wage Petition Headed for November Ballot*, SAN DIEGO BUSINESS JOURNAL 4/22/96, available at 1996 WL 8579170. California also had a referendum in 1996 to consider Proposition 200, which, if enacted, would have instituted a no-fault insurance regime without pain and suffering damages. Proposition 200, available at <http://www.lao.ca.gov/initiatives/1996/prop200.html>. Yet it was not eventually passed. See, *Auto Premium Rate Rise Called Slow in State*, LOS ANGELES TIMES 2/16/96 Part D, available at 1996 WL 5241489. California also had a referendum in 1996 to prohibit the recovery of non-economic losses in certain car accidents. Specifically, an uninsured driver or drunk drivers at the time of an accident could not sue someone at fault for the accident for non-economic losses. Proposition 213, available at <http://www.lao.ca.gov/initiatives/1996/prop213.html>. In Houston, voters defeated a referendum that would have done away with affirmative action. *Affirmative Actions*, THE NATION 11/24/97, available at 1997 WL 8867001.

²¹⁶ Large corporations and interest groups can often defeat a proposed law by wielding their fundraising and grassroots power; creating much controversy about reforming campaign finance law. See, e.g., John Copeland Nagle, *Corruption, Pollution, and Politics*, 110 YALE L.J. 293 (2000) (reviewing ELIZABETH DREW, *THE CORRUPTION OF AMERICAN POLITICS: WHAT WENT WRONG AND WHY* (1999)). For example, the insurance industry spent over \$50 million on a campaign to defeat a California right to sue referendum. See, *Campaign 2000 Proposals 30 & 31 Insurance Industry Tactics Pays Off Despite the Considerable Expense, Use of Referendum to Override Legislature's Work could Inspire Similar Efforts*, LOS ANGELES TIMES 3/9/00, available at 2000 WL 2218887. Additionally, the process of having to frame the issue and then reach a compromise on a law can result in a version of the law different from what the populous desired. See Christopher B. Busch, David L. Kirp, & Daniel F. Schoenholz, *Taming Adversarial Legalism: The Port of Oakland's Dredging Saga Revisited*, 2 N.Y.U. J. LEGIS. & PUB. POL'Y 179, 179-80 (1999) (stating that it took over twenty-five years to reach an agreement on what action to take in the economic development versus environmental protection

of deciding on the application of pain-and-suffering coverage would be through investigation of whether such coverage is efficient. Such coverage would be justified if economists were able to prove to the policy maker that rational individuals indeed demand coverage for pain-and-suffering because it benefits them. Unfortunately, economists have not managed to come up with a valid economic model that can prove such benefit to the rational consumer.²¹⁷ Rather, economists' advise that the matter be tested empirically. But, as was shown above the empirical and experimental attempts that have been conducted to date measuring the demand for pain-and-suffering coverage (or whether providing pain-and-suffering coverage will make rational consumers better off) lacked adequate theoretical basis, in addition to being methodologically flawed and poorly analyzed.

2. Mandated benefits.

The origins of the theoretical framework suggested here are based on (although not identical to) the literature on *mandated benefits*.²¹⁸ The basic idea is that there are rules that directly benefit some or all of the manufacturer's customers while,

dilemma in Oakland Harbor due to interest groups and litigation, among other factors). Finally, the legislative process can suffer from incomplete or erroneous information and the quality of the research affects the quality of the policy enacted. See William H. Robinson, *Legislative Research: Essential Roles and Standards of Excellence*, 29 INT'L J. LEGAL INFO. 560 (2001). Other democratic alternatives have numerous drawbacks as well. For example, when a federal or state legislature delegates its power to an administrative body, there are problems of capture and accountability. Capture occurs because the regulator depends on the person he regulates for his existence, which can result in unreasonable policies. Peter Marra, *Have Administrative Agencies Abandoned Reasonability?*, 6 SETON HALL CONST. L.J. 763, 768 (1996). Agencies undermine the democratic process by their removal from public accountability, while still being susceptible to influence from lobbying groups and the very industries they are created to oversee. Leslie L. Marshall, *Telford: Casting Sunlight on Shadow Governments—Limits to the Delegation of Government Power to Associations of Officials and Agencies*, 24 SEATTLE U.L. REV. 139, 139-40 (2000) (stating that these “associations that set policies, pass resolutions, lobby, take legal positions in court, and use public funds in political campaigns and on ballot measures. The executive directors and others who run these associations are not elected by the public and are mostly unknown to the public. In many respects they now form an unaccountable, powerful, and mostly invisible new branch of government: shadow governments.”). Use of agencies is beneficial to policy formation in that the agency can devote a great deal of time to studying the benefits of a proposed rule, something a legislature cannot.

²¹⁷ As mentioned above, Alan Schwartz, George Priest, and Robert Cooter did reach a definitive conclusion regarding the demand for pain-and-suffering coverage, yet, as was argued at length above, their advise should not serve as a policy making aid, mainly because it is wrong.

²¹⁸ See Lawrence H. Summers, *Some Simple Economics of Mandated Benefits*, 79 AM. ECON. REV. Papers & Proceedings, at 177 (May 1989). Richard Craswell, *Passing On the Costs of Legal Rules: Efficiency and Distribution in Buyer-Seller Relationships*, 43 STAN. L. REV. 361. Christine Jolls, *Accommodation Mandates*, 53 STAN. L. REV. 223 (2000).

at the same time, increase the manufacturer's expected costs; these costs are passed on, partially or completely, to all customers through higher prices.²¹⁹

Pain-and-suffering damages in tort law cause the expected marginal costs of manufacturing products to increase by the amount of actuarial cost of providing such insurance. These costs, however, are passed on back to the consumers through higher product prices.²²⁰ Thus, consumers are not simply receiving a benefit of pain-and-suffering coverage but rather buying it. Therefore, in order to know whether it is efficient to provide pain-and-suffering damages, the policy maker would need to know whether the value that consumers place on this legislative measure outweighs the costs of this measure.²²¹

3. The suggested approach

Rather than mimicking market settings in the lab that infer supply and demand curves and the new equilibrium price, I chose to investigate an individual's direct preferences.²²² More specifically, I measured people's willingness to pay for non-

²¹⁹ The classic example refers to product warranties. The same analysis would apply, however, to any rules directly regulating the safety or quality of a product (e.g., residential housing codes or laws requiring crashworthy automobile bumpers). Craswell at 362-3. In competitive markets only the costs of the cheapest manufacturer will be passed on to consumers. See RICHARD CRASWELL & ALAN SCHWARTZ, FOUNDATIONS OF CONTRACT LAW 39 (1994). The assumption of competitive markets is made just for simplicity and to match previous literature. Nothing material is changed in the analysis if this assumption is withdrawn. Like Craswell, I assume there is no price discrimination in the market. *Id.* at 373 n.19.

²²⁰ As Craswell showed, generally the more consumers value the insurance, the more the manufacturers will be able to pass on the cost of the insurance.

²²¹ The reader might wonder whether the relevant criterion should be "whether the value that consumers place on this legislative measure outweighs the costs *passed on to them*". The argument for this criterion would be that satisfying consumers' preferences means providing the insurance whenever they value it for more than it costs them, and not more than it costs manufacturers. One possible response, as shown by Craswell, would be that when consumers are homogeneous and there is no price discrimination in the market, the two criteria converge. CRASWELL & SCHWARTZ, at 39. I will not elaborate on this point.

²²² In order to draw meaningful conclusion from mimicking markets setting several assumptions, two of which I focus on here, must be made. The first of these assumptions is that consumers are homogeneous with respect to their preferences towards the benefit. *Id.* at 372-85. The second assumption, which I will not focus on here, is that there is no price discrimination in the markets. See Jolls at 259-60. Third, it is assumed that the quality is rigid. See Henry E. Smith, *Ambiguous Quality Changes from Taxes and Legal Rules*, 67 U. CHI. L. REV. 647. The problem is that once these assumptions are withdrawn, the theory no longer generates definitive predictions. For example, once consumers' heterogeneity is introduced some consumers will be made better off by the pain-and-suffering insurance, while other consumers will ultimately be worse off. Additionally, as Craswell notes, it is possible for consumers, as a class, to benefit from an inefficient insurance, or for an efficient insurance to be to their detriment. CRASWELL & SCHWARTZ at 373. Furthermore, as Smith showed, once quality of the products is (endogenized) then quality changes might complicate the picture and generating predictions from the models becomes much more tricky. Smith at 651-2. This would also

monetary insurance. If it exceeds the insurance actuarial costs then it would be efficient to have this mandate because people price it above its cost.

One possible critique of this approach is that people lack the mental capacity to make complex calculations (such as calculating the actuarial cost of the mandate) and, therefore, the mere fact that they were willing to pay for the coverage more than its costs, should teach us nothing.²²³

make any inference from empirical data regarding the meaning of shifts in the supply and demand curves problematic. And can result in data from inefficient mandates looking similar to data reflecting efficient mandates. *Id.* at 702. (“[t]he possibility that price and quantity movements may be motivated by cost-avoiding shifts in quality rather than, or in addition to, shifts in demand makes the data more difficult to interpret. Price rises cannot simply be taken as evidence of value placed on the mandate by the marginal consumer without knowing either that adjustments along various quality margins are not possible or that such adjustments can be accounted for econometrically. Neither prospect is all that likely.”). *Id.* at 706-7. Another issue to consider is that the analysis up until now has been based on a partial equilibrium analysis. A more general analysis must untangle the distributional consequences of such intervention. For example, it might be that employees of the firm pay for the increased liability by receiving lower wages. If the consumers belong to the upper class and the workers to the lower class, e.g. when the product is a fancy car, then the result is regressive. Donohue raised a similar point when commenting on Christine Jolls’ paper. *See* Donohue, at 14-17. Indeed, partial equilibrium analysis can be problematic, yet at the same time it can be helpful in serving as an appropriate first approximation. More importantly, the conclusion of this part, which is that the demand for pain-and-suffering coverage should not be estimated directly but rather by way of comparison to the demand for monetary insurance, is, if anything, reinforced by the possibility of such complications in a general equilibrium framework.

²²³ My empirical studies, discussed below reinforce this critique. This objection is just one of many possible objections to experimental studies, of which four major ones I will discuss below. The first objection is that the behavior of human subjects is variable, compared to physical objects, and therefore less predictable; the lack of internal validity critique. *See* for example, Chris Stramar, [Experiments in Economics: Should We trust the dismal Scientists in White Coats?](#) 6 *Journal of Economic Methodology* 1 (1999) at 7. This is overcome by the design of the study. As long as any auxiliary hypotheses, such as do subjects understand the tasks, and the main hypothesis can be distinguished, then statistical tests can be used to determine whether the theory’s main predictions are valid despite inconsistencies with human behavior. The second objection is that the experimental setting induces different behavior from that which would be produced in the natural setting; the lack of external validity critique. Experimental designs, so goes the critique, do not mirror natural environments closely enough, among other things, because real world experience is based on life long learning whereas laboratory work is based on a short term learning process. This critique may be true in certain circumstances but in the studies presented below the *relative* differences or similarities between the demand for monetary and non-monetary insurance is explored and even if lack of learning experience plays a role on the decision making process there is nothing that would prevent the factor from playing equal roles in the demand for both types of insurance and therefore allowing the relative results to be relevant and valid nonetheless. The third objection is that subjects may not understand their tasks and in any event act to either satisfy or outwit the experimenter. This was solved in several ways. In my studies there was an instruction booklet prewritten so as to maintain coherence among sessions and preclude passing expectations on to the subjects in this manner. Different comprehension questions were planted in the questionnaires thereby signaling whether subjects understood their tasks. Those who did not understand their tasks were excluded from the database. My research assistant who runs the experiment was blind to the research hypothesis. Lastly, I ran three pre-tests, where a small group of subjects (not knowing they are not the “real” subjects) were asked to do the tasks and were then debriefed to see whether everything was clear, whether they could guess the research goal or hypothesis, and so forth. The fourth objection is that subjects have no motivation to act as maximizers but rather their only concern is to finish their tasks as quickly as possible. A solution to this objection is that subjects can be compensated for their performance thereby creating incentives to accurately complete their tasks. For a list of conditions which make the laboratory micro-economy fit into

To deal with this concern, I compare the demand for monetary insurance mandates with the demand for non-monetary insurance mandates. If I find a similar demand for both types of insurance, then in spite of the fact that from a quantitative point of view the magnitude of the demand can teach us nothing, from a qualitative point of view it can teach us a lot.

Economists conventionally assume that people are risk averse with respect to non-negligible monetary losses. The von-Neumann-Morgenstern expected utility theory implies that given the assumption of risk aversion, rational people should buy full insurance against monetary losses.²²⁴ Thus, if we find in the experimental research that people indeed demand coverage against monetary losses and, in addition, that they treat both monetary and non-monetary insurance identically, for example, that they are willing to pay roughly the same premium for the same scope of coverage, then we can make inferences from the demand for monetary insurance to the demand for non-monetary insurance.²²⁵

economic theoretical models, see Wilde L. On the use of Laboratory Experiments in Economics in Joseph Pitt (ed) THE PHILOSOPHY OF ECONOMICS (1980). But even then there is the question of judgment as to what constitute adequate compensation. In a recent study, which reviewed 74 experimental papers in which the level of financial performance-based incentive given to participants was varied, the authors concluded that “in ... risky choices the most typical result is that incentives do not affect the mean performance.” Colin F. Camerer and Robin M Hogarth, *The Effects of Financial Incentives in Experiments: A Review and Capital-Labor-Production Framework*, J. RISK & UNCERTAINTY, 19, 34 (1999). In any case, in my studies this critique is less powerful, however, as I was interested in the *relative* demand for monetary and non-monetary insurance and therefore any lack of incentives would presumably be the same for both type of demand. In any case, my only claim is that the results produced in my studies should be taken as *prima facie* evidence to be further investigated. I, myself, am skeptical regarding the extent of information that can be learned from any single experiment, but as many others think that a lot can be learned from a series of independent studies. See, e.g., Chris Stramar, *Experimental Economics: Hard Science or Wasteful Tinkering?* THE ECONOMIC JOURNAL 109, F5-6 (1999).

²²⁴ Assuming no administrative costs or problems of moral hazard or adverse selection exist.

²²⁵ The logical chain of reasoning is as follows. The von-Neumann-Morgenstern expected utility theory implies that rational and risk averse individuals demand fair insurance for non-negligible monetary losses. According to the mandated benefits framework, the value people place on monetary insurance is more than the actuarial costs they pay for it. If the empirical studies reveal that people treat both types of insurance identically (in the sense described above), then we can conclude that people also place a higher value on non-monetary insurance than what they would have to pay for it (holding the scope of coverage constant). This implies that people would be better off with pain-and-suffering insurance than they would be without it; just as they are better off with monetary insurance than they are without it. One might wonder why the literature dealing with mandated benefits bothers to deal with warranties that are types of monetary mandates. Apparently, if people are risk averse they should always demand any monetary mandates. One possible answer would be that warranties are usually small in magnitude (compared to the health costs and the loss of income associated with injuries). Therefore, it is not clear that people would not prefer to self-insure for this loss. That is, it is not clear that people are risk averse with respect to such small losses. Another possibility is that warranties may solve informational problems where consumers find it costly to measure quality at the point of sale. See, for example, Barzel, *Measurement Cost and the Organization of Markets*, 25 J. L. & ECON. 27, 32-34 (1982); George L. Priest, *A Theory of the Consumer Product Warranty*, 90 YALE L. J. 1297, 1303-07 (1981).

Below I report three empirical studies I conducted in order to investigate whether the demand for pain-and-suffering coverage outweighs its costs, and whether it is significantly different than the demand for monetary coverage.

B. The Empirical Framework: The Demand for Pain-and-Suffering Coverage

I designed three experiments for examining three distinct yet related questions. The first was to test people's demand for pain-and-suffering insurance in the context of product liability. Second, I attempted to verify whether the demand for pain-and-suffering and for monetary insurance differs. Lastly, I wanted to understand the effect of information on people's decision making in this context.

1. Study 1 Experimental Design

a. Participants

The participants were 120 undergraduate from the University of Michigan. Participants were recruited through ads posted around campus and by sending emails to members of the Greek System as well as to a list maintained by the Economics Department of students interested in participating in research studies. Participant were promised \$10 for 40 minutes long sessions.

b. The design²²⁶

Participants faced four insurance decisions involving the purchase of four different types of products: padding for roller skates (\$40), a computer monitor (\$250), a saw (\$100), and tires for a car (\$800). For each product, participants had to state the price they were willing to pay, above the price of the product, for monetary and for pain-and-suffering insurance. Before answering the questions, participants were presented with a cover page explaining to them that they had no other rights whatsoever to a remedy for any loss as result of an accident besides the insurance coverage that they were about to buy. Then, participants were presented with the

²²⁶ See Appendix for the full text of the questionnaires.

following explanations about the nature of pain-and-suffering versus monetary insurance:²²⁷

Insurance for non-monetary harm :

This provides compensation for pain and suffering resulting from an injury. This could include physical or emotional pain, or any suffering involving the hassle of changing your lifestyle to adjust to living with a loss of mobility, a loss of function, or a disability. It *does not* include any compensation for any monetary expenses like medical costs or lost wages.

Insurance for monetary expenses:

This includes full compensation for medical expenses and rehabilitation following an injury, and for lost wages due to time away from work. It *does not* include any compensation for any non-monetary harm like pain and suffering.

Lastly, participants were asked to immerse their arms in ice water for 10 second.

²²⁷ I scrambled the order of the explanations about the nature of the monetary versus the pain-and-suffering insurance. 51 participants saw the explanation for the monetary insurance first and 63 saw the explanation for the pain-and-suffering insurance first. The order of the explanations was not found to be significant. Immediately after part two (where participants were required to immerse their arm in ice water, and which will be described below) was over, we ran a third part in which participants in both groups were asked to again fill out the insurance questionnaires they had filled out in part one. Participants were told that this was not a memory test and that they could go back and see their responses to questionnaires in the first part. They were also told that based on our experience some people usually change their responses and some usually do not, and that we do not care. When they finished filling out the questionnaires the draw began. The purpose of this third part was to see whether immersing their arms in ice water would cause participants to change their responses to the pen-and-paper questionnaires. We ran a student t test, a McNemar's test and a non-parametric rank sum test (Wilcoxon Scores) and found that there was no significant difference between participants' responses

c. Information.

All 120 participants faced insurance decisions under risk, that is, participants were informed of the probability of an accident occurring and of the magnitude of the expected damages, so they had enough information to calculate the expected value to help them decide on the amount they were willing to pay for the insurance. To make it as easy as possible on students I held the expected value of the insurance coverage constant across products, as can be seen in Table 1.

Table 1- The probability of a breakdown and the average magnitude of harm

Product	Probability of breaking down	Average magnitude of harm	Expected value
Padding	1/1,000 (0.1%)	\$1,000	\$1
Saw	1/10,000 (0.01%)	\$10,000	\$1
Monitor	1/10,000 (0.01%)	\$10,000	\$1
Tires	1/100,000 (0.001%)	\$100,000	\$1

d. Study one experimental results.

i. "Cleaning the data set"

I first eliminated participants' responses for whom the amount of money they were willing to pay in total for the product was not equal to the sum of the amounts of money they were willing to pay for the different types of insurance they chose plus the cost of the product itself. Eight such insurance *decisions* were ignored.²²⁸ In addition I faced the problem that some participants were willing to pay extremely high premiums for different types of insurance. I therefore decided to ignore any total payment reported by participants which was above \$4,000, \$1,500, \$700 and \$250 for the tires, monitor, saw and padding (respectively); thus, six participants were erased from my database, leaving me with 114 participants.

(for both "students" and "control") for part 1 and part 3. Therefore, we decided to report only the analysis for part one.

²²⁸ As I specifically asked participants to avoid this error there were only a few incidences like this.

ii. The general demand for both types of insurance.

I compared the overall number of participants who were willing to buy the different types of insurance. Table 2 presents the percentage of participants who were willing to pay (weakly) above the \$1 expected value for each type of insurance.²²⁹

Table 2- The demand for Pain-an-Suffering and Monetary insurance.

1	2	3
Product	Buy monetary insurance	Buy pain and suffering insurance
Padding	72%	68%
Saw	88%	84%
Monitor	76%	69%
Tires	93%	90%

Table 2 reveals that most people demanded pain-and-suffering insurance for all four products. Table 2 also shows that, across all products, the demand for pain-and-suffering insurance is up to 7 percentage-points lower than the demand for monetary insurance, yet for most products this difference was not found to be significant.²³⁰

iii. The dollar value of the demand for monetary versus pain-and-suffering insurance.

I examined the group demand for monetary and pain-and-suffering insurance. Table 3, Chart 1a Chart 1b present the results for the four products.

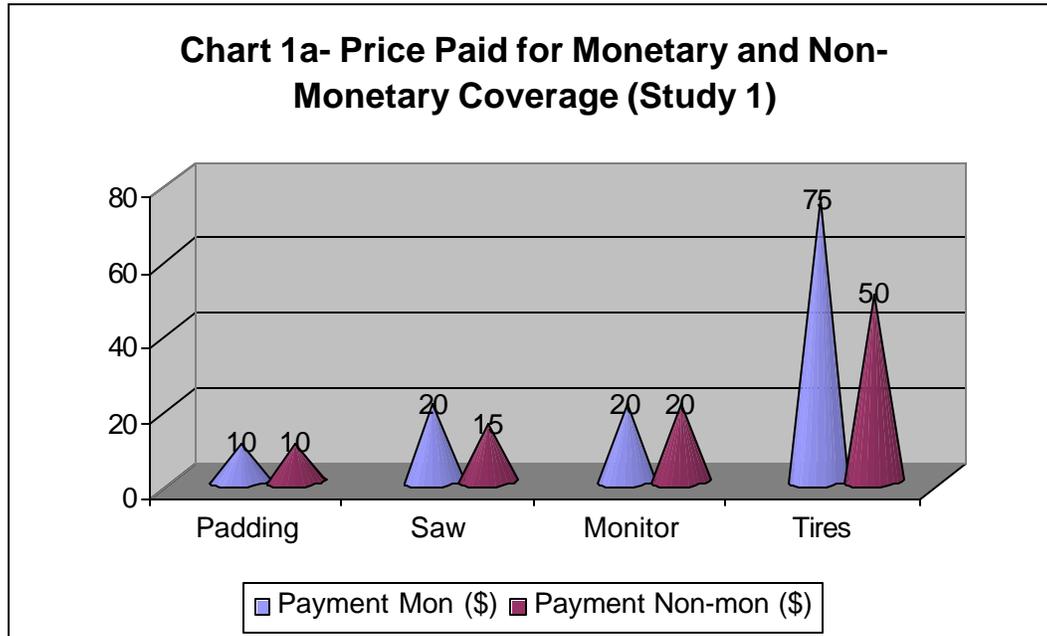
²²⁹ The reason I included only those who were willing to spend the expected value or above was that, clearly, even participants whose demand for insurance is low, such as risk liking people, will be happy, sometimes, to pay a very small amount of money for insurance. Notice that I also included here those who paid the exact amount of the expected value. The justification is that if the budget is balanced (as is the case when the premiums equal the expected value) then there is no reason not to respond to people's preferences and provide them with insurance. For the rest of this study when I refer to the words "buy" or "purchase" we mean paid the expected value or more.

²³⁰ I ran a McNemar test and found that the difference between the demands for both types of insurance was significant only for the monitor ($p=0.0455$). It is worth mentioning that the demand for each type of insurance is either together with the other type of insurance or alone.

Table 3- Demand for pain-and-suffering versus Monetary insurance.

1	2	3	4	5	6	7
Product (Price)	Demand for coverage	Participants' payment for monetary insurance		Demand for coverage	Participants' payment for pain-and-suffering insurance	
	%	Mean	Median	%	Mean	Median
Padding (\$40)	72	\$18 (22)	\$10	68	\$14 (21)	\$10
Saw (\$100)	88	\$35 (46)	\$20	84	\$31 (39)	\$15
Monitor (\$250)	76	\$42 (57)	\$20	69	\$38 (47)	\$20
Tires (\$800)	93	\$107 (133)	\$75	90	\$102 (159)	\$50

*- standard deviations are in brackets.



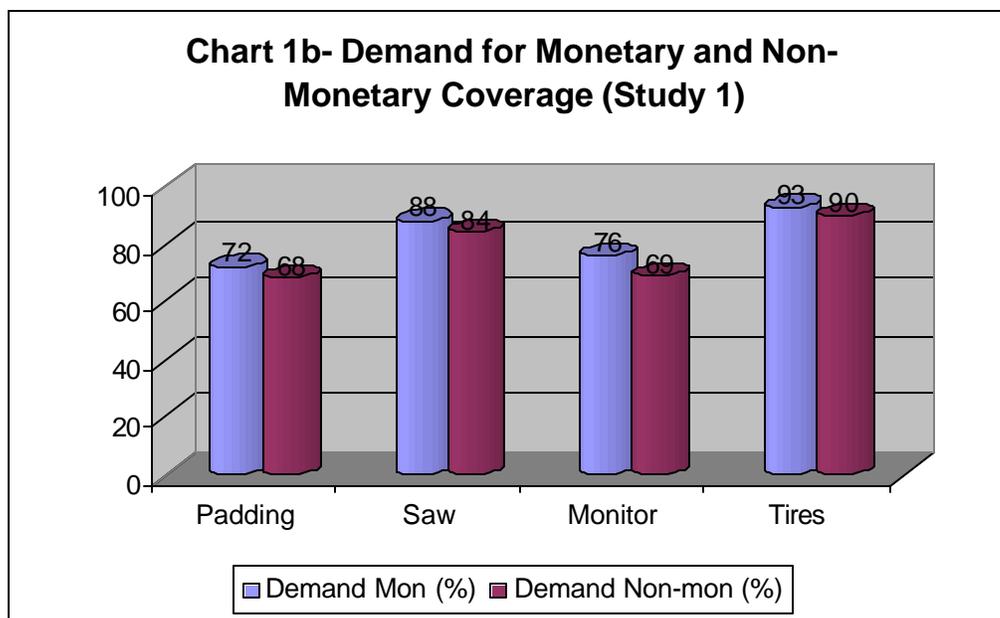


Table 3 reveals that there is, across all products, a demand for *both* types of insurance. Demand for pain-and-suffering insurance exists but is smaller than demand for monetary insurance in two respects. First, as we already saw in Table 2, proportionally fewer participants were willing to buy pain-and-suffering insurance than monetary insurance (compare columns 2 and 5 in Table 3 and the cylinders in Chart 1b), yet the difference was found for most products not to be significant. Second, across all products the average amount of money spent on pain-and-suffering was lower than the average amount of money spent on monetary insurance (compare columns 3 and 6 in Table 3 and the cones in Chart 1a). But, these differences were in general not significant at the $p=0.05$ level.²³¹ Indeed, a comparison of the medians shows that whereas for the saw and the tires the price which participants were willing to pay for the pain-and-suffering coverage was lower than the price for the monetary insurance, for the padding and the monitor it was the same.²³²

²³¹ Except for the padding. The same holds when we included *all* participants (rather than only those who paid weakly above the expected value) in checking whether the difference between the average amount spent on both types of insurance was significant.

²³² As the distributions are skewed and not well defined, the medians are better predictors of the distributions than the means.

Table 3 also shows that participants, as a group, were willing to spend greatly above the \$1 expected value.²³³ This may mean that participants were extremely risk-averse, or, more probably, that what drives their decision (under risk) to buy insurance is not their reflection on the expected value, but something else. For now it is enough to observe that both types of insurance were treated the same. Specifically, focusing on the medians reveals that for both types of insurance participants were willing to pay premiums of about 6%-8% of the monitor and tires prices and 15% -25% of the padding and saw prices.²³⁴

I next turn to an analysis on the individual level. I compared the *differences* between the amount of money that *each* participant spent on both types of insurance. Table 4 presents the results.

iv. The individual demand for both types of insurance.

I explored the difference between the demands by *each* individual for both types of insurance. A McNemar test revealed that the vast majority of the participants treated monetary insurance and pain-and-suffering insurance in the same manner—either buying them both (by paying weakly above the \$1 expected value) or buying neither. Specifically, 82% of the participants treated monetary and pain-and-suffering insurance for padding in the same manner, 86% treated monetary and pain-and-suffering for monitor in the same manner, 93% treated monetary and pain-and-suffering insurance for the saw in the same manner, and 96% treated monetary and pain-and-suffering insurance for the tires in the same manner. Of those participants who did not treat these two types of insurance the same, most preferred monetary insurance to pain-and-suffering insurance.

I then checked the percentage of people who treated both types of insurance *exactly* the same, that is, that were willing to spend *exactly* the same amount of dollars for both types of insurance. Table 4 and Chart 2 present the results.

²³³ The results present the mean and median for those who were willing to pay above the expected value for the coverage; it excludes those who did not pay anything for it or who paid less than the expected value. The fact that the mean is higher than the median may mean that, of those who paid above the expected value, a minority was willing to spend extremely high sums of money.

²³⁴ Doing the same analysis as above for the means reveals that the qualitative analysis is not changed: participants were willing to pay premiums of about 10%-15% of the monitor and tires prices for both types of insurance, and about 30%-35% of the padding and saw prices, again for both types of insurance.

Table 4- Comparison of the differences between the amount of money each participant spent for the two types of insurance.

1		Padding (N=110)	Saw (N=111)	Monitor (N=113)	Tires (N=113)
2	# of people who treated the different types of insurance <i>exactly</i> the same	66 (60%)	69 (62%)	74 (65%)	79 (70%)
3	# of people who paid more for pain-and-suffering	11 (10%)	15 (14%)	13 (11%)	10 (9%)
4	# of people who paid more for Monetary	33 (30%)	27 (24%)	26 (24%)	24 (21%)

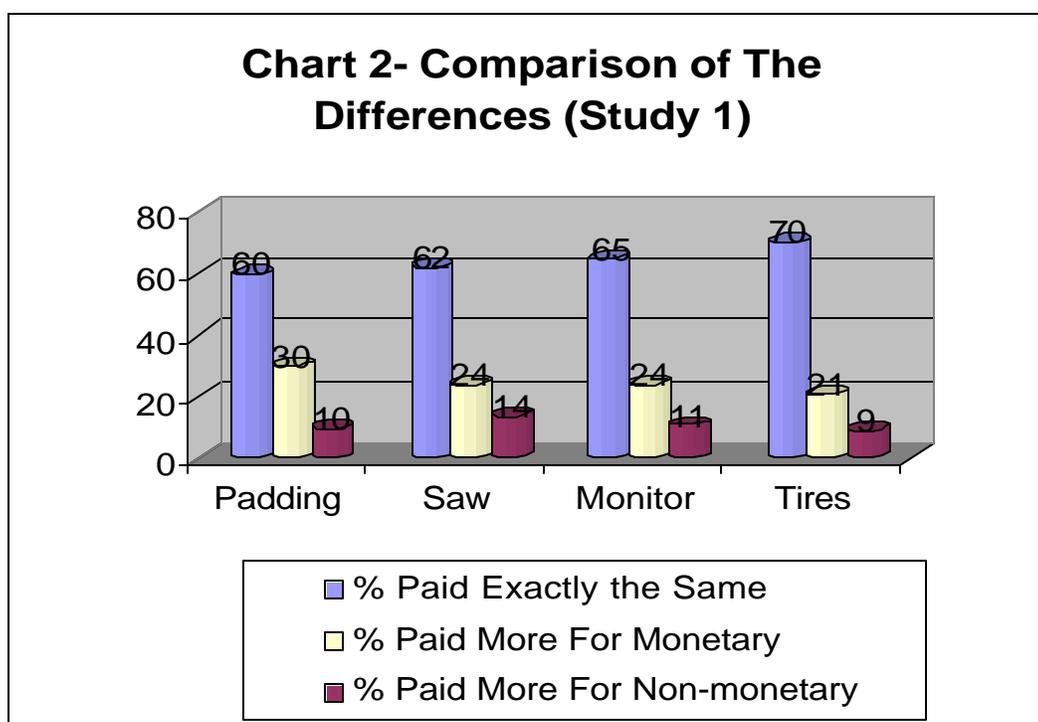


Table 4 and Chart 2 reveal that 60% to 70% of the participants were willing to spend the *exact* same amount of money for pain-and-suffering and monetary insurance across the four products (see row 2).²³⁵ However, among the 30% to 40% who treated these two types of insurance differently, about two-thirds paid more for monetary coverage.

²³⁵ Specifically, 60% of the participants were willing to spend exactly the same amount of money for the monetary and pain-and-suffering insurance for the padding, 62% for the saw, 65% for the monitor, and 70% for the tires.

e. Study one discussion

The results show that the majority of the participants (on average about 80%) expressed a demand for pain and suffering insurance. This demand however was product-dependent, which means that the scope of the demand for pain and suffering coverage cannot be universally answered, but rather there is a need to further investigate the nature of the product and the pain and suffering it causes.²³⁶ This is true, however, also for monetary insurance.

More importantly, the results also show that, in general, the vast majority (on average about 90%) of the participants treated the two types of insurance the same- either they buy them both or they buy neither. Moreover, as Table 4 shows, on average, 60% to 70% of the participants treated both types of insurance *exactly* the same- namely, they paid *exactly* the same amount of money for both types of insurance.

Of those who did not treat it the same, the vast majority preferred monetary to pain and suffering insurance. As a result, the overall demand for monetary was higher than the demand for pain and suffering insurance, yet the differences were not found, in general, to be significant.²³⁷

Interestingly, the results show that people's insurance purchase decision is based on some rough percentage of the product price and not on the probabilities and values.

2. Study two experimental design

In Study one, participants made decisions under risk, that is, they were provided with the probability of the products breaking down and the magnitude of harm that may be caused. As we saw, the premiums participants paid were not dependent on the expected loss. It is an interesting question to explore the influence that information has on the demand for both types of insurance. Do more or fewer participants

²³⁶ Specifically, 90% of participants expressed demanded for pain and suffering insurance for tires, 69% for monitor, 84% for saw, and 68% for padding.

²³⁷ The demand for monetary coverage was larger in two respects: more participants demanded monetary insurance (on average, more than 80% of the participants versus more than 75% who demanded pain and suffering insurance), and, participants were willing to pay, in general, higher

purchase coverage when provided with information? Is the premium they are willing to pay higher or lower?

a. Participants

The participants were 141 undergraduate psychology students from the University of Michigan psychology department. Participants had to subscribe in order to participate in the experiment. It was part of their requirements in the psychology department.

b. The design.

Participants faced insurance decisions involving the purchase of, this time only, three different types of products: padding for roller skates (\$40), a computer monitor (\$250), and tires for a car (\$800). Like in the previous study, for each product, participants had to state the price they were willing to pay, above the price of the product, for a monetary and for a pain-and-suffering insurance. As the design of this study is otherwise almost identical to the design in Study 1 it will not be explained again here.

c. Information

There is one major difference between the two studies- study two was a “between subjects” design. In study two different groups faced different levels of information. One group of participants had no information at all about either the probability of the products breaking down or the magnitude of harm that may be caused. Participants in the other group were informed of the probability of an accident occurring and of the magnitude of the expected damages, so they had enough information to calculate the expected value to help them decide on the amount they were willing to pay for the insurance. As before, I held the expected value of the insurance coverage constant across products.²³⁸

premiums for monetary than for pain and suffering insurance. As mentioned in the text though, the differences were not significant.

- d. Study two experimental results
 - i. "Cleaning the data set"

As before, I eliminated participants' responses which were extremely high or which the amount of money paid in total for the product was not equal to the cost of the product plus the sum of the amounts of money they were willing to pay for the different types of insurance.²³⁹ I was left with ninety five participants.²⁴⁰

- ii. Order effect

I investigated whether the order of the products that participants faced was a factor. Specifically, I was interested whether participants might have been willing to pay more for the product they see first. The reason for this concern is that, by conventional economic theory, participants' demand for the next product would be reduced. I ran a Wilcoxon Scores test and found that in all cases participants expressed no significant difference in their willingness to pay for the monetary insurance or pain-and-suffering insurance across different orders of presentation. In any event, as I randomized over any possible order effect (by scrambling the orders of the products the participants read), I decided to ignore this issue altogether.²⁴¹

- iii. The general demand for both types of insurance (with information).

I start by reporting the results of participants who were in the same condition as those in Study one. I compared the overall number of participants (with information) who were willing to buy the different types of insurance. Table 5

²³⁸ See Table 1 above.

²³⁹ I ignored any total payment reported by participants which was above \$4,000, \$1,500 and \$250 for the tires, monitor and padding (respectively). For example, one participant was willing to pay \$60,000 and \$100,000 for the monetary and pain-and-suffering insurance (respectively) for the \$800 tires. Five participants were erased from the data set. In addition, some participants were wrong for all three products. Only in these cases did I eliminate them entirely from the data set. Forty-one participants were eliminated in that way.

²⁴⁰ The reason that in this study more participants were eliminated from the data set than in Study one, is that in Study two, I did not specifically asked participants to avoid this error.

²⁴¹ Thirty-two participants (33%) saw the tires first, thirty-seven participants (39%) saw the monitor first, and twenty-six (28%) saw the padding first.

presents the percentage of participants who were willing to pay above the \$1 expected value for each type of insurance.

Table 5- The demand for pain-and-suffering and monetary insurance (with info).

1	2	3
Product	Buy monetary insurance	Buy pain-and-suffering insurance
Padding	50%	35%
Monitor	59%	51%
Tires	82%	68%

Table 5 reveals that most people demanded pain-and-suffering insurance for the tires and monitor but not for the padding. Specifically, 68% demanded pain-and-suffering insurance for the tires, 51% for the monitor, but only 35% for the padding.

Table 5 also shows that, across all products, the demand for pain-and-suffering insurance is up to 15 percentage-points lower than the demand for monetary insurance. I ran a McNamar test and found that the difference was significant for the tires ($p=0.025$), was not significant for the monitor ($p=0.317$), and was almost significant for the padding ($p=0.09$).²⁴²

²⁴² The demand for each type of insurance is either together with the other type of insurance or alone. The next table presents the general demand for both types of insurance (across both levels of information).

1	2	3
Product	Buy monetary insurance	Buy pain-and-suffering insurance
Padding	65%	45%
Monitor	71%	59%
Tires	92%	74%

As can be readily seen, the demand for both types of insurance, is higher than the demand under risk alone. The reason is that when they are under ignorance more participants were willing to buy insurance. All the differences in this table between the demand for monetary and the demand for pain-and-suffering insurance are significant for $p=0.05$.

iv. The dollar value of the demand for monetary versus pain-and-suffering insurance (with information).

As before, I first examined the group demand for monetary and pain-and-suffering insurance for the participants who made decisions under risk. Table 6 presents our results for the three products.

Table 6- Demand for pain-and-suffering versus monetary insurance (with info).

1	2	3	4	5	6	7	8	9
Product	Demand for coverage		Participants' payment for monetary insurance		Demand for coverage		Participants' payment for P&S insurance	
	%	N	Mean	Median	%	N	Mean	Median
Padding \$40 (n=34)	50	17	\$24 (31)	\$12	35	12	\$12.5 (12)	\$10
Monitor \$250 (n=41)	59	24	\$89 (108)	\$50	51	21	\$72 (55)	\$50
Tires \$800 (n=34)	82	28	\$316 (336)	\$200	68	23	\$266 (355)	\$100

Table 6 reveals that when participants are informed, there is, across all products, a demand for *both* types of insurance. Demand for pain-and-suffering insurance exists but is smaller than demand for monetary insurance in two respects. First, as we saw in Table 4, proportionally fewer participants were willing to buy pain-and-suffering insurance than monetary insurance (compare columns 2 and 6); yet, this difference was not always significant. Second, across all products the average amount of money spent on pain-and-suffering was lower than the average amount of money spent on monetary insurance (compare columns 4 and 8). The differences were significant for the tires ($p=0.05$), almost significant for the padding (0.07) but not significant for the monitor ($p=0.5$).²⁴³

As before, participants, as a group, were willing to spend greatly above the \$1 expected value. Specifically, focusing on the medians reveals that participants were

²⁴³ When I included *all* participants (rather than only those who paid weakly above the expected value) in checking whether the difference between the average amount spent on both types of insurance (for participants under risk) was significant, I found similar results. Specifically, the difference was significant ($p=0.05$) for the tires, almost significant ($p=0.08$) for the monitor and non-significant ($p=0.3$) for the padding. Recall that I reached the same conclusion in study one.

willing to pay premiums at about 20%-30% of the products prices for the monetary insurance, and at about 15%-25% for the pain-and-suffering insurance.²⁴⁴

I next turn to analysis on the individual level. I compared the *differences* between the amount of money that *each* participant spent on both types of insurance.

v. The individual demand for both types of insurance.

I ran a McNemar test to explore the difference between the demands for both types of insurance. The McNemar test revealed that the vast majority of the participants treated monetary insurance and pain-and-suffering insurance in the same manner- either buying them both (by paying above the \$1 expected value) or buying neither. Specifically, 89% of the participants treated monetary and pain-and-suffering insurance for tires in the same manner, and 79% treated monetary and pain-and-suffering insurance for both the monitor and the padding in the same manner. Of those participants who did not treat these two types of insurance the same, most preferred monetary insurance.

I then checked the percentage of people who treated both types of insurance *exactly* the same, that is, that were willing to spend *exactly* the same amount of dollars for both types of insurance. Table 7 presents the results.

Table 7- Comparison of the differences between the amount of money each participant spent for the two types of insurance (with information).

1		Padding (n=34)	Monitor (n=41)	Tires (n=34)
2	# of people who treated the different types of insurance <i>exactly</i> the same	17 (50%)	23 (56%)	15 (44%)
3	# of people who paid more for pain-and-suffering	3 (9%)	6 (15%)	3 (9%)
4	# of people who paid more for Monetary	14 (41%)	12 (29%)	16 (47%)

²⁴⁴ The qualitative analysis is not changed when we focus on the means: participants were willing to pay premiums of about 40% -60% of the products' prices for the monetary insurance and of about 30% for the pain-and-suffering insurance.

Table 7 reveals that about 50% of the participants were willing to spend *exactly* the same amount of money for pain-and-suffering and monetary insurance across the three products (see row 2).²⁴⁵ However, among those who treated these two types of insurance differently, a *significant* majority paid more for monetary coverage.²⁴⁶

Before turning to the question of the influence of information, it is worth mentioning that, in general, despite some quantitative differences, the results of Study 2 reported so far are qualitatively consistent with the result in Study 1.²⁴⁷

vi. The influence of information

Once I identified the demand for both types of insurance when participants are informed, I was interested to check whether the level of information affects the results.²⁴⁸

I compared the number of participants who were willing to purchase the different types of insurance, slicing it across different levels of information. I also compared the amount of money that participants, as a group, were willing to spend for the different types of insurance across products and across levels of information.²⁴⁹ Table 8 , Chart 3 and Chart 4 present the results.

²⁴⁵ Specifically, forty-four percent of the participants were willing to spend exactly the same amount of money for the monetary and pain-and-suffering insurance for the tires, fifty-six percent for the monitor, and exactly fifty percent for the padding.

²⁴⁶ For the monitor, however, the difference between the number of people who paid more for pain-and-suffering coverage and the number of people who paid more for pain-and-suffering insurance was *not* significant even for $p=0.9$.

²⁴⁷ I will discuss the differences in more detail below.

²⁴⁸ I did not generate a hypothesis because I could not know what participants' prior probabilities for the loss were. If participants' subjective probabilities of a product breakdown were higher than what I provided, then I would expect to see a lower demand for both types of insurance under risk. Conversely, if their subjective probabilities were lower, I would expect to see a higher demand under risk.

²⁴⁹ Table 8 is similar to Table 6 but also includes the data under conditions of ignorance.

Table 8 Participants' Demand for Different Types of Insurance across Levels of Information.

1	2	3	4	5	6	7		
Padding (\$40)	Participants who bought monetary insurance				Participants who bought pain-and-suffering insurance			
	%	N	Mean	Median	%	N	Mean	Median
Ignorance	77	33	\$37 (32)	\$30	53	23	\$29 (29)	\$15
Information	50	17	\$24 (31)	\$12	35	12	\$12.5 (12)	\$10

Monitor (\$250)	Participants who bought monetary insurance				Participants who bought pain-and-suffering insurance			
	%	N	Mean	Median	%	N	Mean	Median
Ignorance	82	40	\$129 (192)	\$50	66	32	\$86 (105)	\$50
Information	59	24	\$89 (108)	\$50	51	21	\$72 (55)	\$50

Tires (\$800)	Participants who bought monetary insurance				Participants who bought pain-and-suffering insurance			
	%	N	Mean	Median	%	N	Mean	Median
Ignorance	100	44	\$367 (390)	\$200	80	35	\$324 (440)	\$100
Information	82	28	\$316 (336)	\$200	68	23	\$266 (355)	\$100

Chart 3a- Demand for Monetary Coverage across Levels of Information (Study 2)

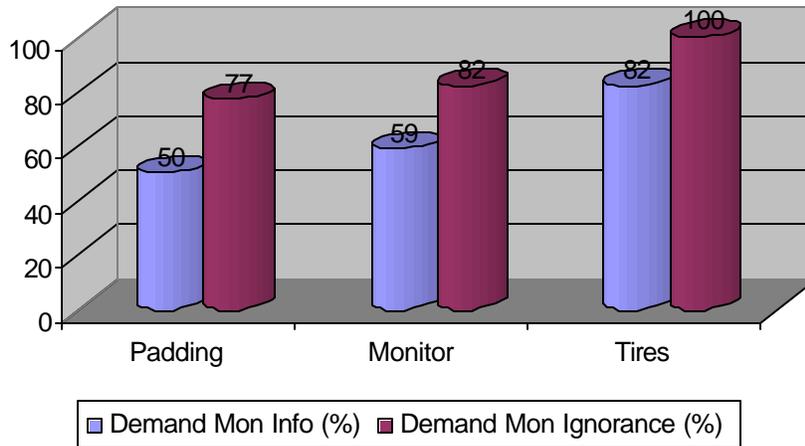
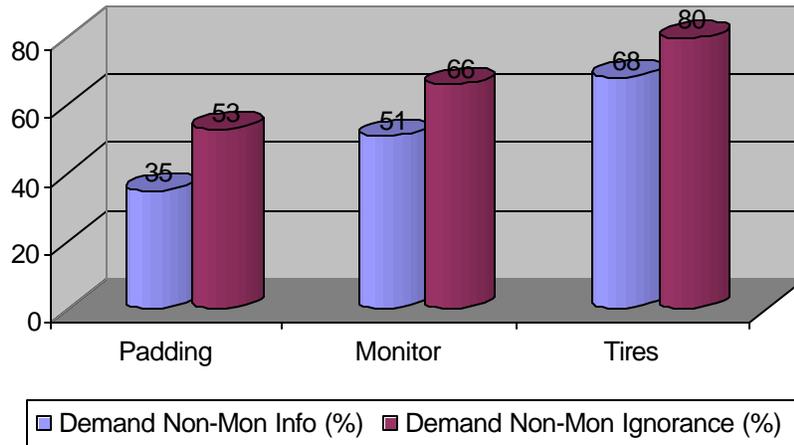


Chart 3b- Demand for Non-Monetary Coverage across Levels of Information (Study 2)



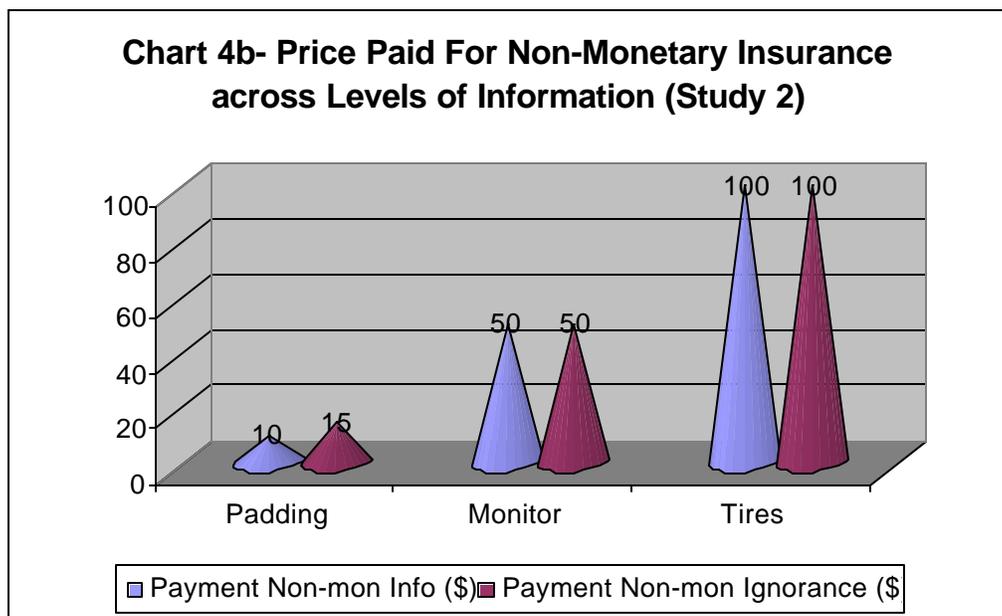
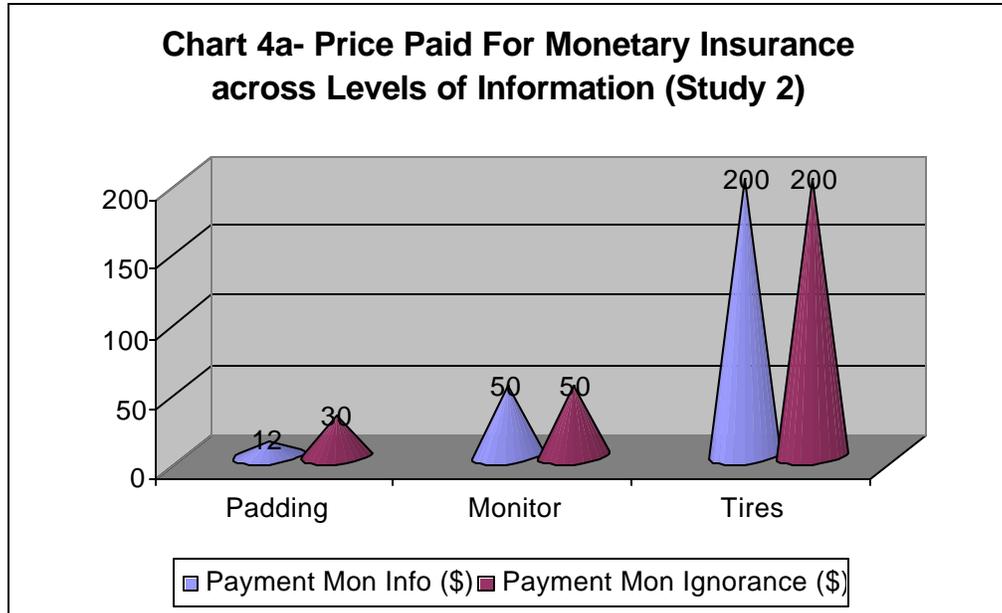


Table 8 reveals that participants under ignorance were much more likely to buy (pay more than the expected value for) either type of insurance than participants under information (compare columns 2 and 5 in Table 8 and see Chart 3). In general, for all products, about 20 percentage-points more participants under ignorance bought both types of insurance.²⁵⁰ Interestingly, being informed seems to play, with respect to

²⁵⁰ Specifically, about 15 percentage-points more participants under ignorance bought both types of insurance for tires, about 18 percentage-points more bought both types of insurance for the monitor, and about 23 percentage-points more bought both types of insurance for the padding, than participants under risk.

the likelihood to buy insurance, a more significant role for monetary than for pain-and-suffering insurance.

Focusing on the price participants paid (see columns 3 and 6), Table 8 reveals that across all products participants under state of ignorance were willing to pay more (for both types of insurance) than participants under a state of information. However, with one exception, neither of these differences was found to be significant even at the $p=0.1$ level. The exception is the difference between the amount of money participants paid for monetary insurance for padding under information and under ignorance, which was almost significant ($p=0.08$).²⁵¹ (And see Chart 4).

I next turn to an analysis on the individual level. I checked *differences* between the amount of money *each* participant spent on both types of insurance in the state of ignorance and in the state of information.²⁵²

Table 9- Comparison of the differences between the amount of money each participant spent for the two types of insurance (under ignorance/ information)

1	Type of comparison	Padding		Monitor		Tires	
2	Level of information	Ignorance (n=43)	Info (n=34)	Ignorance (n=49)	Info (n=41)	Ignorance (n=44)	Info (n=34)
3	# of people who treated both types <i>exactly</i> the same	15 (35%)	17 (50%)	16 (33%)	23 (56%)	10 (23%)	15 (44%)
4	# of people who paid more for pain-and-suffering	3 (7%)	3 (9%)	8 (16%)	6 (15%)	4 (9%)	3 (9%)
5	# of people who paid more for monetary	25 (58%)	14 (41%)	25 (51%)	12 (29%)	30 (68%)	16 (47%)

²⁵¹ This latter result is supported when the medians are compared across different levels of information. Indeed, whereas there was no change in the medians in the cases of the tires and the monitor (see columns 4, 7) across different levels of information, there was a change in the case of the medians of the padding. The mean and the median are calculated for the participants who paid above the expected value. I ran a Wilcoxon Scores test and found that when taking into account *all* participants (and not only those who paid above the expected value), the level of information *was* a significant factor ($p=0.05$) for buying monetary insurance across all products as well as for buying pain-and-suffering insurance for the padding. As the “new” participants included in this test did not buy insurance, this result implies that information was an important factor for the mere decision to buy insurance but not for the premium paid.

²⁵² Table 15 is similar to Table 13, but also includes the state of ignorance.

Chart 5 presents the percentage of participants who paid *exactly* the same amount of money for both types of insurance across different levels of information. Chart 5 is a graphic representation of row 3 in Table 9.

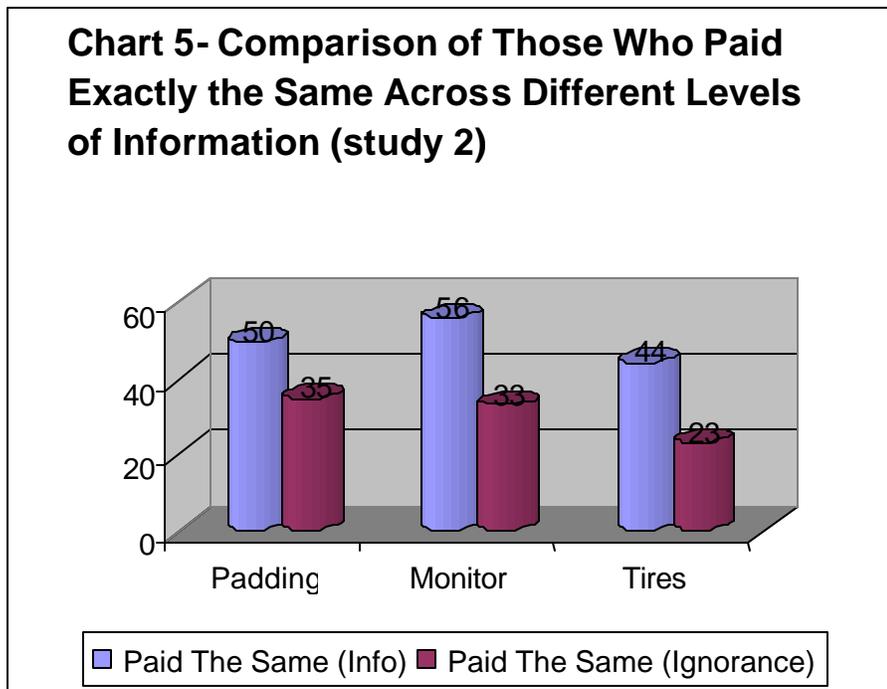


Table 9 and Chart 5 reveal that the number of participants that treated both types of insurance *exactly* the same is larger in the group which was provided with information (see row 3). On average, whereas only 30% of the participants treated both types of insurance *exactly* the same when in the state of ignorance, about 50% treat it the *exactly* same when in the state of information.²⁵³ Moreover, in the group which was provided with information, fewer participants (about 20 percentage-points fewer) were willing to pay *more* for the monetary than for the pain-and-suffering insurance (see row 5) and slightly more participants (about 1 percentage-points more) were willing to spend *more* for the pain-and-suffering than for the monetary insurance (see row 4).

²⁵³ 21 more percentage-points in tires, 23 more in monitor, and 15 more in padding.

e. Study two discussion

Study 2 replicates the results in Study 1 in the sense that it shows that the majority of the participants expressed a product-dependent demand for pain-and-suffering insurance.²⁵⁴ More importantly, Study 2 also replicated the result that the vast majority (more than 75%) of the participants treated both types of insurance the same- either they buy them both or they buy neither. Moreover, about 50% of the participants under information treated both types of insurance exactly the same- namely, they paid *exactly* the same price for both types of insurance. As in Study 1, of those who did not treat it the same, the vast majority preferred monetary to pain-and-suffering insurance. As in Study 1, participants under information paid for monetary insurance 20%-30% of the products' price, and 15%-25% of the products' price for pain-and-suffering insurance.²⁵⁵

Study 2 further sheds light on the role of information. The results show that participants who had information about the probability and magnitude of the harm were less likely (about 20 percentage-points difference) to buy pain-and-suffering (see Table 8).²⁵⁶ Interestingly, once they decided to buy insurance, informed participants paid less (for both types of insurance and across all products) than uninformed ones. However, this difference was not found to be significant.²⁵⁷

More importantly, participants with information were more likely to treat both types of insurance the same. Specifically, whereas under ignorance only 30% of the participants paid *exactly* the same amount of money for both types of insurance, under risk 50% paid *exactly* the same.

In sum, the results show that providing participants with information had almost no significant effect on the premiums they were willing to pay but only on the likelihood they would buy insurance.

²⁵⁴ 74% demanded pain-and-suffering insurance for tires, 59% for monitor, and 45% for padding.

²⁵⁵ From the fact that participants were willing to pay premiums which were high above the expected value demonstrates, again, that, even when provided with information, people neither maximize their expected utility, nor act as if they maximize it. Unless one is willing to assume that participants were extremely risk averse; an implausible assumption in this context.

²⁵⁶ This result, besides demonstrating that information matters, shows that participants had subjective estimations that were higher than their estimations of the probabilities and harm I provided them. As the information I provided about the probabilities and harm was not real, this result, by itself, has no significant value.

²⁵⁷ With one exception- the premium for pain-and-suffering insurance for the padding.

3. Study three experimental design

Another way to explore the influence of information is to design a “within participants” design, where the *same* participants are gradually exposed to more information. This is the design of Study 3.

a. An overview.

Participants first faced a series of four decisions (D1 to D4) involving the purchase of three different types of insurance for one product- a \$100 portable saw. The insurance decisions were whether to purchase a warranty, an insurance against any monetary costs involved in an accident and lastly an insurance against pain-and-suffering involved in an accident. Participants were asked to name the maximum amount of money that they were willing to pay, if any, to buy each type of insurance coverage.

b. Information

The only difference among the four decisions the participants faced was the amount of information they had. In the first decision (D1) participants had no information at all about either the probability of the saw breaking down or the magnitude of harm that it might cause. This condition is called “state of ignorance.” Then, participants were asked to flip the page and move to the next question where more information was provided to them. In the fourth (D4) decision participants had enough information to decide on the amount they were willing to pay for the monetary as well as for the pain-and-suffering coverage. In this condition, participants had all the information they needed; this stage is called “state of information.”²⁵⁸

²⁵⁸ Specifically, in the second decision (D2), participants were informed of the 2% probability of the saw breaking down, so they had enough information to calculate the two-dollar expected value to help them decide on the amount they were willing to pay for the warranty. In the third decision (D3), participants were informed of the 0.01% probability of the saw breaking down and causing injury, as well as of the \$100,000 average dollar value of these injuries, so they had enough information to calculate the ten-dollar expected value to help them decide on the amount they were willing to pay for the monetary coverage. In the fourth decision, participants were informed also of the \$100,000 average dollar value of the pain-and-suffering caused by the accidents.

c. Participants

The participants were 135 students from the University of Michigan Law School. Questionnaires were distributed one half-hour before the end of the first classes (tax law and pollution law) in the Fall 2000 term. (The questionnaires were distributed simultaneously in both classes, so there were no students who filled them out twice).

d. The design

Similar to the task in the previous studies, participants had to state the price they were willing to pay, above the price of the saw, for a monetary and for a pain-and-suffering insurance. Participants were told that the only legal rights they have against the seller of the saw are those they pay for it in the form of insurance. Participants were told that they did not *have* to buy any of the insurance coverage plans.

Then, participants were presented with a table that offered them three different Deals; a deal for a warranty, a deal for the monetary insurance, and a deal for the pain-and-suffering insurance (see Appendix). Participants were asked to specify the maximum amount of money they would be willing to pay for each deal, if any, above the \$100 that the saw costs. Participants were also asked to give reasons for each decision they made.²⁵⁹

e. Study three experimental results

i. "Cleaning the data set"

As before, I eliminated those participants who did not understand that the Deals are additive. Five participants were eliminated in that way.²⁶⁰ As before, some participants were willing to pay extremely high premiums for different types of

²⁵⁹ To make sure that participants understood that the insurance Deals are additive, I asked participants, after they filled out the amount of money they would be willing to pay for each type of insurance, to sum up the *total* amount of money they would spend on the saw.

²⁶⁰ I did this by eliminating the participants for whom the amount of money they were willing to pay in total for the saw was not equal to the sum of the partial amounts of money they were willing to pay for the Deals plus the \$100 cost of the saw. For six more participants I was not certain whether they understood this point, because they did not answer this question. I, thus, performed the analysis twice—once with these six participants and once without; there was no significant difference.

insurance.²⁶¹ I therefore decided to ignore any insurance premium reported by participants which was above \$100 (the price of the circular saw); consequently, results from three more subjects were ignored.

ii. Order effect

In order to control for this *order-effect* the Deals were scrambled so that three factorial different questionnaires were distributed.²⁶² I then checked whether the order of the Deals is a factor. I ran two different non-parametric tests, Wilcoxon Scores, and Median Scores.²⁶³ I found that in most, but not all, cases participants expressed no significant difference (P value was about 0.8) in their willingness to pay for the monetary insurance or pain-and-suffering insurance across different orders of presentation. Because I scrambled the orders of the Deals the participants read, I decided to ignore the minor *order-effect* found

iii. The General demand for insurance under full information²⁶⁴

As before, I begin by analyzing the stage where participants were provided with information- the “state of information” (D4). Table 10 presents the percentage of participants who were willing to buy any type of insurance and the mean and median of their premiums.

Table 10- The demand for pain-and-suffering and Monetary insurance (under info).

123 participants	Participants’ payment for monetary insurance			Participants’ payment for pain-and-suffering insurance		
	% buy	Mean	Median	% buy	Mean	Median
Full information, D4	48%	\$25	\$20	27%	\$25	\$10

²⁶¹ For example, the three highest premiums that participants were willing to pay for the monetary insurance (for which the expected value was \$10) were \$1000, \$400, and \$300.

²⁶² Forty-three participants saw (in all four questions- D1 to D4) the warranty first, forty participants saw the monetary insurance first and forty-one participants saw the pain-and-suffering insurance first.

²⁶³ We rejected normality with $p=0.0001$ Shapiro-Wilk statistic.

²⁶⁴ In the analysis below, I present only the results that relate to the comparison between pain-and-suffering and monetary insurance; I omitted, for reasons of simplicity, the analysis related to the warranty. The complete analysis is on file with the author.

Table 10 shows that when under conditions of information, only about 27% were willing to purchase pain-and-suffering coverage. The demand for monetary insurance was likewise not very high- less than half of the participants (48%) were willing to purchase monetary insurance. I ran a McNamar test and found that the difference was significant ($p=0.001$). Table 10 also shows that, under full information those participants who were willing to buy insurance, spend, on average, *exactly* the same amount of money - \$25 - on pain-and-suffering and monetary insurance.²⁶⁵ Lastly, Table 10 shows that participants were willing to spend well above the \$10 expected value for both types of insurance.

I next examined the *differences* between the premiums that *each* participant spent on both types of insurance.

The McNamar test revealed that the vast majority of the participants treated monetary insurance and pain-and-suffering insurance in the same manner- either buying them both or buying neither. Specifically, 71% of the participants treated monetary and pain-and-suffering insurance in the same manner. Of those who did not treat them the same, most participants (25.5%) preferred monetary to pain-and-suffering insurance, whereas only 3.5% preferred pain-and-suffering to monetary insurance.

I then checked the percentage of people who treated both types of insurance *exactly* the same. Table 11 presents the results.

Table 11- Participants' payments under full information, n=121

1	# of people who treated the different types of insurance <i>exactly</i> the same	68 (56%)
2	# of people who paid more for pain-and-suffering	10 (8%)
3	# of people who paid more for Monetary	43 (36%)

²⁶⁵ Focusing on the medians shows that most participants who bought both types of insurance coverage paid below the \$25 mean. However, as few of them paid much above it, the total mean is \$25. This effect, of few people paying a lot more than the mean, was stronger for the pain-and-suffering insurance, than for the monetary one.

Table 11 reveals that 56% of the participants were willing to spend *exactly* the same amount of money for pain-and-suffering and monetary insurance.²⁶⁶ However, among those who treated these two types of insurance differently, a *significant* majority (36%) paid more for monetary insurance.

iv. The influence of information

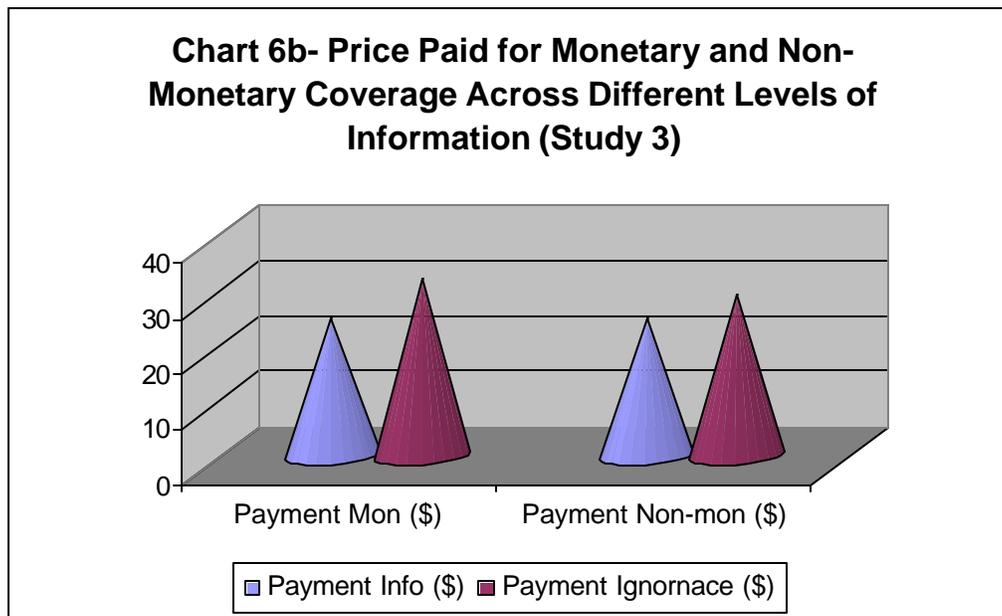
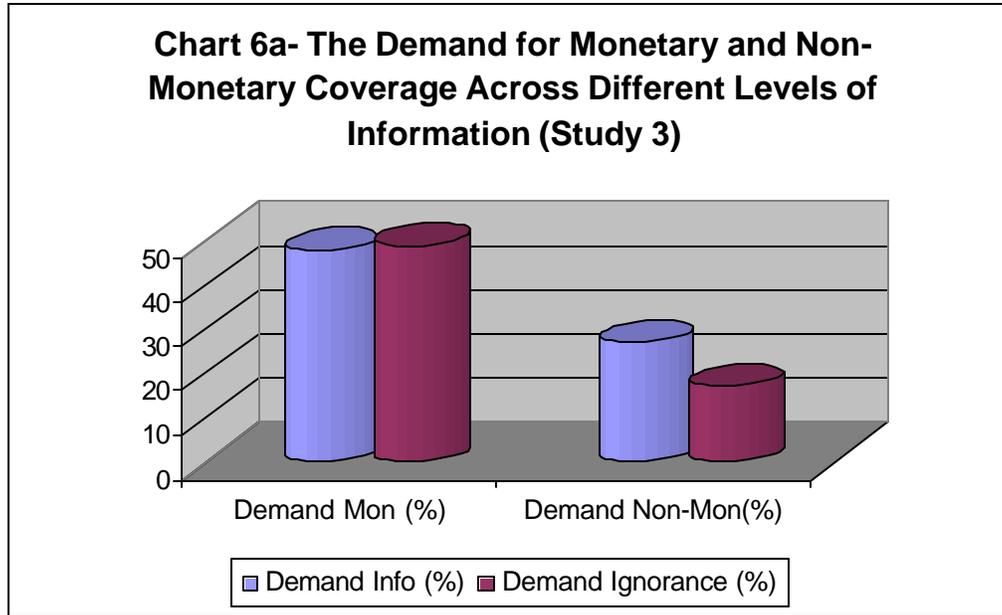
I then examined whether the amount of information that participants hold influenced their preferences. I checked whether the difference between those who were willing to buy any type of insurance under ignorance (D1) and those who were willing to do it under full information (D4) is significant. Table 12 and Chart 6 present my results.

Table 12- Participants' demand for different types of insurance across different levels of information.

1	2	3	4	5	6	7	8	9
Level of information	Participants who bought monetary insurance				Participants who bought pain-and-suffering insurance			
N=123 participants	%	N	Mean	Median	%	N	Mean	Median
Ignorance D1	49	60	\$32 (25.1)	\$20	17	21	\$29 (16.6)	\$25
information D4	48	59	\$25 (23.1)	\$20	27	33	\$25 (26.9)	\$10

* Standard deviations are reported in brackets.

²⁶⁶ As we here focused on participants who treated the different types of insurance *exactly* the same, we obtained a relatively smaller number, 56%, than the 71% I reported before.



For the monetary insurance, information did not change the number of participants who were willing to spend more than the expected value for the insurance; under both ignorance and information the number was almost 50% (see columns 2 and 3). More interestingly, for the pain-and-suffering insurance more information caused an *increase* in the demand. Specifically, there was an increase of almost 60%, or 10 percentage-points, from 17% to 27% (see columns 6 and 7) in the number of participants who were willing to buy pain-and-suffering insurance under

full information as compared to under ignorance. This increase was significant ($p=0.007$).

Comparison of the means shows that providing participants with information caused them to decrease their payments for both the monetary insurance (column 4) and the pain-and-suffering insurance (column 8). But the differences between the means were not significant.²⁶⁷

This last test demonstrates that providing participants with information causes more people to shift towards buying pain-and-suffering insurance but has no significant effect on their premiums. In contrast, not only does providing participants with information have no significant influence on the premiums they pay, neither does it have an influence on the number of people who buy monetary insurance.

I was then interested whether providing participants with information has an influence on the way they perceive both types of insurance. I ran a McNamar test and found that providing participants with information caused more participants to treat the two types of insurance similarly, in the sense that they either bought them both or bought neither. Specifically, whereas under ignorance (stage D1) 63.5% of the participants either bought them both or bought neither of them, under full information 71% treated them identically.

Another comparison I made was among the differences between the premiums that each participant was willing to pay for different types of insurance under ignorance and under full information. Table 13 is similar to Table 10 but also includes the state of ignorance.

²⁶⁷ Note that for the monetary insurance, we could compare (in the paired Wilcoxon test) only 46 pairs and for the pain-and-suffering only 17 pairs. I also ran a paired T-test and found that the difference was significant for the pain-and-suffering insurance. However, as the distribution of the dependent variables is not symmetric, the Wilcoxon test is the more accurate. Indeed, the standard deviations (reported in brackets below the means) are relatively large; this means that it is difficult to be certain that the differences between the means are significant.

Table 13- Amount of money that the participants were willing to pay under full information and under ignorance

1	Level of information	D1	D4
2	# of people who treated the different types of insurance <i>exactly</i> the same	58 (48%)	68 (56%)
3	# of people who paid more for pain-and-suffering	5 (4%)	10 (8%)
4	# of people who paid more for Monetary	58 (48%)	43 (36%)

Table 13 reveals that, as before, information matters. There is an increase of 17% (or 10 percentage-points) in the number of participants that treated both types of insurance the same when provided with information (see row 2). Whereas only 48% of the participants treated both types of insurance the same when in the state of ignorance, about 56% treat it the same when in the state of risk.

Moreover, when provided with information, fewer participants (25% fewer or 12 percentage-points fewer) were willing to pay *more* for the monetary than for the pain-and-suffering insurance (see row 4). Lastly, when provided with information more participants (100% more or about 4 percentage-points more) were willing to spend *more* for the pain-and-suffering than for the monetary insurance (see row 3).

In sum, generally most people treat pain-and-suffering and monetary insurance in an identical fashion. Of those who do not, the demand for pain-and-suffering insurance is lower than the demand for monetary insurance. Providing participants with information causes more of them to treat both types of insurance identically, (as well as to demand more pain-and-suffering coverage). Information has no significant effect on the demand for monetary insurance.

f. Study three discussion

I was interested first to test people's demand for pain-and-suffering insurance in the context of product liability. The results show that only 27% of the participants under information were willing to purchase pain-and-suffering coverage. However,

and this relates to our second issue of whether the demand for pain-and-suffering and for monetary insurance differs, this low demand for pain-and-suffering insurance should be read in light of the similarly low demand for monetary coverage (49% of the participants). Indeed, and more importantly, about 71% of the participants treated monetary and pain-and-suffering insurance in the same manner- either buying them both, or buying neither. Moreover, the participants who were willing to buy insurance spent, on average, the same amount of money on each type of insurance. As Table 11 reveals, the majority of participants under risk paid *exactly* the same amount of money for both types of insurance. Of those who did not treat it the same, the majority preferred monetary to pain-and-suffering insurance.

The third issue I examined was the effect of information on people's decision making in this context. Our results show that providing participants with information causes a significantly higher percentage of them to purchase pain-and-suffering insurance, but has no significant influence on the number who buy monetary insurance (see Table 12). Providing participants with information apparently caused them to lower the premiums they were willing to pay for both types of insurance; but this effect was not significant.

Information also has an influence on the perception of the relation between the two types of insurance. Specifically under full information (D4), more participants paid more for pain-and-suffering than for monetary coverage and more participants paid exactly the same amount of money for both types of insurance than under ignorance (see Table 13).

The results clearly show that providing participants with information had no significant effect on the premiums they were willing to pay, which was a percentage of the product price and unrelated to the expected loss, but only on the likelihood they would buy insurance.²⁶⁸

²⁶⁸ Interestingly, I found only minor gender effects. Specifically, women were much more likely to buy monetary insurance than men were, and, under full information (D4), were willing to pay more for both types of insurance than men were; but this latter effect was not significant. In the state of ignorance, women and men were willing to pay about the same amount of money for both types of insurance. Providing participants with information, however, increased both genders' likelihood of buying pain-and-suffering insurance (see table 8). In addition, both men and women expressed more tendency to treat both types of insurance the same when provided with information; this effect was stronger for women.

C. General Summary

In this part, I will discuss the similarities and the differences that emerged in the results of all three studies.

1. The demand for pain-and-suffering versus the demand for monetary insurance.

With respect to the primary question I was interested in, my results in all studies show that the vast majority of the participants (90% in Study 1, 75% in study 2 and 71% in study 3) treated the two types of insurance the same- either they buy them both or they buy neither. Moreover, on average, in all studies the majority of participants under information treated both types of insurance *exactly* the same- namely, they paid *exactly* the same amount of money for both types of insurance. Of those who did not treat it the same, the vast majority preferred monetary to pain-and-suffering insurance.

This result may shed doubt on the approach applied by scholars that people will always buy a fair monetary insurance but not non-monetary insurance. The results clearly show that people do not always demand monetary insurance, and are much more likely to treat both types of insurance in the same manner than scholars have traditionally thought.

The fact that people were willing to pay well above the expected value, in all studies, across all products, may tell us that people may add some perceived-as-reasonable premium to the price of the product, neglecting the expected value altogether. Indeed, most participants in a state of risk were willing to pay an estimated 15% to 35% of the product price, regardless of the expected value of the coverage. Indeed, in conversations I had with participants in the pretest stages, I discovered that many participants, when deciding how much to spend, do not take into account the expected value of the coverage. This result was corroborated by the fact that information about the expected value was not significantly correlated with a change in the premiums, but only with the mere likelihood of buying insurance. This pattern of

decision-making may attract entrepreneurs who might extract surplus from lay consumers, especially in non-competitive markets.²⁶⁹

There are two main differences between the results in Study 1, Study 2 and Study 3. First, there is a significant difference in the overall demand for both types of insurance (monetary and pain-and-suffering). In Study 1, on average 82% and 77% of the participants were willing to purchase monetary and pain-and-suffering insurance, respectively, whereas in Study 2, on average 63% and 51% of the participants were willing to do so and in Study 3 only 49% and 27% of the participants were willing to do so. Before I try to explain these differences it is important to observe that the internal ranking of the insurance coverage is the same: in both Study 1 and Study 2, participants were more likely to purchase insurance coverage and the price they were willing to pay was higher for tires than for monitor then for padding. This probably corresponds to the severity of the injury for each product, as was described in the questionnaire.²⁷⁰ Thus, from a qualitative perspective the demand across studies *is* in some sense similar.

As for the quantitative difference between the studies, first, the students in Study 1 were required to immerse their arm in ice water for 10 seconds. It is possible that priming pain in this way influenced their demand. Indeed, these students expressed the highest demand for insurance and were the ones who more than any other group treated both types of coverage the same.

Second, the difference could be related to the fact that the populations were different. It might be that psychology undergraduates are significantly different from law students, who in their turn are significantly different than economics students. It could be the age, or even that the people who study law as graduate students are cognitively different than those who study psychology or economics as an

²⁶⁹ For example a local monopoly that sells a specific audio system may well extract surplus (which would be much above the “regular” monopoly rent) because consumers determine the premium they are willing to pay for a service-contract (a warranty) by applying a rule of thumb and paying some fix percentage of the product price. In competitive markets, in contrast, there is a higher chance that consumers will be charged a price that is closer to the supplier’s marginal cost, which is virtually the expected value of the insurance coverage.

²⁷⁰ For the padding participants read that “a fall can then result in serious injury to the affected joints, possibly leading to permanent damage in the form of reduced mobility and function.” For the monitor they read that “certain form of migraine headache can be directly linked to the radiation emitted by all standard computer monitors. The migraines resulting from use of computer monitors are very painful, and are usually accompanied by nausea and spotty vision. They generally occur once or twice a month. They last for 4 hours and are treated with rest and medication.” Finally, for the tires they read that “the injuries to the driver can be very severe and can include spinal cord damage resulting in paralysis (i.e., permanent immobility of the legs).” See the Appendix for more details.

undergraduate. However, I do not have a theory that will explain how the differences would drive the results one-way or the other.²⁷¹

Third, it might be that the difference in the design of the three studies was a factor. Whereas the law students faced a “within participants” design and had to make decisions about one product (circular saw), the psychology students faced a “between participants” design and had to make decisions about three products (tires, monitor and padding). The economics students had to make decisions about four products. Here, too, I do not have a theory that will explain the differences.

Forth, it might be that the nature of the product was a source of the difference. If we ignore the results of Study 1, on the theory that immersing one’s hand in ice water for 10 seconds, significantly changes its preferences, then a closer look at the demand for insurance in Studies 2 and 3 may shed some light on the results. The demand, under risk, by psychology students in Study 2 for insurance for tires and monitor was relatively high,²⁷² whereas, the demand for insurance for the padding, by psychology students, and for the circular saw, by law students, was relatively low.²⁷³ Analysis of verbal responses made by participating law students reveals that many of those who did not buy coverage had two main reasons for this decision. First, they thought they could control the materialization of the harm (“if I am careful with the saw I should not be injured” (L27), and “I would rather take the chance that I will not injure myself” (L12)). Second, they thought that they did not “deserve” to be compensated as they assumed a known risk voluntarily. Both of these reasons apply directly to padding but not for monitor or tires. Thus, it might well be that the low demand for both types of insurance, for both the padding and the circular saw, reflects these lines of arguments.

²⁷¹ One may argue that this priming effect is exactly what makes this study more reliable because participants were less likely to ignore the effects of pain on their lives. In other words, participants were more “informed” about the decision they were suppose to make.

²⁷² 82% (67%) were willing to pay weakly above the expected value for monetary (pain-and-suffering) insurance for tires, and 58% (51%) were willing to pay weakly above the expected value for monetary (pain-and-suffering) insurance for monitor.

²⁷³ 50% (35%) were willing to pay weakly above the expected value for monetary (pain-and-suffering) insurance for padding, and 49% (27%) were willing to pay weakly above the expected value for monetary (pain-and-suffering) insurance for the saw.

2. The influence of information

All of the studies show that information matters. First, information caused more participants to treat both types of insurance in the same manner. One possible reason for this could be that absent information, it is easier for participants to suppress the possibility of incurring pain-and-suffering. Once confronted with information regarding this possibility, participants tend to treat it exactly as monetary insurance, and to increase their demand for pain-and-suffering insurance.

Second, whereas in Study 3 information caused significantly more participants to buy pain-and-suffering insurance, in Study 2, informed participants were less likely to buy *both* types of insurance.

In both studies, however, information was not a cause for a significant difference in the premiums participants were willing to pay for both types of insurance. As participants do not take the expected value as the focal point when deciding their maximum willingness to pay, one should not be surprised that information does not influence the premiums participants were willing to pay.

If these results are robust, then there is an argument to compel manufacturers to publish the rates of failures of their products. Clearly, manufacturers have no incentives to do that, as they gain from people's superfluous demand for monetary insurance in the state of ignorance. Indeed, it is not evidently clear why pharmaceutical companies must publish their products' rates of failure (side effects) while other product manufacturers are not burdened with a responsibility of this sort.

IV. SUMMARY AND FUTURE REASERCH

A. *Summary*

The departure point of this article is the conventional economic analysis of the law. It deals with two interrelated problems. First, whether the economic theory and the empirical work on pain-and-suffering damages suggest that there is *no*, and should not be, demand for such damages in the product liability context. The Article criticized the theoretical tools scholars have applied in their analysis, as well as the empirical work done to investigate the actual demand for pain-and-suffering coverage.

Second, once it was established that the demand for pain-and-suffering coverage is an empirical question, the Article proposed a theoretical framework to explore the demand for pain-and-suffering coverage by means of relative comparison to the demand for monetary coverage in the context of product liability. Indeed, a significant demand for pain-and-suffering coverage was found in this way.²⁷⁴

This result joins other recent evidence that people are willing to pay more in order to secure pain-and-suffering damages. For example, in 1998 the Office for National Statistics in the UK researched public perceptions of what the levels of damages for pain-and-suffering loss should be.²⁷⁵ The research was based on “face to face” interviews conducted in September and November 1998 with adult interviewees, selected in such a way that they form a random and a representative sample of the population of Great Britain. One thousand nine hundred respondents were presented with 4 injury cases and were asked how much money they think each of the injured people should have been awarded *for their pain-and-suffering loss*. About 60 percent of the respondents suggested awards at least one and half times higher than would currently be available in the UK, of this group about 80-90 percent suggested awards which were at least double current awards.²⁷⁶ The important point however is that even when told that higher awards cause higher insurance premiums

²⁷⁴ More accurately, the demand that was found is for the type of pain-and-suffering coverage that was described to participants. The description stated that the coverage “provides compensation for pain and suffering resulting from an injury. This could include physical or emotional pain, or any suffering involving the suffering of changing your lifestyle to adjust to living with a loss of mobility, a loss of function, or a disability. It *does not* include any compensation for any monetary expenses like medical and rehabilitation costs or lost wages.” One should recall that even if it becomes evident, by means of further empirical studies, that individuals do not demand pain-and-suffering coverage, there are still some arguments in the literature that support pain-and-suffering awards. For example, some have argued that pain-and-suffering awards have a tacit role to help pay the plaintiff’s legal expenses (one-third of the compensation paid to the plaintiff) and thus help to offset the alleged over insurance provided by pain-and-suffering damages. BSB at 936; Viscusi, *Souder Rationale* at 162-3. Indeed one commentator has proposed that victims forgo awards for pain-and-suffering damages in exchange for guaranteed payment of lawyers’ fees. J. O’Connell, *Proposal to Abolish Defendants’ Payments for pain-and-suffering in Return for Payment of Claimants’ Attorneys’ Fees*, U. ILL. L. REV. 333 (1981); Geistfeld argues that the majority of victims never file lawsuits. Geistfeld at 802-3. Thus, pain-and-suffering damages serve as a multiplier of the compensatory damages sending the correct signals to potential injurers. Geistfeld concludes that even if the individual consumer does not prefer non-pecuniary coverage, consumers as a class probably prefer full compensation for pain-and-suffering damages. *Id.*

²⁷⁵ The Law Commission, *DAMAGES FOR PERSONAL INJURY: NON-PECUNIARY LOSS* (1999), <http://www.lawcom.gov.uk/library/lc257/lc257.pdf>. The Law Commission is an independent body set up by English Parliament in 1965 to keep the law of England under review and to recommend reform when it is needed. There are five Commissioners, all of whom work full-time at the Commission. The Chairman is a High Court judge. The other four Commissioners are experienced judges, barristers, solicitors or law professors. See <http://www.lawcom.gov.uk/misc/about.htm#what/>

²⁷⁶ *Id.* at 45.

so that eventually the public, rather than the negligent person who caused the injury, pay the awards, 80% of interviewees did not change their answers.²⁷⁷ The research resulted in a recommendation by The Law Commission to increase the awards for pain and suffering damages by 50 to 100 percent. In March 2000, the Court of Appeal, discussing the Law Commission's report, decided, in a seminal case, to increase the pain and suffering damages awarded in England up to a maximum of one third, for the most severe injuries.²⁷⁸

It is not only important to explore whether healthy people are willing to pay for pain-and-suffering damages to be available but also whether injured people think the same. The theory behind this idea is that they may know something healthy participants do not know. Indeed, the only reason that traditionally we have the pre-accident "self" decide the insurance premiums is technological: one, usually, cannot consult with her future post-accident "self" and inquire about her need for coverage. But this technological problem can be reduced if we let other future "selves" inform us on their need for coverage. These other future "selves" are the injured. If their responses were significantly different than those of the healthy, we will have to develop a mechanism to include their preferences in the social welfare function.

There is some evidence of injured people's preferences. In a pioneering study from 1972, Jeffrey O'Connell and Rita James Simon reported a study where 391 compensated automobile *accident victims* were interviewed via the telephone.²⁷⁹ Most surveyed victims favored continuing payments for pain-and-suffering and maintaining

²⁷⁷ *Id.* at 48. The study does not provide information on who were those who did change their minds. One might argue that nothing should be learned from the UK as the tort damages in the UK are significantly lower than in the US, for, among other things, the social security system in the UK provides broader coverage. Yet, a closer look reveals that the pain-and-suffering awards in the UK are *not* significantly different than pain-and-suffering awards in the US, at least in states which cap damages for pain-and-suffering. For example, the maximum award for pain-and-suffering in the UK, as published in the Guidelines for the Assessment of General Damages in Personal Injury Cases, is 130,000 pounds, about \$200,000. Still, most people thought it was much too low, even when explained that the cost of higher damages is born by the public.

²⁷⁸ *Heil v. Rankin*, [2001] Q.B 272. The court was concerned about the failure to explain sufficiently and explicitly to participants what would be the potential effect on premiums charged by insurance companies in the event that pain and suffering were increased as well as by absence of any indication to the participants of the significance of an increase in damages on the resources of National Health Services (NHS). There would be an increase of 133 billion pounds per year in the NHS's liability for clinical negligence and an increase of 1 billion pounds per year in the insurance industry's liability as a whole. *Id.* at paragraphs 66, 87 and 95. Nonetheless, the court was criticized by victims' lawyers for not adopting The Law Commission's recommendation of an increase of 50% to 100%.

²⁷⁹ The interviewees were Illinois residents who had been paid during the year 1966 by a given insurance company. J. O'Connell & R J Simon, *Payment for Pain and Suffering: Who Wants What, When and Why?*, 1 U. IL. FORUM 14 (1972).

present premium rates, as well as would choose to buy their own coverage for pain-and-suffering, covering themselves and their families, were it possible.²⁸⁰

O'Connell and Simon summarize previous studies, most of which reached similar results.²⁸¹

In the UK, a 1993 survey of 761 compensated accident victims ran by the Law Commission, found that many respondents fail to realize, in the period after the settlement, for how long they are likely to be affected by their injuries and dependent on their damages in the future.²⁸² The researchers found that four in five victims were still experiencing pain at the time of the interview (84% of the accidents occurred

²⁸⁰ In both cases, it was about two-thirds of respondents. *Id.* at 29-34.

²⁸¹ *Id.* 34-43. In a recent 1998 study with several co-authors, Viscusi assesses intangible health losses associated with multiple sclerosis (MS). They used two different methods: risk-dollars and risk-risk tradeoffs. The sample included subjects from the general population and persons with MS. The authors found that marginal utility of income is lower in the state with MS than without it, but that the difference in marginal utility in the two states was greater for people without MS than for those with the disease. In addition, people with MS overestimated the probability of acquiring MS to a greater extent than did people without MS. See *Alternative Approaches*. Specifically, respondents with MS were willing to pay much more to avoid acquiring the disease (risk-dollar tradeoff). *Id.* at 486. But were much more restraint to undergo a painless operation that would either completely cure their MS or kill them instantly (risk-risk tradeoff). *Id.* at 488. These two results seem inconsistent with each other. When asked to undergo the operation, MS respondents placed less disutility on having the disease than do others without it, but when asked to pay to avoid it they were willing to pay more, implying otherwise. Viscusi et al attempt to reconcile these inconsistent results in the following way. They interpreted the reluctance to undergo an operation, as derived from the risk-risk tradeoff, to mean that the decrease in the overall utility drop from having MS is not as big as the healthy respondents seemed to think and that the decrease in the marginal utility of income at the state with MS is larger for people with MS. *Id.* at 489. Viscusi et al conclude that "if the question concerns research funding financed by general revenue, then the estimates from the general sample are germane. They additionally argued, that preferences of persons with MS should be reflected in the willingness to pay estimates, yet when these preferences are properly weighted, they represent a very trivial fraction of the sample. However, for purposes of selecting among alternative therapies, estimates of value from the inflicted persons are relevant." Viscusi et. al., *Alternative Approaches* at 495. Other studies have found high correlation between responses of patients and the general public. This includes arthritis, cancer and more. See sources cited at pages 494. In one study however, respondents who have relatives with chronic bronchitis were more willing to forgo income than the general sample. Krupnick A. & Cropper M. *The Effect of Information on Health Risk valuations*. 5 J. RISK & UNCERTAINTY 29 (1995). Yet, they were not willing to increase their risk of auto death to reduce the risk of bronchitis.

²⁸² The Law Commission, *Personal Injury Compensation: How much is Enough?* (1994, Law Com 225). This is especially true for victims of non-catastrophic injury because their inability to carry out normal life is less salient at the time of the settlement. The purpose of the study was to gather information directly from accident victims about their experiences several years after the settlement (either out of court settlements or awards by the court) of their claims. Indeed, almost all victims supported the availability of pain-and-suffering damages. Interviews with 52 accident victims led Professor Genn, who led the study, to relate these findings to the "widespread experience of continuing pain, even many years after the date of the injury." *Id.* at 211. A somewhat similar question rises with respect to whether damages for pain-and-suffering loss should survive the death of the victim. In this case, too, marginal deterrence requires that they would (so that it would not be cheaper to kill than to injure), and optimal insurance presumably requires that they would not (why would the victim pay premium for a pain-and-suffering insurance she would never personally enjoy ?) Yet, the experience in Scotland, where damages for pain and suffering loss were excluded from survival actions between 1976 and 1992 reinforce the general conclusion. Public unrest led to a change in the law in 1993. See THE DAMAGES (SCOTLAND) ACT 1993.

between 4 to 11 years prior to the interview) and two in five were still in constant pain.²⁸³ Moreover, although most victims were satisfied with the awards at the time of settlement, “this satisfaction drains away over time when the reality of long term ill-effects and reduced capacity to work bite.”²⁸⁴ Indeed, one of the most common reasons for victims’ dissatisfaction was that the settlement represented inadequate compensation for the impact of the injuries on their whole way of life.²⁸⁵ The study concluded that even years after they receive the awards, victims still have need for psychological support, for ways to debilitate effects of pain, for some work retraining, as well for some general help to adjust to their circumstances and envision a useful and productive future for themselves.²⁸⁶ Indeed, six years later, The Law Commission’s general conclusion was that the ongoing pain and suffering effects of many injuries “are far greater than anticipated by victims at the time that they receive their compensation.”²⁸⁷

In Scotland, researchers in the Disability Management Research Group of the Rehabilitation Studies Unit at the University of Edinburgh conducted a follow-up study in 1993 of compensated victims of personal injuries arising out of motor vehicle accidents and medical negligence. One hundred and fifty-two claim files were examined and 83 claimants were interviewed. They had their accident occur, on average, ten years prior to the study and who had received compensation payments. The researchers found that the costs of care increased beyond those anticipated at the time the award was made. The care costs of one person with quadriplegia, who required twenty-four hour attention, doubled in the span of five years and resulted in the claimant's family having to assume greater responsibility for the management of the care provided.²⁸⁸

In Australia, a study from 1983 examined 263 compensated victims of motor vehicle, work and general accidents who were interviewed an average of six years

²⁸³ *Id.* at page ??? to the introduction.

²⁸⁴ *Id.*

²⁸⁵ *Id.* at 260. The reader should bear in mind that in the UK, only around 12% of victims (sustaining more than minor injuries) obtain damages through the tort system, so in an important sense, the study represents the ‘fortunate’ minority’s views. *Id.* at 262.

²⁸⁶ *Id.* at 265.

²⁸⁷ For this reason, among other things, the Commission recommended that pain-and-suffering damages should be increased by 50% to 100%. The Law Commission, *DAMAGES FOR PERSONAL INJURY: NON-PECUNIARY LOSS* 35 (1999).

²⁸⁸ P. Cornes, *Coping With Catastrophic Injury*; University of Edinburgh, (1993) (As cited in the Australian Law reform Committee’s report at <http://www.parliament.vic.gov.au/lawreform/default.htm>).

after having received their payments. It was found that about 50 percent of all victims had an incomes lower than average weekly earnings at the time of the interview and that about 50 percent received social security benefits. More relevantly, a substantial majority of the recipients regarded the amount they received as inadequate. Almost 70 percent of those interviewed reported continuing injury-related expenses six years after receiving their payments that were not predicted at the time of settlement.²⁸⁹ In 1992, two researchers from the University of Adelaide Law School interviewed 227 who had nine years earlier, received damages after having been injured in road accidents in South Australia. It was found that 18.5 percent were reliant upon social security for reasons related to the accident and that about 16 percent were living in families which were below the poverty line (compared with about 12 percent of the general population). Approximately 22 percent were rated by interviewers as financially insecure because of the accident whereas 52.6 percent said that their compensation was insufficient to cover their accident-related losses. More relevantly, about 60 percent were originally satisfied with the amount of compensation they received but by the time of the interview, some eight to nine years after settlement, only 24 percent were satisfied.²⁹⁰ In another 1992 study, researchers at the Centre for Socio-Legal Studies at La Trobe University in Melbourne had interviewed 24 people who had sustained a health/medical care injury. All of the families of injured children who were interviewed felt that the money they had received in compensation was inadequate to meet their child's on-going needs and therefore they would be required to provide financial support themselves. In particular, many of those interviewed were initially pleased with the lump sum but soon discovered that there were subtle forms of hidden costs that had not been anticipated.²⁹¹

²⁸⁹ C. Bass, 'Lump Sum Accident Compensation', 1 HUMAN RESOURCES 59, 165-7 (1983). (As cited in the Australian Law reform Committee's report at <http://www.parliament.vic.gov.au/lawreform/default.htm>)

²⁹⁰ M. Neave & L. Howell, *The Adequacy of Common Law Damages*, University of Adelaide, Adelaide, 1992 (As cited in the Australian Law reform Committee's report at <http://www.parliament.vic.gov.au/lawreform/default.htm>).

²⁹¹ Commonwealth of Australia, Department of Health, Housing and Community Services, Review of Professional Indemnity Arrangements for Health Care Professionals, *The Health/Medical Care Injury Case Study Project*, AGPS, Canberra, 1993. As cited in the Australian Law reform Committee's report at <http://www.parliament.vic.gov.au/lawreform/default.htm>).

B. Future research

My next project deals with the measurability question; how to best provide pain-and-suffering coverage in practice. Responding to this question requires us to consider two major issues. First, we must decide which institution we feel can best deal with providing pain-and-suffering coverage. Should this coverage be provided through legal rules or, perhaps, left to the insurance markets? Second, we must decide upon the means of application. What is the best way to provide pain-and-suffering coverage in practice? Should pain-and-suffering coverage be determined by applying some structured means, such as schedules, or perhaps it should be left to a jury's full discretion on a case-by-case basis? In either case, how exactly should the decision maker calculate the appropriate coverage?

Bovbjerg, Sloan and Blumstein (BSB), offer three different models for structuring the calculations of pain-and-suffering damages.²⁹² First, a system of standardized awards set according to a matrix or schedule of dollar values based on the plaintiff's age and severity of injury.²⁹³ Second, a system that employs scenarios of hypothetical injuries and their corresponding non-economic awards, which are presented to juries as suggested and non-binding guides to valuations.²⁹⁴ Third, a system of flexible ranges of monetary awards that would reflect the various categories of injury severity and victim age.²⁹⁵ Mark Geistfeld, in contrast, suggests that in the event of a prior contractual relationship between the parties, a jury would assess damages from an ex-ante perspective; asking how much a reasonable person would have paid to eliminate the risk that caused the pain-and-suffering loss. This measure, Geistfeld argues, reflects the consumer's ex-ante assessment of the cost of the pain-and-suffering loss.²⁹⁶

²⁹²BSB, *supra* note 150.

²⁹³*Id.* at 941. The severity of injury would be categorized according to whether it is permanent or temporary, and whether it is a minor or major one. As with respect to age, the authors argue that whereas with bodily injuries, young people are expected to recover faster from temporary pain-and-suffering loss, they would suffer more from permanent loss due to their increased life span.

²⁹⁴BSB, *supra* note 150, at 953-6. The authors suggest constructing nine scenarios that would describe the physical severity of the injury, such as the victim's age, the pain endured, etc.

²⁹⁵*Id.* at 956-960. Recognizing that some injuries are much more severe than others, the authors object to applying a single flat cap. The authors also question the wisdom in assuming that some awards would be disproportionate to the damages sustained, because of sympathetic juries. It is worth mentioning that the authors see this alternative as inferior to the matrices and scenarios for in most cases they give the juries no guidance, but only deal with the problem of outliers. *Id.* at 959.

²⁹⁶Geistfeld, *supra* note 16, at 805-807.

My next paper criticizes these different approaches taken. It then suggests that the ideal approach would constitute having a jury assess how much a rational and informed individual would pay ex-ante to insure pain-and-suffering loss in a world with no tort law. This ex-ante willingness to pay for insurance is the natural measure based on the theoretical framework.

Unfortunately, as my empirical studies indicated, while individuals' responses are reliable as a means of establishing a *qualitative* demand for pain-and-suffering coverage, they cannot be considered a reliable means in assessing the scope of the *quantitative* demand for such coverage. I, therefore, suggest a yardstick to determine the pain-and-suffering awards by using medical costs as the basis for calculating pain-and-suffering losses. Under my approach, a system of multipliers will be associated with the health costs in order to calculate the pain-and-suffering component. This system solves the unpredictability problem inherent in pain-and-suffering in tort law at negligible administrative costs. It combines the advantages of efficiency and fairness associated with having a jury decides on a case-by-case basis, without the high complexity of assessing pain-and-suffering losses that other proposals have.²⁹⁷

²⁹⁷ Ronen Avraham, *Putting a Price on Pain-and-Suffering Damages: A Critique of the Current Approaches and a Proposal for a Change* (on file with the author).

V. APPENDIX

A. The “between-subject” design.

In some legal systems it is not possible to sue manufacturers or vendors when their products fail. So for example, under such a legal system, if you get injured as a result of using a defective product, you may not sue anyone for compensation. You cannot sue the manufacturer, and you cannot sue the vendor.

Under such legal systems, instead of having the right to sue, people are offered various kinds of insurance. Imagine that you live in such a system. In the pages that follow, you will be asked to imagine that you have purchased a particular product, and you will be asked what kind of insurance, if any, you would buy. In particular, you will be asked about two kinds of insurance.

Insurance for pain & suffering

This provides compensation for pain and suffering resulting from an injury. This could include physical or emotional pain, or any suffering involving the suffering of changing your lifestyle to adjust to living with a loss of mobility, a loss of function, or a disability. It *does not* include any compensation for any monetary expenses like medical and rehabilitation costs or lost wages.

Insurance for monetary expenses:

This provides compensation for medical expenses and rehabilitation following an injury, and for lost wages due to time away from work. It *does not* include any compensation for any pain & suffering like physical or emotional pain.

Neither of these kinds of insurance is included in the price of the product you are purchasing. If you decide to purchase either or both then you will have to pay extra for whichever one(s) you want.

For all of what follows you should assume that you do not currently have any insurance. That is, assume that you *do not* have any insurance coverage through school, through work, through the government, nor through your parents’ health plan.

Any insurance that you do buy will apply only to injuries or illnesses following the use of the one product in question. And finally, all insurance policies are paid as a one-time flat rate, and will provide coverage for 1 year. At the end of that year, you may assume that you will have an opportunity to renew both types of coverage, if you wish.

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Imagine that you have just purchased some wrist guards, knee pads, and elbow pads which you intend to use while rollerblading. All of this padding costs \$40 in total. But such padding has been known to fail in the past. Sometimes, due to weaknesses in the material, the plastic padding cracks on impact. A fall can then result in serious injury to the affected joints, possibly leading to permanent damage in the form of reduced mobility and function.

When purchasing the padding you are provided with some statistical information that was collected by the Consumer Product Safety Commission (CPSC is a federal agency that is responsible for, among other things, studying possible causes and remedies for product accidents and health effects). According to the data provided by the CPSC, in each calendar year, 1 out of every 1000 sets of padding sold (i.e., 0.1%), cracks on impact during a fall, resulting in significant injury. The compensation for pain and suffering following such an injury, if you had insurance, would be in the amount of \$1000. The monetary expense that can be expected following such an injury is also \$1000 (in medical expenses and lost wages due to time away from work.)

Remember, under the current legal system, you do not have the option of suing for compensation, but you do have the opportunity to purchase insurance. Please answer the following questions regarding your insurance preferences. In answering the questions remember that you do not currently have any insurance coverage whatsoever (not through school, through work, through the government, nor through your parents health plan.)

- 1) How much, if anything, will you pay for insurance that will pay you \$1,000 for *pain & suffering* resulting from an injury caused by the failure of this product. (This includes any kind of physical or emotional pain and suffering that you endure as a result of the injury.) You will already be spending \$40 for the padding. In addition to this \$40, what is the most, if anything, that you will pay, as a one time fee, to have this kind of insurance coverage for 1 year?

- 2) How much, if anything, will you pay for insurance that will pay you \$1,000 for *monetary expenses* resulting from an injury caused by the failure of this product. (Such monetary expenses include health care costs and lost wages due to time away from work.) You will already be spending \$40 for the padding. In addition to this \$40, what is the most, if anything, that you will pay, as a one time fee, to have this kind of insurance coverage for 1 year?

- 3) In total I will pay for this product _____ dollars. (Please make sure that the amount you write is equal to the price of the product, \$40 in this case, plus the amounts you wrote in questions 1 and 2).

Imagine that you have just purchased a computer monitor for \$250. Recent research has shown that a certain form of migraine headache can be directly linked to the radiation emitted by all standard computer monitors. The migraines resulting from use of computer monitors are very painful, and are usually accompanied by nausea and spotty vision. They generally occur once or twice a month. They last for 4 hours and are treated with rest and medication.

When purchasing the monitor you are provided with some statistical information that was collected by the Consumer Product Safety Commission (CPSC is a federal agency that is responsible for, among other things, studying possible causes and remedies for product accidents health effects). According to the data provided by the CPSC, in each calendar year, 1 out of every 10,000 people who use a computer monitor (i.e., 0.01%) develop the kind of migraine condition described above. The compensation for pain and suffering following such an illness, if you had insurance, would be in the amount of \$10,000. The monetary expense that can be expected following such an illness is also \$10,000 (in medical expenses and lost wages due to time away from work.)

Remember, under the current legal system, you do not have the option of suing for compensation, but you do have the opportunity to purchase insurance. Please answer the following questions regarding your insurance preferences. In answering the questions remember that you do not currently have any insurance coverage whatsoever (not through school, through work, through the government, nor through your parents' health plan.)

- 1) How much, if anything, will you pay for insurance that will pay you \$10,000 for all *pain & suffering* resulting from an illness caused by this product. (This includes any kind of physical or emotional pain and suffering that you endure as a result of the illness.) You will already be spending \$250 for the monitor. In addition to this \$250, what is the most, if anything, that you will pay, as a one time fee, to have this kind of insurance coverage for 1 year?

-
- 2) How much, if anything, will you pay for insurance that will pay you \$10,000 for *monetary expenses* resulting from an illness caused by this product (Such monetary expenses include health care costs and lost wages due to time away from work.) You will already be spending \$250 for the monitor. In addition to this \$250, what is the most, if anything, that you will pay, as a one time fee, to have this kind of insurance coverage for 1 year?
-

In total I will pay for this product _____ dollars. (Please make sure that the amount you write is equal to the price of the product, \$250 in this case, plus the amounts you wrote in questions 1 and 2).

Imagine that you have just purchased a portable electric saw for \$100. Recent research has shown that electric saws have been known to fail in the past. Sometimes, due to weaknesses in the material, the rotor cracks on impact. The most frequent injury caused by the breakdown of a saw is amputation, usually of a finger or the whole hand, but occasionally it can be even more severe than that leading to a permanent disability.

When purchasing the electric saw you are provided with some statistical information that was collected by the Consumer Product Safety Commission (CPSC is a federal agency that is responsible for, among other things, studying possible causes and remedies for product accidents and health effects). According to the data provided by the CPSC, in each calendar year, 1 out of every 10,000 electric saws sold (i.e., 0.01%), breaks down within a period of a year, resulting in serious injury described above. The compensation for pain and suffering following such an injury, if you had insurance, would be in the amount of \$10,000. The monetary expense that can be expected following such an injury is also \$10,000 (in medical expenses and lost wages due to time away from work.)

Remember, under the current legal system, you do not have the option of suing for compensation, but you do have the opportunity to purchase insurance. Please answer the following questions regarding your insurance preferences. In answering the questions remember that you do not currently have any insurance coverage whatsoever (not through school, through work, through the government, nor through your parents health plan.)

- 1) How much, if anything, will you pay for insurance that will pay you \$10,000 for *pain & suffering* resulting from an injury caused by the failure of this product. (This includes any kind of physical or emotional pain and suffering that you endure as a result of the injury.) You will already be spending \$100 for the electric saw. In addition to this \$100, what is the most, if anything, that you will pay, as a one-time fee, to have this kind of insurance coverage for 1 year?

- 2) How much, if anything, will you pay for insurance that will pay you \$10,000 for *monetary expenses* resulting from an injury caused by the failure of this product. (Such monetary expenses include health care costs and lost wages due to time away from work.) You will already be spending \$100 for the electric saw. In addition to this \$100, what is the most, if anything, that you will pay, as a one-time fee, to have this kind of insurance coverage for 1 year?

- 3) In total I will pay for this product _____ dollars. (Please make sure that the amount you write is equal to the price of the product, \$100 in this case, plus the amounts you wrote in questions 1 and 2).

Imagine that you are about to purchase some new tires for your Sport Utility Vehicle. The tires cost \$800. As you may know, it has recently been revealed that tire failure on such vehicles has resulted in numerous deaths and injuries. Following tire failure the vehicle can spin out of control and flip over. The injuries to the driver can be very severe and can include spinal cord damage resulting in paralysis (i.e., permanent immobility of the legs).

When purchasing the tires you are provided with some statistical information that was collected by the Consumer Product Safety Commission (CPSC is a federal agency that is responsible for, among other things, studying possible causes and remedies for product accidents and health effects). According to the data provided by the CPSC, in each calendar year, 1 out of every 100,000 sets of tires sold (i.e., 0.001%) fails, resulting in a severe crash where the driver is left paralyzed. The compensation for pain and suffering following such an injury, if you had insurance, would be in the amount of \$100,000. The monetary expense that can be expected following such an injury is also \$100,000 (in medical expenses and lost wages due to time away from work.)

Remember, under the current legal system, you do not have the option of suing for compensation, but you do have the opportunity to purchase insurance. Please answer the following questions regarding your insurance preferences. In answering the questions remember that you do not currently have any insurance coverage whatsoever (not through school, through work, through the government, nor through your parent's health plan.)

- 1) How much, if anything, will you pay for insurance that will pay you \$100,000 for *pain & suffering* resulting from an injury caused by the failure of this product. (This includes any kind of physical or emotional pain and suffering that you endure as a result of the injury.) You will already be spending \$800 for the tires. In addition to this \$800, what is the most, if anything, that you will pay, as a one time fee, to have this kind of insurance coverage for 1 year?

- 2) How much, if anything, will you pay for insurance that will pay you \$100,000 for *monetary expenses* resulting from an injury caused by the failure of this product. (Such monetary expenses include health care costs and lost wages due to time away from work.) You will already be spending \$800 for the tires. In addition to this \$800, what is the most, if anything, that you will pay, as a one time fee, to have this kind of insurance coverage for 1 year?

- 3) In total I will pay for this product _____ dollars. (Please make sure that the amount you write is equal to the price of the product, \$800 in this case, plus the amounts you wrote in questions 1 and 2).

1. Please circle your gender: MALE FEMALE

2. Please indicate your age: _____

Thank you for your participation.

B. The “within subject” design.

Dear Student;

Thank you very much for your willingness to participate in this research. Your answers are confidential and will be used for statistical analysis only. Although your answers are very important to us, we will be using them only for learning about people’s decision making in the aggregate and are not keeping track of any individual’s behavior.

The following questionnaire asks about your tastes and preferences. There are no right or wrong answers. We are interested in what you think you would really do in each situation.

There are 4 questions labeled 1 through 4; each question has several parts. Please answer the questions in the order in which they appear.

Also, please write neatly.

Thank you very much.

The Research Team
In the University of Michigan

File 123

Question 1:

Imagine that you have decided to purchase a new portable electric saw. You go to a hardware store and, after browsing, settle upon a particular model. The seller tells you that the price of the model you chose is \$100 and that it has a disclaimer that says that the seller is not liable for any reason whatsoever. Assume that this deal is acceptable to you. In other words, you are willing to pay \$100 (but no more than \$100) for the saw even if you must give up all legal rights against the seller.

Before you write your check, the seller offers you 3 different additional Deals, described below. In each of these Deals, assume that the only legal rights you have against the seller of the saw are those described in each part of the question. (The seller accepts no returns, nor do you have any legal rights against anybody else, nor do you have insurance to cover you against such losses—no health insurance, property insurance, or disability insurance).

Note, however, that you have the opportunity to accept any of these Deals, or any combination of them (including accepting them all). Alternatively, you can refuse all of these Deals, in which case you pay \$100 for the saw, but have no legal rights against the seller.

<u>Deal 1</u>	<u>Deal 2</u>	<u>Deal 3</u>
Besides the \$100 price of the saw, you may pay an extra amount and get a 5-year warranty in which the seller has to provide you with a new saw if the one you purchased should break down for any reason whatsoever.	Besides the \$100 for the saw, you may pay an extra amount of money and get a 5-year right to have the seller reimburse you for any direct monetary expenses that you may suffer in the event of an injury caused by the saw. Such monetary damages might include, for instance, medical costs, rehabilitation, or loss of income you might have due to injury.	Besides the \$100 for the saw, you may pay an extra amount of money and get a 5-year right to have the seller compensate you for any non-monetary harm such as pain-and-suffering that you may suffer in the event of an injury caused by a saw. Such damages reimburse you, for instance, for pain or any other suffering you may feel during or after your health treatment or rehabilitation.
Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal. <input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____	Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal. <input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____	Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal. <input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____
The reason I chose to do this is: _____ _____ _____ _____ _____	The reason I chose to do this is: _____ _____ _____ _____ _____	The reason I chose to do this is: _____ _____ _____ _____ _____

In sum, I will pay a total amount of \$_____ for the saw.

Please, DO NOT go back and change your answers after you read this new question.

Question 2:

Imagine that before you wrote the check the seller offers you some statistical data collected by the Consumer Product Safety Commission (CPSC is a federal agency that is responsible, among other things, to study possible causes and cures for product accidents). According to the data provided by the CPSC, out of every 50 portable saws, 1 breaks down within a period of 5 years (2% of the saws break down within a period of 5 years).

As before, the seller offers you 3 different Deals, described below. Those Deals are the same as the deals you already considered and we repeat them for your convenience. In each of these Deals, assume that the only legal rights you have against the seller of the saw are those described in each part of the question. (The seller accepts no returns, nor do you have any legal rights against anybody else, nor do you have insurance to cover you against such losses—no health insurance, property insurance, or disability insurance).

Note, however, that you have the opportunity to accept any of these Deals, or any combination of them (including accepting them all). Alternatively, you can refuse all of these Deals, in which case you pay \$100 for the saw, but have no legal rights against the seller.

Deal 1	Deal 2	Deal 3
Besides the \$100 price of the saw, you may pay an extra amount and get a 5-year warranty in which the seller has to provide you with a new saw if the one you purchased should break down for any reason whatsoever.	Besides the \$100 for the saw, you may pay an extra amount of money and get a 5-year right to have the seller reimburse you for any direct monetary expenses that you may suffer in the event of an injury caused by the saw. Such monetary damages might include, for instance, medical costs, rehabilitation, or loss of income you might have due to injury.	Besides the \$100 for the saw, you may pay an extra amount of money and get a 5-year right to have the seller compensate you for any non-monetary harm such as pain-and-suffering that you may suffer in the event of an injury caused by a saw. Such damages reimburse you, for instance, for pain or any other suffering you may feel during or after your health treatment or rehabilitation.
Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal.	Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal.	Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal.
<input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____ The reason I chose to do this is: _____ _____ _____ _____ _____ _____	<input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____ The reason I chose to do this is: _____ _____ _____ _____ _____ _____	<input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____ The reason I chose to do this is: _____ _____ _____ _____ _____ _____

In sum, I will pay a total amount of \$_____ for the saw.

Please, DO NOT go back and change your answers after you read this new question.

Question 3:

Imagine that the seller provides you with further information from the CPSC study (in addition to the information she already gave you). She tells you that indeed out of every 50 saws, 1 breaks down, however not all of these breakdowns involve physical injury. In fact, out of every 10,000 portable saws, 1 saw breaks down AND causes injuries within a period of 5 years (0.01% of the saws break down AND cause injuries in a period of 5 years). The statistical data reveal that on average the injuries involve direct monetary costs (medical costs and loss of income) of \$100,000.

Again, the seller offers you the same 3 Deals, described below. Those Deals are the same as the deals you already considered and we repeat them for your convenience. In each of these Deals, assume that the only legal rights you have against the seller of the saw are those described in each part of the question. (The seller accepts no returns, nor do you have any legal rights against anybody else, nor do you have insurance to cover you against such losses—no health insurance, property insurance, or disability insurance).

Note, however, that you have the opportunity to accept any of these Deals, or any combination of them (including accepting them all). Alternatively, you can refuse all of these Deals, in which case you pay \$100 for the saw, but have no legal rights against the seller.

<u>Deal 1</u>	<u>Deal 2</u>	<u>Deal 3</u>
<p>Besides the \$100 price of the saw, you may pay an extra amount and get a 5-year warranty in which the seller has to provide you with a new saw if the one you purchased should break down for any reason whatsoever.</p>	<p>Besides the \$100 for the saw, you may pay an extra amount of money and get a 5-year right to have the seller reimburse you for any direct monetary expenses that you may suffer in the event of an injury caused by the saw. Such monetary damages might include, for instance, medical costs, rehabilitation, or loss of income you might have due to injury.</p>	<p>Besides the \$100 for the saw, you may pay an extra amount of money and get a 5-year right to have the seller compensate you for any non-monetary harm such as pain-and-suffering that you may suffer in the event of an injury caused by a saw. Such damages reimburse you, for instance, for pain or any other suffering you may feel during or after your health treatment or rehabilitation.</p>
<p>Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal.</p>	<p>Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal.</p>	<p>Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal.</p>
<p><input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____</p>	<p><input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____</p>	<p><input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____</p>
<p>The reason I chose to do this is: _____ _____ _____ _____ _____</p>	<p>The reason I chose to do this is: _____ _____ _____ _____ _____</p>	<p>The reason I chose to do this is: _____ _____ _____ _____ _____</p>

In sum, I will pay a total amount of \$_____ for the saw.
 Please, DO NOT go back and change your answers after you read this new question.

Question 4:

Imagine that the seller further provides you with more information from the CPSC study (in addition to the information she already gave you). She tells you that in those breakdowns that cause injuries (1 out of 10,000 saws, or 0.01%) the most frequent injury caused by the breakdown of a saw is amputation, usually of a finger, but sometimes the whole hand. For this type of injury, courts (in those states which have tort law) grant pain and suffering damages of (on average) \$100,000.

As before, the seller offers you the same 3 Deals, described below. Those Deals are the same as the deals you already considered and we repeat them for your convenience. In each of these Deals, assume that the only legal rights you have against the seller of the saw are those described in each part of the question. (The seller accepts no returns, nor do you have any legal rights against anybody else, nor do you have insurance to cover you against such losses—no health insurance, property insurance, or disability insurance).

Note, however, that you have the opportunity to accept any of these Deals, or any combination of them (including accepting them all). Alternatively, you can refuse all of these Deals, in which case you pay \$100 for the saw, but have no legal rights against the seller.

<u>Deal 1</u>	<u>Deal 2</u>	<u>Deal 3</u>
Besides the \$100 price of the saw, you may pay an extra amount and get a 5-year warranty in which the seller has to provide you with a new saw if the one you purchased should break down for any reason whatsoever.	Besides the \$100 for the saw, you may pay an extra amount of money and get a 5-year right to have the seller reimburse you for any direct monetary expenses that you may suffer in the event of an injury caused by the saw. Such monetary damages might include, for instance, medical costs, rehabilitation, or loss of income you might have due to injury.	Besides the \$100 for the saw, you may pay an extra amount of money and get a 5-year right to have the seller compensate you for any non-monetary harm such as pain-and-suffering that you may suffer in the event of an injury caused by a saw. Such damages reimburse you, for instance, for pain or any other suffering you may feel during or after your health treatment or rehabilitation.
Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal. <input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____	Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal. <input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____	Are you interested in this Deal? <input type="checkbox"/> No, I am not interested in this Deal. <input type="checkbox"/> Yes, I am interested in this Deal and the maximum amount of money I would be willing to pay above \$100 to get this Deal is _____
The reason I chose to do this is: _____ _____ _____ _____ _____	The reason I chose to do this is: _____ _____ _____ _____ _____	The reason I chose to do this is: _____ _____ _____ _____ _____

In sum, I will pay a total amount of \$_____ for the saw.

Thank you very much for your cooperation. We would like to remind you that your answers are confidential and that we do not keep track on any individual's answers.

My age is _____

My gender is _____

My race is _____ (optional).

Personal condition: single married divorce
 Widow/er separated living with a partner

How do you feel today?

1) bad 2) not so bad 3) o.k. 4) good 5) very good

How do you define your level of income? Or in case of family support, your family's level of income?

1) much below average 2) below average 3) average
 4) above average 5) much above average

Again, we would like to thank you for your participation. Suppose we could offer you a reward for filling out this questionnaire, and that we offered you either

- a) to participate in a lottery in which one of ten thousand participants in our research gets \$100,000 (a lottery where you have 0.01% chance to win \$100,000), OR
- b) to get a certain amount of money for sure.

What is the **MINIMUM** amount of money that you are willing to get from us for sure and not participate in the lottery. Why? _____