A Further Justification for the Negligence Rule

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We use a principal-agent framework to reexamine the implications of the negligence and strict liability rules when the tortfeous is an agency. We assume a unilateral care situation and consider both the cases of moral hazard and of adverse selection. In both instances the negligence rule is shown to Pareto dominate the strict liability rule when the activity level is exogenously given. We find a simple condition that guarantees that the result extends to an endogenous activity level. We also examine the case where this condition is not satisfied. © 1999 by Elsevier Science Inc.

I. Introduction

Under tort law courts often consider the duty of an upstream party in relation to its ability to control a downstream party. In the economic literature vertical relationships between an upstream and a downstream party are usually modelled within a principal-agent framework. The purpose of this note is to reexamine the rules of negligence and of strict liability in a principal-agent model characterized by asymmetric information. We show that in comparison with existing results the presence of informational asymmetries will tend to favor the negligence rule.

We assume a so-called unilateral care situation. Specifically, the potential victims' behavior does not influence the likelihood and size of loss. As in the standard analysis of liability rules, the social objective is to minimize primary costs, i.e., the sum of the cost of care and of expected accident losses. It is well known that in this kind of environment the strict liability rule and the negligence rule both attain the social optimum.

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when the tortfeasor is a single decision-maker and the level of activity is exogenously
given. Our first purpose is to show that this equivalence no longer holds when the
tortfeasor is an agency characterized by informational asymmetries. From the existing
literature there is another well-known result, which states that strict liability rather than
the negligence rule should be favored when the activity level is endogenous. The
heuristic is that, under the negligence rule, a tortfeasor who complies with the legal
standard will not pay for damages if an accident occurs, and therefore will engage in too
much activity. In contrast, strict liability attains the first-best because it correctly inter-
nalizes accident costs.2 Our second objective is to show that these conclusions do not
extend either when the injuring party is an agency relationship.

Informational asymmetries can take the form of either hidden information (adverse
selection) or hidden action (moral hazard). We examine both cases in a framework
where the participants in the agency relationship are risk neutral. In the case of moral
hazard, we impose on the agent a limited liability constraint, because otherwise the
first-best solution is always feasible as it is well known.3 In either situation, whether
moral hazard with limited liability or adverse selection, the agent will generally earn an
informational rent.4 This rent is an internal transfer between the principal and the
agent that cancels out in the aggregate. Consequently, under strict liability the rent
drives a wedge between the objective function of the principal and that of a benevolent
social planner. For example, in the case of an exogenous level of activity, the principal
seeks to minimize the sum of expected accident losses and incentive costs—where the
latter are the sum of the costs of care and of the agent’s rent. By contrast, a benevolent
social planner is concerned only with primary costs and would want to minimize the
sum of expected accident losses and of the cost of care. As a consequence, strict liability
will lead to an underprovision of care. Here the inefficiency does not follow because the
principal fails to internalize some of the social costs, but rather because he includes too
many costs. Although in the paper the actual results are derived in a specific environ-
ment (for instance one with risk neutrality), the conclusions would carry through to any
environment were a principal is forced to pay an informational rent.

For an exogenous level of activity, the negligence rule can never do worse when the
negligence standard is defined by the first-best level of care. Indeed, if the principal
chooses not to comply with due care she falls back on the strict liability rule. However,
the socially efficient solution may be attainable with the negligence rule. Although
implementing the standard increases incentive costs, it may reduce the principal’s
overall costs by eliminating liability in the instance of an accident. Specifically, we show
that the negligence rule induces the principal to implement the socially efficient level
of care if expected accident costs are greater than the increase in compensation costs
that she must incur to satisfy the standard.

In the case of an endogenous activity level, strict liability also leads to an underpro-

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Heuristically, without limited liability the principal-agent problem disappears because the principal can sell the firm to
the agent. Alternatively, as mentioned by one of the referees, the principal would set a strict liability structure against
the agent where the agent’s wealth must be large enough to pay the entire damages in the case of accident.

4For the case with moral hazard under limited liability, see Park, E.S. “Incentive Contracting Under Limited
vision of care. However, because the agent’s rent increases the principal’s costs for undertaking the activity above social costs, there is too little activity. Consequently, given that the negligence rule always induces more activity than strict liability, it may do better. Indeed, we show that negligence weakly Pareto dominates if the agency problem (as measured by the agent’s rent) is more important than the externality (as measured by the expected accident losses).

The current research is related to the papers by Newman and Wright\(^5\) who also use a principal-agent framework to compare liability rules. We differ because we examine the issues of moral hazard, adverse selection and exogenous versus endogenous activity levels, and because participants in the agency relationship are risk-neutral.\(^6\) The remainder of the paper is organized as follows: we first analyze the case of an exogenous activity level; in Sections II and III, we examine strict liability under moral hazard and adverse selection respectively; in Section IV, we study the negligence rule; Section V considers the case of an endogenous activity level. The last section offers some concluding remarks.

**II. Strict Liability and Moral Hazard**

Both participants in the agency relationship—the principal and the agent—are risk neutral. The agent undertakes on behalf of the principal an activity that is socially beneficial, yet imposes an externality in that it can potentially generate a loss of amount \(A\) on a third party. Through his level of care \(x\), the agent influences the probability of loss denoted \(p(x)\), where \(p' < 0\) and \(p'' > 0\). The agent’s cost of care is \(C(x)\), where \(C(0) = 0\) and \(C' > 0\), \(C'' > 0\). To avoid trivial solutions, the problem is one where the agent has limited liability; for parsimony, the agent’s liability limit is taken to be zero. The liability limit reflects the fact that the maximum penalty that can be imposed on the agent is small compared to the loss \(A\) suffered by third parties if an accident occurs. This may be due to the agent’s limited wealth (if the agent is a firm or a worker) or to the fact that, for institutional reasons, his consumption cannot be reduced below a certain level (if the agent is a worker).

In this section, the informational asymmetry results from the fact that care is not contractible. To align incentives the principal relies on an information system. An information system refers to a set of observable actions correlated with the agent’s hidden action. The signals generated by the information system will usually result from the principal’s direct supervision of the agent but will also take into account whether or not an accident has occurred. In the crudest information system, the only information available to the principal is whether or not an accident has occurred. In general, there will also be direct monitoring, but this is assumed here to produce only imperfect


\(^6\)The present paper is also related to Demougin, D. and D. Garvie, “Strict Liability Versus Negligence,” mimeo, 1997. We briefly address their analysis at the end of Section II. See also Kornhauser, I.W. “An Economic Analysis of the Choice between Enterprise and Personal Liability for Accidents,” *California Law Review*, 70:1345–1392, 1982; Sykes, A.O. “The Economics of Vicarious Liability,” *Yale Law Journal*, 91:168–206, 1984; Polinsky, A.M., and S. Shavell, “Should Employees Be Subject to Fines and Imprisonment Given the Existence of Corporate Liability?,” *International Review of Law and Economics* 13:239–257, 1993. The latter paper abstracts from agency costs (i.e., the agent’s participation constraint is assumed to be binding) and focuses on the possibility that courts may be able to impose greater sanctions on employees than are feasible for firms. By contrast, we assume that sanctions are the same, and we focus on agency costs.
information about the agent’s effort. The signals generated by the information system combine the signals from monitoring *per se* and the signal defined by the occurrence or nonoccurrence of an accident. Let the sufficient statistic\(^7\) for this information system be a discrete random variable with finite support. Denote its realizations by \(y\) and its probability distribution function by \(q(y, x)\).

**Assumption:**

1. \(q(y, x) > 0\) for all \(y\) and all \(x\);
2. for all \(y\), \(q(y, x)\) is twice continuously differentiable with respect to \(x\);
3. for all \(y\), \(q_y(y, x)/q(y, x)\) is strictly increasing in \(y\) and \(x\);
4. for all \(y\), \(\sum_y q(y, x)q(y, x)\) is convex in \(x\).

The first condition states that the information system never reveals perfectly the true level of effort (i.e., all realizations of the sufficient statistic have positive probability for any level of effort). The second condition is a regularity requirement. Condition (3) implies that the information system satisfies the monotone likelihood ratio condition (MLRC). Condition (4) is known as the convexity of the distribution function condition (CDFC). These requirements are standard in moral hazard problems and are known to guarantee the validity of the first-order approach.\(^8\)

Given these conditions, Demougin and Fluet\(^9\) have shown that from a mechanism design point of view all the relevant information contained in the information system’s sufficient statistic can be summarized by a binary statistic. Equivalently, as shown by Park,\(^10\) the optimal contract will be a “bonus” scheme. This means that for a given amount of care that the principal wants to implement the principal rewards only the most favorable outcome, among all possible realizations of the sufficient statistic, and imposes the maximum penalty otherwise. In the present context, because of the agent’s liability limit, the maximum penalty is a payment equal to zero (e.g., a dismissal or discharge).\(^11\) Let \(\varphi(x)\) denote the probability of the most favorable outcome so that the principal will reward with probability \(\varphi(x)\) and penalize with probability \(1 - \varphi(x)\). The assumptions imply \(\varphi(x) > 0\) for all \(x\), together with \(\varphi' > 0\) and \(\varphi'' < 0\).

To analyze the principal’s problem, we separate the incentive issue from the choice of the appropriate level of care. As will be seen, the information system allows the principal to implement any level of care. From the discussion above, the optimal scheme is a bonus contract. This may be described by a payment \(T\) made with certainty and by a bonus \(t\) paid out only in the case of favorable information. With this notation, the expected payment from the principal to the agent is \(T + \varphi(x)t\). The agent’s utility from exercising care \(x\) is

\[
\pi(x) = T + \varphi(x)t - C(x). \tag{1}
\]

\(^3\)Heuristically a signal is said to be statistically sufficient for another random variable if none of the informational content is lost. For a thorough reference, see for instance Gourieroux, C., and A. Monfort, *Statistics and Econometric Methods*, New-York: Cambridge University Press, 1995.


\(^11\)Supra, note 4.

Given an amount of care \(x\) that the principal wants to implement, the most favorable outcome is that which maximizes the likelihood ratio \(q_y(y, x)/q(y, x)\) over all possible realizations \(y\).
We assume that the agent’s reservation utility is normalized to zero. To implement a level of care \( x \), the optimized “incentive costs” to the principal, denoted \( C_p(x) \), solves:

\[
C_p(x) = \min_{T,t} T + \varphi(x)t
\]  

subject to

\[
\begin{align*}
x &\in \arg \max_{x \geq 0} T + t\varphi(x) - C(x) \\
T + t\varphi(x) - C(x) &\geq 0 \\
T &\geq 0 \\
T + t &\geq 0.
\end{align*}
\]  

The first constraint is the incentive compatibility requirement ensuring that the agent will always find it optimal to undertake the level of care that the principal’s want to implement. The second constraint is a participation condition stating that the contract provides the agent with his reservation level of utility. The remaining inequalities are limited liability constraints which state that the actual transfer to the agent cannot be negative.\(^{12}\)

**Lemma 1:** The optimal contract implementing \( x > 0 \) has \( T = 0 \), \( t = C'(x)/\varphi'(x) \) and the incentive cost to the principal satisfies

\[
C_p(x) = \frac{\varphi(x)}{\varphi'(x)} C'(x) > C(x). \tag{7}
\]

Furthermore, \( C_p(x) > C'(x) \).

The lemma follows directly from Demougin and Fluet,\(^{13}\) so the proof is left out. It states that the agent necessarily earns a positive rent

\[
\pi(x) = C_p(x) - C(x) > 0 \tag{8}
\]

and furthermore that the marginal cost of care to the principal is greater than the marginal cost to the agent. This implies that the agent’s rent is increasing in the level of care, that is \( \pi'(x) > 0 \). The above results remain true even if the agent has a positive liability limit \( L > 0 \), as long as \( L \) is not too large and the principal’s information system is not too “informative.”\(^{14}\)

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\(^{12}\)The limited liability constraints can easily be generalized by requiring that \( T \geq -L, T + t \geq -L \) where \( L \geq 0 \) is the agent’s liability limit.


\(^{14}\)With \( L > 0 \), we have

\[
C_p(x) = \max \left\{ -L + \frac{\varphi(x)}{\varphi'(x)} C'(x), C(x) \right\}.
\]

The results in what follows hold for \( L \geq 0 \) as long as \( C_p(x) > C(x) \). Note that \( C_p(x) > C'(x) \) follows from the convexity of \( C(x) \) and from the strict concavity of \( \varphi(x) \).
Under strict liability, the overall objective function of the principal is to minimize the sum of expected accident costs and of incentive costs, that is to minimize

\[ \bar{C}_p(x) = p(x) A + C_p(x). \] (9)

Substituting from (8) we get

\[ \bar{C}_p(x) = p(x) A + C(x) + \pi(x). \] (10)

This clarifies the nature of problem facing the upstream party: the principal will trade off the cost of accidents against the sum of the cost of care and of the agent’s rent. The principal will choose the optimal level of care by equalizing the marginal benefit of a reduction in expected accident costs with the marginal incentive cost of care, inclusive of the agent’s rent. However, from a social point of view, the agent’s rent is an organizational transfer between two economic participants and is not part of the social costs. Instead of using (10) a benevolent social planner would like the level of care to be chosen as to minimize social costs,

\[ p(x) A + C(x). \] (11)

Because \( p' (x) > 0 \), it is easily seen that strict liability will not lead to the socially efficient outcome.

**Proposition 2:** In a principal-agent problem with moral hazard, strict liability will generate an underprovision of care when the agent earns a positive rent.

The proposition remains true even if the agent has a positive liability limit and can be made jointly liable, provided the agent’s liability limit is less than the amount of harm (and provided there is not “too much” information as noted above). Other extensions are also possible. For instance, one could introduce variable monitoring. The work by Demougin and Fluet (1997) suggests that in this case the main result of the section, the underprovision of care, remains valid even if the agent earns no rent. With endogenous and costly monitoring, the cost to the principal is the sum of incentive costs and of monitoring costs, and it can be shown that the marginal cost to the principal of inducing some level of effort on the part of the agent (here care) is always strictly greater than the agent’s marginal cost. When the rent is strictly positive, the argument for the underprovision of care is the same as above. When the rent is zero, an increase in effort will increase the agent’s rent or monitoring costs or both, but in all cases it raises the principal’s cost by more than the increase in the agent’s cost of effort.\(^\text{15}\)

III. Strict Liability and Adverse Selection

We now consider the situation where the principal-agent relationship is characterized by an adverse selection problem. Specifically, although care is now assumed to be contractible, the principal cannot observe the costs incurred by the agent. Let \( C(x, k) \) denote the agent’s cost function with \( C_k(x, k) > 0 \), where \( k \) is the agent’s private information. The parameter \( k \) may be interpreted as the agent’s cost characteristics (i.e., the agent’s type) or, equivalently, as the particular circumstances of the situation that affect the cost of care and that are known only to the agent. From the point of view of the principal, \( k \) is perceived as a random variable with density \( f(k) \) on the support \( K = \)

\(^{15}\)The issue of variable monitoring is addressed for a particular case in Demougin and Garvie, supra, note 6.
As in the foregoing section, we assume that it is always optimal for the principal to undertake the activity.\footnote{Note that the verifiability of care is equivalent to saying that the level of risk $p(x)$ chosen by the agent is verifiable. An alternative formulation would be to assume that the cost $C(x, k)$ is verifiable, with $x$ and $k$ unobservable [and therefore $p(x)$ is also unobservable]. This would lead to the same results.}

When care is contractible but the agent’s cost is unobservable, the principal knows that, to implement any given level of care, she will in general be paying more than the minimum required by the agent. As a consequence, so as to reduce the payment of rent, the principal is led to require less effort from the agent than would be warranted under first-best conditions. In what follows, we use the standard approach to deal with the principal’s problem and to analyze a contract that induces the agent to reveal the true cost parameter honestly. The solution to the principal’s problem is to offer a schedule specifying the payment to the agent as a function of the level of care undertaken by the agent; because we assume that the activity is always undertaken, the payment schedule is such that the agent will always want to participate irrespective of the true cost parameter. Specifying such a payment schedule is equivalent to specifying a schedule $\{x(k), t(k)\}_{k \in K}$ relating the level of care $x(k)$ and the payment $t(k)$ to a report $k$ made by the agent about the cost parameter. Using the revelation principle,\footnote{See Myerson, R.B., “Incentive Compatibility and the Bargaining Problem,” *Econometrica*, 1979, 47:61–74.} we focus on a truth-revealing mechanism. The principal’s problem can then be written as follows:

$$\min_{x(k), t(k)} \int_{k_0}^{k_1} \{ p(x(k)) A + t(k) \} f(k) \, dk$$

subject to

$$\pi(x(k), k) = t(k) - C(x(k), k) \geq 0 \quad (12)$$

$$\frac{d\pi}{dk}(x(k), k) = -C_x(x(k), k). \quad (13)$$

The first requirement is the participation constraint guaranteeing that the agent will always find it optimal to accept a contract. The second condition is the incentive compatibility requirement. It insures that the agent will find it optimal to report the true cost parameter.\footnote{To induce the agent to tell the truth it must be that:}

$$k \in \arg \max \pi(x(r), k). \quad (15)$$

Applying the envelope theorem yields (13). Note that the payment to the agent for any given level of care could also be made conditional on whether or not an accident occurs (or on any other information correlated with the level of care). With respect to the analysis presented here, this does not affect the results since we need only interpret $t(k)$ as the expected payment to the agent for a report $k$.\footnote{To induce the agent to tell the truth it must be that:}
subject to (13) and $\pi(x(k_1), k_1) \geq 0$. This is a standard optimal control problem. From the principal’s objective function, we see again that in the case of strict liability the principal will trade off accident costs against the cost of care and the agent’s rent. Again a benevolent planner would ignore the agent’s rent as an interpersonnel transfer. As a result, the principal will not induce the Pareto efficient solution.

**Proposition 3:** In a principal-agent problem with adverse selection, strict liability will generate an underprovision of care when the agent earns a positive rent.

For an exact proof we refer to the existing literature. A heuristic argument will suffice. Consider the first-best $x^*(k)$ when the circumstances of the situation correspond to the cost parameter $k$. By construction a small variation from the first-best solution will not affect the sum of accident and care costs. However, reducing incentives will reduce the agent’s rent. In other words, the principal’s overall cost is increasing in care at $x^*(k)$, and this leads her to require less care than in the first-best solution.

It is worthwhile stressing that Propositions 1 and 2 are not model specific. The result concerning the underprovision of care follows from the presence of rent in the agency relationship. Whenever there is rent, there is a wedge between the cost to the principal and the cost to society. The underprovision of care is then merely a consequence of the fact that this wedge is increasing in the level of effort.

### IV. The Negligence Rule

For the negligence rule, we assume first that courts are able to determine what would have been the first-best level of care in the situation at hand and that they use this as their due care standard. Thus, in the moral hazard case courts are able to determine $x^*$ and in the adverse selection case they are able to determine $x^*(k)$, given the cost parameter of the situation. Second, we assume that courts can obtain all the necessary information to verify if the first-best level of care has been implemented. We base the court’s ability on its unique powers, by which we mean subpoena and penalties for perjury or contempt of court, among others.

Consider the moral hazard case. In this context, the court’s ability to determine what level of care has been implemented may mean two very different things. First, it may mean that the court is able to observe the level of care actually chosen by the agent; that is, the court has perfect information ex post about the agent’s effort. Second, it may mean that the court is able to observe the level of care implemented by the principal, in the sense that it observes the incentives put in place by the principal and that it is able to determine whether or not these incentives can lead to a level of care compatible with the due care standard.

In the former case, the court’s finding under a negligence rule produces information that has been assumed to be otherwise unavailable to the principal. The principal could then conceivably condition her payments to the agent on the ex post information produced by the court. Because the principal’s information system would now incorporate much more precise information, it is clear that a negligence rule would then

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19See for instance Baron and Myerson, *op. cit.*

20The payment to the agent for any given level of care could also be made conditional on whether or not an accident occurs (or on any other information correlated with the level of care). With respect to the analysis presented here, this does not affect the results since we need only interpret $t(k)$ as the expected payment to the agent for a report.
generally do strictly better than a strict liability rule. In particular, it is easily shown that the information produced by the courts would reduce the rent earned by the agent, thereby reducing the cost to the principal of implementing the first-best level of effort. By contrast, in the latter case the court produces no information about the agent’s effort. It merely checks what level of care the principal has chosen to implement. For instance, the court may find that the work schedule imposed by the principal makes it highly unlikely for the agent’s level of care to be compatible with the due care standard. Thus, in this situation the cost to the principal of implementing any level of care is the same as under strict liability.

In what follows, we analyze the role of negligence under the latter interpretation because it is the least favorable to the negligence rule. Equivalently, we assume that the principal cannot condition the payment to the agent on the information produced by the court. If it can be shown that under this assumption the negligence rule is socially preferable to strict liability, then it would a fortiori be preferable under the alternative assumption. A similar issue arises in the case of adverse selection. If the court can verify both \( x^* (k) \) and \( x(k) \), a finding of negligence provides ex post information about \( k \). This information could be used ex ante in the principal’s contract design problem. Again, we consider the least favorable case for the negligence rule and assume that the principal cannot condition on the court’s finding.

Under a negligence rule, the principal’s problem is to decide whether or not she should implement the due care standard. Clearly, if the principal chooses to be knowingly negligent by not implementing the standard, she will face exactly the same trade-offs as in the case of strict liability. The results from the foregoing section then apply and predict an underprovision of care. The other possibility is to apply the standard. This has two opposite effects on the objective function of the principal. First, it eliminates the expected accident costs; and second, it increases incentive costs because of the increase in care to the first-best level. Whether it is more profitable for the principal to apply or ignore the standard depends on which of the two effects dominate.

For the moral hazard case the principal will find it preferable to implement the standard if

\[
C(x^*) + \pi(x^*) \leq p(x^*) A + C(x^*) + \pi(x^*)
\]  

where \( x^* \) denotes the outcome under the strict liability rule. Equivalently, the principal will implement the standard if expected accident costs are greater than the increase in the principal’s incentive cost:

\[
[ C(x^*) - C(x^*) ] + [ \pi(x^*) - \pi(x^*) ] \leq p(x^*) A. 
\]  

A similar result is obtained for the adverse selection case. The principal will implement the standard if

\[
\int_{k_0}^{k_1} \{ [ C(x^*(k), k) + \pi(x^*(k), k) ] - [ p(c'(k)) A + C(x'(k), k) + \pi(x'(k), k) ] \} f(k) dk \\
\leq 0.
\]  

\[\footnote{Even though this possibility would reduce the moral hazard problem, it would not in general eliminate it because payments remain bounded by the agent’s liability limit.} \]
PROPOSITION 4: In a principal-agent model with risk-neutral participants and asymmetric information, the negligence rule weakly dominates the strict liability rule.

Again, the proposition would only be strengthened should courts produce additional information otherwise unavailable to the principal. Of course, this would then combine two effects: the incentives to escape liability under a negligence rule and the reduction in agency costs made possible by the ex post information provided by courts.

V. Variable Activity Level

In this section, we extend the foregoing analysis by allowing the activity level to be determined endogenously by a market equilibrium. Because it is clear from the foregoing analysis that the inefficiency argument induced by an agency problem is similar under adverse selection and moral hazard, we only examine the second case where the principal cannot see the level of care undertaken by the agent. We already know from existing work by Landes and Posner, Polinsky, and Shavel that as agency costs converge to zero—i.e., as the asymmetric information problem disappears—the strict liability rule generates the first-best outcome and dominates any negligence rule. The heuristic for this conclusion is well known. The result follows because under strict liability accident costs are correctly internalized, whereas under negligence the aggressor who complies with the legal standard will disregard the accident losses imposed on third parties.

However, in the presence of an agency problem strict liability never yields a first-best outcome. As shown in Sections II and III, the agent’s rent leads the principal to induce too little care compared with the Pareto-efficient solution. We now show that the agent’s rent will also impact the level of activity chosen by the principal. For parsimony, we assume an additive technology, by which we mean that each agent is equally productive (each produces one unit of activity) and faces the same care problem, including the moral hazard consideration. Consequently, the total activity or level of output within the industry can be measured in terms of the total number, \( l \), of agents employed in the industry. We assume perfect competition for the activity and for the agents. Let \( q(l) \) denote the resulting market price (the inverse demand function) for the activity, and let \( h \) denote the cost of the activity per agent, in addition to accident costs and to the agent’s income.

The first-best solution is obtained by equating the marginal willingness to pay for one more unit of activity (i.e., one more agent) with the social costs associated with the activity undertaken by the agent. The social cost is the cost of the activity plus expected accident losses and the cost of care—where care has been chosen optimally:

\[
0 = p'(x^*) A + C'(x^*)
\]

\[
q(l^*) = h + p(x^*) A + C(x^*). \tag{18}
\]

Equation (17) the first-best level of care. Equation (18) is the equality between the demand price for the activity and the supply price (given an infinitely elastic supply).

Under strict liability, the agency structure between the principal and each agent is exactly the same as in Section II, yielding a positive rent for the agent. The market equilibrium is then given by \( x^* \) and \( l^* \) satisfying:

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Supra, note 2.
Comparing the conditions for the first-best outcome proves the following result:

**Proposition 5:** In a principal-agent problem where care is a hidden action undertaken by the agent and the activity level is endogenous, strict liability will generate too little activity and an underprovision of care when the agent earns a positive rent.

The two sources of inefficiency under strict liability are represented in Figure 1. The shaded triangle measures the welfare loss resulting from the reduction in consumer surplus because $l^s < l^o$. The shaded rectangle measures the increase in primary costs generated by the underprovision of care from $x^s \leq x^*$. For the negligence rule, we assume, as is common in the literature, that courts can only impose a standard on the level of care, and not on the level of activity. Principals may choose to be negligent—in which case the level of care and production are the same as under strict liability, i.e., they are determined by (19) and (20)—or they may comply with the standard which is assumed to be the Pareto-efficient level of care. This choice determines the private marginal (or unit) cost of the activity. Thus, principals will chose to induce due care if and only if doing so reduces marginal cost. This is equivalent to condition (14) in the foregoing section. Consequently, in the market equilibrium with nonnegligent principals the level of activity is determined by the condition:

\[
q(l^o) = h + p(x^*)A + C(x^*) + \pi(x^*). \tag{21}
\]

By comparison with (20), we see that production is larger than under strict liability. This conclusion follows from the same argument as in the case without agency costs. Indeed, the negligence rule still creates an externality leading principals to ignore
accident losses. However, due to the agency problem strict liability generates too little production, so that ignoring accident costs may actually improve welfare. Whether it does or not will depend on the relative importance of the agency costs compared to the accident losses resulting for the externality. One extreme case yields a straightforward result that is independent of the market demand for the activity.

**PROPOSITION 6:** If $\pi(x^*) \geq p(x^*)A$, the negligence rule weakly Pareto dominates strict liability.

The result follows because it is always the case that $l' \leq l''$ because the condition in the proposition implies that $l'' \leq l'$. In such a situation, welfare losses under the negligence rule are consequently always less than under strict liability. For the case where the condition is not satisfied, we have $l'' \geq l'$ and the above reasoning does not apply. However, negligence may still weakly dominate strict liability. The exact result will depend on a comparison of the welfare losses generated by each of the rules. Figure 2 is an example where $\pi(x^*) < p(x^*)A$. The shaded area represents the welfare loss under negligence. Comparing the welfare effects of both rules amounts to comparing the shaded areas in both figures. We note that the standard result from the existing literature follows immediately from Figures 1 and 2. In Figure 1, the shaded area is positively related to agency costs and completely vanishes as $\pi(x^*)$ converges to zero. In contrast, in Figure 2 the welfare loss is decreasing in the agency costs and is maximal when there is no informational asymmetry.

The overall implications of this section are that with an endogenous activity level strict liability cannot be guaranteed to Pareto dominate the negligence rule. Indeed, depending on the relative importance of the agency costs (as measured by the agent’s rent) versus the cost of the externality (as measured by expected accident losses), one rule
will be better than the other. When agency costs are relatively large compared to the externality losses, the negligence rule will be better, whereas in the opposite case strict liability will dominate.

VI. Conclusion

The existing literature offers a number of comparisons between the basic liability rules of negligence and strict liability. As in the standard framework, we focused on primary costs and abstracted from risk aversion and administrative costs. Also, we considered the “best” case for strict liability by analyzing the unilateral care situation.

We find that, in the case of a fixed activity level, asymmetric information breaks the equivalence between the negligence and the strict liability rules in favor of negligence. The heuristic is simply that the asymmetry creates informational rents. In the case of strict liability, these informational rents distort the principal’s decision away from the first-best solution and lead to the underprovision of care. The negligence rule may perform better because it confronts the principal with a discontinuous profit function. Although increasing care to the socially efficient level raises the principal’s incentive costs, it allows her to escape paying accident costs. As a consequence, if expected accident costs are large, it is preferable for the principal to implement the standard.

When the activity level is endogenously determined, we find that agency costs may overturn the advantage of strict liability, yielding an underprovision of care and too little activity. Under negligence, if principals conform to the due care standard, there will always be more activity than under strict liability. Depending on the relative size of the agency costs and accident losses, the negligence rule may then be strictly preferable. Negligence weakly Pareto dominates when informational rents are large relative to expected accidents losses.

These results allow numerous extensions by combining the principal-agent framework with other questions. For example, with respect to environmental liability, it has been suggested that lender liability could circumvent the judgement-proofness of the borrowing firm by introducing incentives on the part of the lender to screen and monitor borrowers. This has usually been analyzed in a strict liability context.24 The present paper suggests that a negligence rule could do better.

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