

THE REASONABLE PERSON NEGLIGENCE STANDARD AND LIABILITY INSURANCE

Vickie Bajtelsmit
Paul D. Thistle

ABSTRACT

We show that, under the reasonable person negligence rule, heterogeneity of potential injurers can be sufficient to create a demand for liability insurance. Potential injurers with a low probability of accidents or a high cost of exercising care have optimal levels of care that are below the negligence standard. For these groups, it may be less costly to be negligent and purchase insurance than to comply with the negligence standard. We show that the availability of insurance is socially desirable.

INTRODUCTION

The purpose of this article is to provide a possible explanation for why individuals purchase liability insurance under a negligence rule. Under a negligence rule, injurers are responsible for the damages they cause to their victims only if they have not met the applicable standard of care. If injurers meet that standard of care, then they are not liable and victims bear the full cost of their injuries. Brown (1973) shows that risk-neutral agents will meet the negligence standard if it is set optimally. Shavell (1982) proves that this implies that risk-averse agents will meet the negligence standard and therefore will choose not to purchase liability insurance. In the United States, negligence is usually determined by the "reasonable person" standard, that is, the level of care that would be taken by an average reasonable person. Thus, if a person takes appropriate care, there is no reason to purchase liability insurance.

Substantial amounts of money are spent on liability insurance each year by individuals and businesses. For some types of negligence, the demand for insurance is the result of legal (e.g., automobile liability, workers compensation) or contractual

Vickie Bajtelsmit is at the Department of Finance and Real Estate, Colorado State University, Ft. Collins, CO 80523. Paul D. Thistle is at the Department of Finance, University of Nevada, Las Vegas, NV 89154. The authors can be contacted via e-mail: vickie.bajtelsmit@colostate.edu and paul.thistle@unlv.edu, respectively. An earlier version of this article was presented at the American Risk and Insurance Association meeting. We would like to thank two anonymous referees, whose comments have improved the article. Dr. Thistle's research was supported by the Nevada Insurance Education Foundation. We retain the responsibility for any remaining errors.

(e.g., homeowners) requirements. The markets for other types of negligence liability insurance, such as medical malpractice, professional liability, and commercial general liability insurance, are more difficult to explain. The Insurance Information Institute reports that in the United States during 2005, premiums for medical malpractice insurance were \$12.1 billion, premiums for the liability portion of commercial multiple peril insurance were \$13.9 billion, premiums for commercial general liability (excluding products liability) were \$39.5 billion, and premiums for "other liability" were \$54.1 billion.¹ But for the types of liability covered by these policies, knowledge of the standard of care would imply that every potential injurer could simply meet the standard of care and would never be liable.

Shavell (2000, pp. 171–172), reflecting widely held views, argues that liability insurance is purchased to protect against possible risks arising out of the following: (1) the uncertain operation of the legal system, (2) risks due to momentary lapses in care, and (3) risks due to the negligent behavior of agents. In this article we show that even in the absence of these three risks, heterogeneity of potential injurers can be sufficient to create a demand for insurance.² The reasonable person standard applies the same standard of care to all individuals.³ However, potential injurers may have different probabilities of accidents or different costs of care (e.g., not all doctors are equally competent). We show that if the reasonable person negligence standard is applied to a heterogeneous population, then some individuals may find that it is less costly to be negligent and purchase insurance than to meet the negligence standard.⁴

Liability insurance protects individuals against the risk of having to pay legal sanctions. The purpose of these legal sanctions is to discourage unwanted behavior. This raises the question of whether the availability of insurance weakens the deterrence of unwanted behavior and undermines the effect of the law. Indeed, we show that potential injurers who purchase insurance will optimally choose levels of care that do not meet the negligence standard. Since these individuals choose to be negligent, the insurance increases the expected number of accidents. However, we also show that the availability of liability insurance is socially desirable. If insurance is not available, a victim could be injured by a nonnegligent injurer and, in that case, would have to bear the full cost of any harm. If insurance is available, potential injurers who buy insurance are better off, whereas those who do not are no worse off. Potential victims

¹ "Other liability" includes coverages for liability resulting from negligence, carelessness, or failure to act. This category includes, among others, professional liability (e.g., lawyers, accountants), directors and officers, errors and omissions, and employment practices liability.

² Our view is that these risks are all reasons that liability insurance is purchased. We assume them away to focus on the question of whether heterogeneity is also a reason for buying insurance.

³ As Keeton et al. (1984, pp. 173–174) state, "The standard of conduct which the community demands must be an external and objective one, rather than the individual judgment, good or bad, of the particular actor; and it must be, so far as possible, the same for all persons, since the law can have no favorites."

⁴ Since we allow potential injurers to take actions to reduce the probability of an accident, our analysis is related to the literature on "self-protection" (Ehrlich and Becker, 1972). Meeting the negligence standard provides complete self-protection. Also, since potential injurers' care and insurance purchases are correlated with the potential injurers' type, the problem analyzed here can also be viewed as one of endogenous risk categorization (Bond and Crocker, 1991).

are also better off, since they will be fully compensated for the harm they suffer at the hands of insured, but negligent, injurers.

The next section describes the basic assumptions of the model. The third section analyzes the incentives to insure when individuals have different accident probabilities. The fourth section evaluates the outcomes when individuals have different costs of care. The final section provides brief concluding remarks.

THE BASIC MODEL

Assumptions

The model used is an extension of the standard model of accidents in the law and economics literature (e.g., Shavell, 1982, 1987). To keep the analysis simple, we assume that accidents are unilateral so that only the potential injurer's care affects the probability of an accident. We assume that accidents are between strangers so that there is no contractual relationship that the potential victim can use to provide incentives for the potential injurer to take care.

The potential injurer's expenditure on accident prevention or care is denoted by x . The probability of an accident when a good risk type (bad risk type) spends x on care is $\pi_G(x)$ ($\pi_B(x)$). For any expenditure on care, the good risk types have a lower accident probability than the bad risk types, $\pi_G(x) < \pi_B(x)$. The accident probabilities are strictly decreasing and strictly convex functions of the expenditure on care. We assume that $\pi'_G(x) > \pi'_B(x)$ for all x ; that is, expenditure by the good risks is less productive in reducing the accident probability than expenditure by the bad risks.⁵ We assume that the accident probabilities are bounded away from both zero and one so that accidents are neither certain nor entirely preventable. The proportions of good and bad risks in the population are θ_G and θ_B , respectively. The average probability of an accident is $\bar{\pi}(x) = \theta_G \pi_G(x) + \theta_B \pi_B(x)$.

Potential victims suffer monetary damages d in the event of an accident. We assume that potential victims are risk neutral since this leads to a simple characterization of the liability rule. Potential injurers have initial wealth $w > d$ so that they are not judgment proof. Potential injurers are risk averse, with the strictly increasing and strictly concave von Neuman–Morgenstern utility function u .

An insurance policy consists of a premium, p , paid whether or not the policyholder is liable, and an indemnity, q , paid in the event the policyholder is liable for damages to a victim. Then, a potential injurer who buys the insurance policy (p_i, q_i) and spends

⁵ For example, compare two heart surgeons, a more experienced good risk and a less experienced bad risk, so that $\pi_G(0) < \pi_B(0)$. The assumption on productivity of effort is consistent with the case where additional effort by the good heart surgeon does not improve the already high success rate by as great an amount as an equivalent amount of effort by the bad surgeon. This assumption plays an important role in the analysis. The alternative assumptions are that expenditures by good risks are more productive in reducing the accident probability, $\pi'_G(x) < \pi'_B(x)$ and that expenditures by both types are equally productive, $\pi'_G(x) = \pi'_B(x)$. We should point out that under our assumption, the bad risks may actually have a lower loss probability than the good risks in equilibrium since they spend more on loss prevention. Under the alternative assumption, the bad risks have a higher loss probability than the good risks in equilibrium.

x_i on care has expected utility given by

$$U_i(p_i, q_i, x_i) = (1 - \pi_i(x_i))u(w - p_i - x_i) + \pi_i(x_i)u(w - \pi p_i - x_i - d + q_i) \quad (1)$$

if $x_i < x^*$, where x^* is the negligence standard (defined below), and

$$U_i(p_i, q_i, x_i) = u(w - p_i - x_i) \quad (2)$$

if $x_i \geq x^*$ for $i = B, G$.

We assume that victims always sue injurers and that there are no litigation costs. We assume that the liability standard is perfectly enforced so that there is no uncertainty about the appropriate standard of care and no uncertainty in the application of the negligence rule. Then if an accident occurs, the victim, courts, and insurers can perfectly verify the injurer's level of care. Since victims, courts, and insurers can verify the injurer's care, we assume that care is observable. This implies that the insurance premium can depend on the level of care.⁶ We assume throughout that the insurance market is competitive and that insurers earn zero-expected profit, given the information they have about policyholders. The zero-expected-profit constraint for insurers is $p_i = \pi_i(x)q_i$, $i = B, G$. If potential injurers insure and the premium is actuarially fair, they will choose full coverage ($q = d$) and choose the level of care that minimizes the total cost of accidents and care, $x_i^* = \argmin x_i + \pi_i(x_i)d$, $i = B, G$.

The Reasonable Person Standard

The reasonable person standard is based on the behavior of an average member of the community balancing the costs and benefits of expenditures on care. As Shavell (1987, p. 74) puts it, "It should be observed that the optimal uniform level of due care will actually correspond to the individually optimal level of care for some 'representative' individual within the class of individuals under consideration."

Definition 1: Under the "reasonable person" negligence standard, an injurer is negligent if $x < x^*$, where

$$x^* = \argmin x + \bar{\pi}(x)d. \quad (3)$$

The reasonable person standard can also be written in terms of the first-order condition; that is, x^* satisfies $\bar{\pi}'(x^*)d = -1$. This is the well-known Hand's rule; that is, injurers are negligent if the social burden of the untaken precaution is less than the expected social harm. In that case, injurers are fully liable for damages to victims and the

⁶ We are making an assumption about timing, namely, that care is observed *ex ante* so that the premium can depend on care. However, under the alternative assumption that care is only observed *ex post* in the event of an accident, the indemnity can depend on the level of care.

standard of care minimizes the total cost of accidents and care. Shavell (1982) shows that if injurers are identical and victims are risk neutral, then the reasonable person standard achieves the first best outcome. We assume that in the absence of insurance, all potential injurers meet the reasonable person standard, x^* .⁷ If potential injurers meet the standard of care and are never negligent, they bear no risk. Finally, we observe that the assumptions on the accident probabilities imply that $x_G^* < x^* < x_B^*$.

The reasonable person standard applies uniformly to all individuals who are in similar situations. The situation determines the loss probabilities and damages. Thus, for example, the π_i and d are different for appendectomies versus heart transplants, and the resulting standard of care is different for appendectomies and heart transplants. However, the reasonable person rule applies the same standard of care, x^* , to all heart transplant surgeons.

Compared to a socially optimal individualized or type-specific negligence rule, good risks are required to spend too much on care to meet the reasonable person standard, whereas bad risks are required to spend too little. The reasonable person standard increases the total social cost of accidents plus expenditure on care relative to the total cost imposed by individualized standards of care. This leads to the question of why the uniform reasonable person rule would be used. As Landes and Posner (1987, pp. 123–131) point out, the inefficiency of the reasonable person rule must be compared to the information costs of determining individualized standards of care. Posner (2007, p. 171) writes: "... the courts do not attempt to measure the actual costs to the parties. ... Rather, they estimate the accident-avoidance costs of the average (in legal parlance 'reasonable') person in each party's situation. This approach is justified by the costs of individualized measurement." The fact that the reasonable person standard is so widely used implies that in most cases, these individualized measurement and information costs are high.

HETEROGENEOUS RISK OF ACCIDENTS

We now consider the question of whether there will be a demand for liability insurance under the negligence rule when potential injurers have different probabilities of accidents.

We initially assume that insurers can verify whether a potential injurer is a good risk or a bad risk. Then if potential injurers know that they are bad risks, they will meet the standard of care and have utility $u(w - x^*)$. If there is a demand for liability insurance, then it must come from good risks.

Proposition 1: *Under the reasonable person negligence rule, if insurers can verify potential injurers' risk type, then a necessary and sufficient condition for good risks to fully insure*

⁷ Shavell (2007) shows that risk-neutral potential injurers will choose to be negligent if the cost of meeting the standard of due care exceeds the privately optimal cost of care plus the expected harm. It follows from Shavell's argument that risk-averse individuals will choose to be negligent in the absence of insurance if the cost of meeting the reasonable person standard exceeds the privately optimal cost of care plus the expected harm by "too much." Formally, let $\tilde{x}$ be the expenditure on care that maximizes expected utility in the absence of insurance. A risk-averse potential injurer will choose to be negligent if $\tilde{x} + \pi(\tilde{x})d + R \leq x^*$, where R is the risk premium.

($q = d$) and expend x_G^* on accident prevention is

$$x^* \geq x_G^* + \pi_G(x_G^*)d. \quad (4)$$

Proof: If good risks meet the standard of care, they have utility $u(w - x^*)$. They may be better off to choose a lower level of care and insure against the resulting liability exposure. Since insurers can verify their type, the premium is actuarially fair, $\pi_G(x)q$. Then the good risks will fully insure and choose the level of care, x_G^* , to minimize their total cost of accidents plus expenditure on care. This yields utility $u(w - x_G^* - \pi_G(x_G^*)d)$. Good risks are better off purchasing insurance if, and only if, (4) holds. Q.E.D.

The availability of insurance makes good risks better off if, and only if, the inequality in (4) holds. Since they do not buy insurance, its availability makes bad risks neither better off nor worse off; they have utility $u(w - x^*)$ in either case. Since good risks take less care ($x_G^* < x^*$), the expected number of accidents increases when insurance is available. However, because the courts are assumed to perfectly assess fault, they will find the good risks negligent and the victims will thus be compensated for accidents caused by good risks. Therefore, the availability of insurance makes potential victims better off. If the inequality in (4) is reversed, then the availability of insurance is of no consequence since neither good risks nor bad risks buy insurance.⁸

Under the assumptions of Proposition 1, the insurer is able to distinguish between good risks and bad risks, but the courts are not able to set different legal standards for good risks and bad risks. This is reasonable only if insurers must have some information about potential injurers' observable characteristics that the courts do not have or cannot use. For example, insurers could look at the potential injurer's loss history. However, prior findings of negligence are generally not admissible at trial. Proposition 1 states that only the good risks buy insurance, so the court could set different standards for insured injurers and uninsured injurers. But again, information on the defendant's insurance coverage is not admissible in most jurisdictions.

The full-coverage insurance policy bought by the good risks is also attractive to bad risks. The insurer was able to offer the policy since it could identify the goods risks and exclude the bad risks from purchasing the policy. However, suppose that the insurance company cannot verify whether potential injurers are good or bad risks. Since it cannot exclude the bad risks, the insurance company now faces an adverse selection problem which it must take into account in designing the policy. That is, any insurance policy offered to the good risks must satisfy the self-selection constraint:

$$U_B(\pi_G(x)q, q, x) \leq u(w - x^*). \quad (5)$$

Again, if there is a demand for liability insurance, it must come from the good risks.

⁸ The alternative assumption that $\pi_G'(x) < \pi_B'(x)$ implies that $x_B^* < x^* < x_G^*$. A version of Proposition 1 then holds with the bad risks fully insuring and spending x_B^* on care if, and only if, $x^* \geq x_B^* + \pi_B(x_B^*)d$. The alternative assumption that $\pi_G'(x) = \pi_B'(x)$ implies $x_G^* = x_B^* = x^*$. In this case, all individuals choose to be nonnegligent and do not buy insurance.

Proposition 2: *Under the reasonable person negligence rule, if insurers cannot verify whether potential injurers are good or bad risks, then a sufficient condition for good risks to less than fully insure ($\hat{q}_G < d$) and increase expenditure on accident prevention ($\hat{x}_G > x_G^*$) is that the self-selection constraint (5) is binding.*

Proof: Assume that the self-selection constraint in (5) is binding. Let $\hat{q}_G$ and $\hat{x}_G$ maximize $U_G(\pi_G(x)q, q, x)$ subject to the self-selection constraint. Observe that if $q = d$ and $x = x_G^*$, the constraint is violated. Since the constraint is binding, we must have $\hat{q}_G < d$, and since the good risks are less than fully insured, they increase expenditure on care, $\hat{x}_G > x_G^*$. Letting $\hat{z}_G = (\pi_G(\hat{x}_G)\hat{q}_G, \hat{q}_G, \hat{x}_G)$, informed good risks obtain expected utility $U_G(\hat{z}_G)$. Since $U_G(\hat{z}_G) > U_B(\hat{z}_G) = u(w - x^*)$, good risks are better off purchasing insurance. Q.E.D.

The inability of insurers to distinguish potential injurers' risk type makes the good risks worse off since $u(w - x_G^* - \pi_G(x_G^*)d) > U_G(\hat{z})$. Combined with a binding self-selection constraint in (5), this implies that the inequality in (4) must hold. Therefore, regardless of whether the insurance company is able to distinguish good from bad risks, the inequality in (4) is a necessary condition for good risks to purchase insurance. Conversely, if the inequality in (4) is reversed, there is no demand for liability insurance.⁹

Despite the adverse selection problem, the availability of liability insurance is socially beneficial. If the self-selection constraint holds, the availability of insurance makes good risks better off, whereas bad risks are neither better off nor worse off. Victims are better off when insurance is available because they are compensated for accidents caused by good risks. Again, if the inequality in (4) does not hold, then neither good risks nor bad risks buy insurance and the availability of insurance has no effect on welfare.

HETEROGENEOUS COST OF CARE

In this section, we assume that all potential injurers have the same accident probabilities but have different costs of care.

Assumptions

The potential injurer's level of risk-reduction activity (safety) is denoted by s . The probability of an accident is $\pi(s)$, which is strictly decreasing, strictly convex, and the same for all potential injurers. Individuals can have either a high cost of care, c_H , or a low cost of care, c_L , where $0 < c_L < c_H$. Expenditure on care is then $x_i = c_i s$, $i = H, L$. We let θ_H and θ_L denote the proportions of high-cost and low-cost parties. The average cost of care is $\bar{c} = \theta_H c_H + \theta_L c_L$. Then, the potential injurer who buys the insurance policy (p_i, q_i) and chooses the level of safety s_i has expected utility:

$$U_i(p_i, q_i, s_i) = (1 - \pi(s_i))u(w - \pi p_i - c_i s_i) + \pi(s_i)u(w - p_i - c_i s_i - d_i + q_i) \quad (6)$$

⁹ If risk type is not observable by the insurer, then under the alternative assumption that $\pi_G'(x) < \pi_B'(x)$ both good and bad risks are nonnegligent and there is no demand for liability insurance.

if $s_i < s^*$, where s^* is the negligence standard and

$$U_i(p_i, q_i, s_i) = u(w - p_i - c_i s_i) \quad (7)$$

if $s_i \geq s^*$, for $i = H, L$. We retain the assumptions that the level of care is observable and that insurance companies earn zero-expected profit.¹⁰ Again, if potential injurers insure and premiums are actuarially fair, they fully insure ($q = d$) and choose the cost-minimizing level of care, $s_i^* = \operatorname{argmin} c_i s_i + \pi(s_i)d$, $i = H, L$.

The reasonable person rule is based on the average cost of care:

Definition 2: *Under the reasonable person negligence rule, an injurer is negligent if $s < s^*$, where*

$$s^* = \operatorname{argmin} \bar{c}s + \pi(s)d. \quad (8)$$

The assumptions about the cost of care imply that $s_H^* < s^* < s_L^*$.

Analysis

Low-cost individuals can meet the standard of care, so if there is a demand for liability insurance it arises from the high-cost individuals.

Proposition 3: *Under the reasonable person negligence rule, then a necessary and sufficient condition for high-cost parties to fully insure ($q = d$) and choose care s_H^* is that*

$$c_H s^* \geq c_H s_H^* + \pi(s_H^*)d. \quad (9)$$

Proof: If they meet the standard of care, high cost of care potential injurers have utility $u(w - c_H s^*)$. If high-cost parties fully insure and choose the level of care, s_H^* , they obtain utility $u(w - c_H s_H^* - \pi_G(s_H^*)d)$. They are better off purchasing insurance if, and only if, (9) holds. Q.E.D.

Proposition 3 does not assume that the insurance company can determine an individual's cost of care. If individuals have different accident probabilities then, as we have seen, adverse selection problems can arise when insurers cannot verify potential injurers' risk type. However, adverse selection problems do not arise when individuals have different costs of care but all have the same accident probability. Proposition 3 holds whether or not insurers can verify potential injurers' cost of care.

As when potential injurers have different accident probabilities, the availability of insurance increases welfare when potential injurers have different costs of care and for the same reasons. Good risks are better off if, and only if, the inequality in (9)

¹⁰ Since the expenditure on care is $x_i = c_i s$, the accident probabilities as a function of expenditure are $\pi_i(x_i) = \pi(x/c_i)$, $i = H, L$. If π is strictly decreasing and strictly convex, then $\pi_L(x) < \pi_H(x)$. The high-cost individuals are unambiguously at a higher risk. See Fagart and Kambia-Chopin (2006) for a more detailed discussion of this point. We would like to thank the referee for bringing this reference to our attention.

holds. Bad risks are neither better off nor worse off. Victims are better off since they are compensated for some accidents. If the inequality in (9) does not hold, then the availability of insurance has no effect on welfare.

CONCLUSIONS

We show that heterogeneity of potential injurers may be sufficient to create a market for liability insurance under the reasonable person negligence standard. We assume that the legal system operates perfectly, that care is deterministic, and that potential injurers act on their own behalf. The reasonable person standard applies the same standard of care to all individuals. However, potential injurers may have different probabilities of accidents or different costs of care. We show that some individuals may find that it is less costly to be negligent and purchase insurance than to meet the negligence standard.

Liability insurance protects individuals against the risk of having to pay legal sanctions and may undermine the effect of the law. In fact, we conclude that the purchase of insurance leads some individuals to reduce care below the negligence standard, which increases the expected number of accidents. However, we also show that the availability of liability insurance is socially desirable. Potential injurers who buy insurance are better off, whereas potential injurers who do not buy insurance are no worse off. In particular, potential victims are better off since they receive compensation for some accidents when insurance is available.

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