A Note on the Logical Relationship between Two Different Notions of Negligence

Satish K. Jain, Jawaharlal Nehru University

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Satish K. Jain

Abstract

In the law and economics literature the notion of negligence has been conceptualized in two different ways. The mainstream conceptualization defines a party to be negligent if his care level is below a certain specified level called due care level; and nonnegligent otherwise. It is further assumed that the due care levels for the parties are chosen appropriately from the perspective of minimization of total social costs. Another way to define negligence, pioneered by Mark Grady, is in terms of cost-justified untaken precautions. A party is called negligent if there exists a precaution which the party could have taken but did not, and which would have cost less than the reduction in expected harm that it would have brought about; and nonnegligent otherwise. This note explores the logical relationship between these two negligence notions. It is shown in the paper that, while in general the two notions are logically completely independent of each other, under certain plausible conditions, likely to be satisfied in most cases which are actually litigated, negligence in the sense of shortfall from due care implies negligence as existence of a cost-justified untaken precaution. Consequently for the court cases which are decided under the untaken precaution approach there is some presumption of efficiency when the verdict is that of nonnegligence; there is, however, no such presumption when the verdict is of negligence.

Keywords: Negligence as Shortfall from Due Care, Negligence as Existence of a Cost-Justified Untaken Precaution, Efficiency of Liability Rules, Efficiency of Court Decisions

JEL Classification: K13

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1Centre for Economic Studies and Planning, School of Social Sciences, Jawaharlal Nehru University, New Delhi 110067
Email:skjain@mail.jnu.ac.in, satish.k.jain@gmail.com
1. Introduction

There are at least two different senses in which the term ‘negligence’ is used by the courts. Corresponding to these two senses are the two conceptualizations of the idea of negligence in the law and economics literature. The mainstream conceptualization defines a party to be negligent if his care level is below a certain specified level called due care level; and nonnegligent otherwise. It is further assumed that the due care levels for the parties are chosen appropriately from the perspective of minimization of total social costs. Another way to conceptualize negligence, pioneered by Grady (1983, 1984, 1989), is in terms of cost-justified untaken precautions. A party is called negligent if there exists a precaution which the party could have taken but did not, and which would have cost less than the reduction in expected harm that it would have brought about; and nonnegligent otherwise. As efficiency implications of these two different ways of defining negligence are quite different, it is important to know how often one or the other of these notions is employed by courts for negligence determination; and what implications determination of negligence according to one conceptualization has for the other. This note is addressed to the second of these problems.

It is shown in the note that in general the two notions of negligence are logically completely independent of each other. There is however one entailment relation of considerable significance in the context of actual cases which holds if three assumptions are made. If it is assumed that: (i) the interaction is such that the effectiveness of care by a party does not increase with increase in the other party’s care level, (ii) there is a unique care-configuration at which total social costs are minimized, and (iii) neither party’s actual care level is in excess of the level required for total social costs minimization; then it can be shown that if a party’s care level is less than the due care level (the due care level being appropriate from the perspective of total social costs minimization), i.e., the party is negligent in terms of the mainstream approach, then it must be the case that the party is negligent in terms of the untaken precaution approach as well. While in the context of litigated cases complementarities in the cares of the two parties cannot be ruled out altogether, one expects (i) to be satisfied in most instances. In the kind of cases which are actually litigated the assumption of uniqueness of care-configuration at which

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If negligence is defined as failure to take at least the due care and the due care levels are chosen appropriately from the perspective of total social costs minimization, then a liability rule is efficient if it satisfies the condition of negligence liability. The condition of negligence liability requires that whenever one party is negligent and the other nonnegligent, the entire loss in case of accident must be borne by the negligent party. On the other hand, if negligence is defined as existence of a cost-justified untaken precaution then no liability rule is efficient. See Brown (1973), Landes and Posner (1987), Shavell (1987), Jain and Singh (2002), and Jain (2006), among others.
total social costs are minimized is hardly restrictive; it will rarely be the case that they
are minimized at more than one care-configuration. Also, in the kind of cases which are
actually litigated, it is highly unlikely that one of the two parties’ actual care level will be
in excess of the level at which total social costs are minimized. Consequently, it follows
that if in a litigated case a party has been found to be nonnegligent because of failure to
find any cost-justified untaken precaution then in all likelihood the party will be nonneg-
ligent in the sense of mainstream approach as well. However, if a party is found negligent
under the untaken precaution approach, in the kind of cases which tend to be litigated,
one cannot in general make any inference as to the party’s negligence or otherwise under
the mainstream approach. Thus for the court cases which are decided under the untaken
precaution approach, while there is presumption of efficiency when the verdict is that of
nonnegligence, there is no such presumption when the verdict is of negligence.

2. Notation and Definitions

Let \( c \geq 0 \) denote the cost of care taken by the victim and \( d \geq 0 \) the cost of care
taken by the injurer. Costs of care will be assumed to be strictly increasing functions of
indices of care, i.e., care levels; consequently, costs of care themselves can be taken to be
indices of care. Let
\[
C = \{ c \mid c \text{ is the cost of some feasible level of care which can be taken by the victim} \}
\]
and
\[
D = \{ d \mid d \text{ is the cost of some feasible level of care which can be taken by the injurer} \}.
\]
We will identify \( c = 0 \) with victim taking no care; and \( d = 0 \) with injurer taking no care.
We assume:
\[
0 \in C \land 0 \in D.
\] (A1)
(A1) merely says that, for each party, taking no care is always a feasible option.

Let \( \pi \) denote the probability of occurrence of accident and \( H \geq 0 \) the loss in case
of occurrence of accident. Both \( \pi \) and \( H \) will be assumed to be functions of \( c \) and \( d \);
\( \pi = \pi(c,d), H = H(c,d) \). Let \( L = \pi H \). \( L \) is thus expected loss due to accident.
We assume:
\[
(\forall c, c' \in C)(\forall d, d' \in D)[[c > c' \rightarrow L(c, d) \leq L(c', d)] \land [d > d' \rightarrow L(c, d) \leq L(c, d')]].
\] (A2)
That is to say: a larger expenditure on care by either party, given the expenditure on
care by the other party, does not result in greater expected accident loss.

Total social costs (TSC) are defined to be the sum of cost of care by the victim, cost
of care by the injurer, and expected loss due to accident; \( TSC = c + d + L(c, d) \). Let
\[
M = \{(c', d') \in C \times D \mid c' + d' + L(c', d') \text{ is minimum of } \{c + d + L(c, d) \mid c \in C \land d \in D\} \}.\]
Thus $M$ is the set of all costs of care configurations $(c', d')$ which are total social cost minimizing. It will be assumed that:

$C, D$ and $L$ are such that $M$ is nonempty. (A3)

In the law and economics literature, the notion of negligence is usually defined as shortfall (sf) from a specified level called due care. We denote by $c^*$ the due care level for the victim; and by $d^*$ the due care level for the injurer. It will be assumed: that $(c^*, d^*) \in M$ in case the idea of negligence is relevant both for the victim and the injurer; that $(\exists d^* \in D) [(c^*, d^*) \in M]$ in case the idea of negligence is relevant only for the victim; and that $(\exists c^* \in C) [(c^*, d^*) \in M]$ in case the idea of negligence is relevant only for the injurer. That is to say, due care levels are chosen appropriately from the perspective of minimization of total social costs. When the notion of negligence is defined in terms of shortfall from due care, the injurer is called negligent at $(c, d)$ iff his care level $d$ is less than $d^*$; and nonnegligent otherwise. The victim is called (contributorily) negligent at $(c, d)$ iff his care level $c$ is less than $c^*$; and nonnegligent otherwise.

Another way to conceptualize negligence is in terms of cost-justified untaken precautions (up).

Corresponding to each $(c, d) \in C \times D$, we define:

$D^u(c, d) = \{d^u \in D \mid d^u > d \land L(c, d) - L(c, d^u) > d^u - d\}$; and

$C^u(c, d) = \{c^u \in C \mid c^u > c \land L(c, d) - L(c^u, d) > c^u - c\}$.

Thus, $D^u(c, d)$ is the set of all cost-justified untaken precautions at $(c, d)$ which the injurer could have taken; and $C^u(c, d)$ is the set of all cost-justified untaken precautions at $(c, d)$ which the victim could have taken. When the notion of negligence is defined in terms of cost-justified untaken precautions, the injurer is called negligent at $(c, d)$ iff $D^u(c, d)$ is nonempty; and nonnegligent at $(c, d)$ iff $D^u(c, d)$ is empty. In other words, at $(c, d)$, the injurer is defined to be negligent iff there is a cost-justified untaken precaution; and nonnegligent iff there does not exist any cost-justified untaken precaution. Similarly, the victim is called (contributorily) negligent at $(c, d)$ iff $C^u(c, d)$ is nonempty; and nonnegligent at $(c, d)$ iff $C^u(c, d)$ is empty.

3. The Logical Relationship between Negligence as Shortfall from Due Care and Negligence as Existence of A Cost-Justified Untaken Precaution

Proposition 1 In general, the notion of negligence as shortfall from due care and the notion of negligence as existence of a cost-justified untaken precaution are logically completely independent of each other.
Proof: The following example constitutes a proof of the proposition.

Let \( C = D = \{0, 1, 2\} \); and let \( L(c, d), (c, d) \in C \times D \), be as given in the following array:

\[
\begin{array}{ccc}
\hline
 & d & \\
0 & 10.0 & 8.0 & 6.7 \\
1 & 8.0 & 6.5 & 6.0 \\
2 & 6.7 & 6.0 & 5.7 \\
\hline
\end{array}
\]

Thus \((1,1)\) is the unique TSC-minimizing care-configuration.

Let due care for the injurer \( d^* \) be 1.

We obtain \( D^u(c, d), (c, d) \in C \times D \), as given in the following array:

\[
\begin{array}{ccc}
\hline
 & d & \\
0 & \{1, 2\} & \{2\} & \emptyset \\
1 & \{1\} & \emptyset & \emptyset \\
2 & \emptyset & \emptyset & \emptyset \\
\hline
\end{array}
\]

(i) At \((c, d) = (0, 1)\), the injurer is nonnegligent under the negligence (sf) notion as \( d = d^* \). However, the injurer is negligent under the negligence (up) notion as at \((0,1)\) the set \( D^u(c, d) \) is nonempty (If the injurer increases his care level from 1 to 2, expected loss decreases by 1.3 which is greater than 1, increase in the cost of care).
(ii) At \((c, d) = (2, 0)\), the injurer is negligent under the negligence (sf) notion as \(0 = d < d^* = 1\). However, the injurer is nonnegligent under the negligence (up) notion as at \((2,0)\) the set \(D^a(c, d)\) is empty (There does not exist any cost-justified untaken precaution).

(iii) At \((c, d) = (0, 0)\), the injurer is negligent under the negligence (sf) notion as \(0 = d < d^* = 1\). The injurer is negligent under the negligence (up) notion as well as at \((0,0)\) the set \(D^u(c, d)\) is nonempty (If the injurer increases his care level from 0 to 1, expected loss decreases by 2 which is greater than 1, increase in the cost of care).

(iv) At \((c, d) = (1, 1)\), the injurer is nonnegligent under the negligence (sf) notion as \(d = d^*\). At \((1,1)\) the injurer is nonnegligent under the negligence (up) notion as well, as the set \(D^u(1,1)\) is empty (There does not exist any cost-justified untaken precaution).

\[\square\]

Let an interaction \(<C, D, L>\) be termed as unilateral care (injurer-care) interaction iff it is such that \((\forall (c', d') \in C \times D)(c', d') \in M \rightarrow c' = 0\); and as unilateral care (victim-care) interaction iff it is such that \((\forall (c', d') \in C \times D)(c', d') \in M \rightarrow d' = 0\). Thus, an interaction is unilateral care kind if the optimal care by the victim is zero; or the optimal care by the injurer is zero.

The next proposition shows that even if we consider only unilateral care (injurer-care) interactions, there is still no entailment relationship between the two notions of negligence.

**Proposition 2** In the context of unilateral care (injurer-care) interactions, the notion of negligence as shortfall from due care and the notion of negligence as existence of a cost-justified untaken precaution are logically completely independent of each other.

**Proof:** The following example constitutes a proof of the proposition.

Let \(C = D = \{0, 1, 2\}\); and let \(L(c, d), (c, d) \in C \times D\), be as given in the following array:

\[
\begin{array}{c|ccc}
\quad & d & \\ \hline
\quad & 0 & 1 & 2 \\
0 & 10.0 & 8.5 & 7.6 \\
c & 9.1 & 7.9 & 6.8 \\
2 & 8.3 & 7.4 & 6.6 \\
\end{array}
\]
TSC\((c,d), (c,d) \in C \times D\), are as given in the following array:

\[
\begin{array}{c|ccc}
  \quad & d & 0 & 1 & 2 \\
\hline
  0 & 10.0 & 9.5 & 9.6 \\
  c & 1 & 10.1 & 9.9 & 9.8 \\
  2 & 10.3 & 10.4 & 10.6 \\
\end{array}
\]

Thus \((0,1)\) is the unique TSC-minimizing care-configuration.

Let due care for the injurer \(d^{*}\) be 1.

We obtain \(D^u(c,d), (c,d) \in C \times D\), as given in the following array:

\[
\begin{array}{c|ccc}
  \quad & d & 0 & 1 & 2 \\
\hline
  0 & \{1,2\} & \emptyset & \emptyset \\
  c & \{1,2\} & \{2\} & \emptyset \\
  2 & \emptyset & \emptyset & \emptyset \\
\end{array}
\]

(i) At \((c,d) = (2,0)\) the injurer is negligent under the negligence (sf) notion as \(0 = d < d^{*} = 1\). However, the injurer is nonnegligent under the negligence (up) notion as at \((2,0)\) the set \(D^u(c,d)\) is empty (There does not exist any cost-justified untaken precaution).

(ii) At \((c,d) = (1,1)\) the injurer is nonnegligent under the negligence (sf) notion as \(d = d^{*}\). However, the injurer is negligent under the negligence (up) notion as at \((1,1)\) the set \(D^u(c,d)\) is nonempty (If the injurer increases his care level from 1 to 2, expected loss decreases by 1.1 which is greater than 1, increase in the cost of care).

(iii) At \((c,d) = (0,0)\) the injurer is negligent under the negligence (sf) notion as \(0 = d < d^{*} = 1\). The injurer is negligent under the negligence (up) notion as well, as at \((0,0)\) the set \(D^u(c,d)\) is nonempty (If the injurer increases his care level from 0 to 1, expected loss decreases by 1.5 which is greater than 1, increase in the cost of care).

(iv) At \((c,d) = (0,1)\) the injurer is nonnegligent under the negligence (sf) notion as \(d = d^{*}\).
At (0,1) the injurer is nonnegligent under the negligence (up) notion as well, as the set $D^u(0,1)$ is empty (There does not exist any cost-justified untaken precaution).

Similarly in the context of unilateral care (victim-care) interactions the two notions of negligence can be shown to be logically completely independent of each other. In what follows we consider only unilateral care (injurer-care) interactions, as analogous propositions hold for unilateral care (victim-care) interactions and which can be established by interchanging the positions of injurer and victim in the arguments establishing the propositions for unilateral care (injurer-care) interactions.

In the context of results on the efficiency of liability rules, one assumption which is almost always made is that successive units of care are non-increasing in their effectiveness in reducing expected loss, the other party’s care level remaining fixed. Let an interaction with such a property be called D-restricted. More formally, an interaction $<C,D,L>$ is D-restricted iff $(\forall c,c',c'' \in C)(\forall d,d',d'' \in D)[c > c' > c'' \land d > d' > d'' \rightarrow \frac{L(c',d) - L(c,d)}{c - c'} \geq \frac{L(c,d') - L(c,d)}{d - d'}].$

**Remark 1** The interactions which were used to establish Propositions 1 and 2 were D-restricted; therefore the proofs of Propositions 1 and 2 also constitute proofs for the corresponding propositions for D-restricted interactions.

Another assumption which is usually made in the context of results on the efficiency of liability rules is that the effectiveness of care does not increase with the care level of the other party. Let an interaction with such a property be called S-restricted. More formally, an interaction $<C,D,L>$ is S-restricted iff $(\forall c,c' \in C)(\forall d,d' \in D)[c > c' \land d > d' \rightarrow [L(c',d) - L(c,d) \leq L(c,d') - L(c,d)] \land [L(c,d') - L(c,d) \leq L(c',d') - L(c',d)]]].$

**Remark 2** The interaction which was used to establish Proposition 1 was S-restricted; therefore the proof of Proposition 1 also constitutes a proof for the corresponding proposition for S-restricted interactions. For establishing the proposition for S-restricted interactions corresponding to Proposition 2, we consider the following interaction:

Let $C = \{0,1\}, D = \{0,1,2,3\};$ and let $L(c,d),(c,d) \in C \times D,$ be as given in the following array:
(0,1) is the unique TSC-minimizing care-configuration. Let due care for the injurer \( d^* \) be 1. As injurer is: (i) negligent (sf) and nonnegligent (up) at (1,0); (ii) nonnegligent (sf) and negligent (up) at (0,2); (iii) negligent (sf) and negligent (up) at (0,0); and (iv) nonnegligent (sf) and nonnegligent (up) at (0,1); the logical independence of the two notions of negligence in the context of S-restricted unilateral care (injurer-care) interactions follows.

As the interaction which was considered for establishing Proposition 1 is both D-restricted and S-restricted, it follows that the two notions of negligence are logically independent of each other in the context of interactions which are bilateral, D-restricted, and S-restricted. However, for unilateral care interactions which are both D-restricted and S-restricted, the two notions of negligence are not logically independent as the following proposition establishes.

**Proposition 3** In the context of unilateral care (injurer-care) interactions which are both D-restricted and S-restricted, injurer’s negligence in the sense of existence of a cost-justified untaken precaution implies injurer’s negligence in the sense of shortfall from due care.

**Proof:** Let interaction \(< C, D, L >\) be unilateral care (injurer-care), D-restricted, and S-restricted. Let \((0, d^*) \in M\) and let \(d^*\) be the due care for the injurer.

Consider \((c, d)\) such that \(d \geq d^*\). Thus injurer is nonnegligent (sf) at \((c, d)\).

Suppose there is a \(d' > d\) such that \(L(c, d) - L(c, d') > d' - d\).

\[L(c, d) - L(c, d') > d' - d \rightarrow L(0, d) - L(0, d') > d' - d\] as the application is S-restricted.

If \(d = d^*\) then we have: \(L(0, d^*) - L(0, d') > d' - d^*\), contradicting that TSC are minimized at \((0, d^*)\).  \(\text{(1)}\)

Next consider \(d > d^*\).

As the application is D-restricted, from \(d' > d\) and \(d > d^*\) we obtain:

\[
\frac{L(0, d^*) - L(0, d)}{d - d^*} \geq \frac{L(0, d) - L(0, d')}{d' - d} > 1
\]

\[\rightarrow L(0, d^*) - L(0, d) > d - d^*\]

\[\rightarrow \text{TSC}(0, d^*) \text{ is not minimum}\] \(\text{(2)}\)

(1) and (2) establish that there does not exist any \(d' > d\) such that \(L(c, d) - L(c, d') > d' - d\).
This establishes that the injurer is nonnegligent (up) at \((c, d)\). Thus we have shown that injurer being nonegligent (sf) implies injurer being nonnegligent (up); the proposition being the contrapositive of it is therefore established.

\[\square\]

**Remark 3** It should be noted that in the context of unilateral care (injurer-care) interactions which are both \(D\)-restricted and \(S\)-restricted, injurer’s negligence in the sense of shortfall from due care does not imply injurer’s negligence in the sense of existence of a cost-justified untaken precaution as the following example shows:

Let \(C = \{0, 1\}, D = \{0, 1, 2\}\); and let \(L(c, d), (c, d) \in C \times D\), be as given in the following array:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>10.0</td>
<td>8.9</td>
<td>8.0</td>
</tr>
<tr>
<td>1</td>
<td>9.1</td>
<td>8.2</td>
<td>7.4</td>
</tr>
</tbody>
</table>

\((0, 1)\) is the unique TSC-minimizing care-configuration. Let due care for the injurer \(d^*\) be 1. At \((1, 0)\) injurer is negligent (sf) but nonnegligent (up).

**Remark 4** It is important to note that in the context of unilateral care (injurer-care) interactions which are both \(D\)-restricted and \(S\)-restricted, victim’s negligence in the sense of existence of a cost-justified untaken precaution does not imply victim’s negligence in the sense of shortfall from due care. For this class of interactions while it is not possible for the victim to be negligent (sf), victim’s negligence in the sense of existence of a cost-justified untaken precaution is not ruled out as the following example shows:

Let \(C = \{0, 1\}, D = \{0, 1\}\); and let \(L(c, d), (c, d) \in C \times D\), be as given in the following array:

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<td>7.9</td>
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</tbody>
</table>
(0,1) is the unique TSC-minimizing care-configuration. Let the due care $c^*$ for the victim be 0; and the due care $d^*$ for the injurer be 1. At (0,0) the victim is negligent (up).

Another assumption which is usually made in the literature relating to efficiency of liability rules is that of the uniqueness of the care-configuration at which TSC are minimized. As in all the interactions which were considered for establishing Propositions and Remarks, TSC were minimized at a unique care-configuration, all of them will continue to hold even if the uniqueness of the TSC-minimizing care-configuration is assumed additionally.

In the context of cases which are litigated it would rarely be the case that the care level that one of the parties actually took was greater than the due care level. Thus, in the context of cases which are litigated it is reasonable to assume that the actual care levels of the parties are less than or equal to due care levels. The next proposition establishes an entailment relation between the two notions negligence when neither party is taking more than due care.

**Proposition 4** In the context of an S-restricted bilateral care interaction which is such that the care-configuration at which total social costs are minimized is unique, at a care-configuration where neither party is taking more care than required for total social costs minimization, a party’s negligence in the sense of failure to take at least due care implies party’s negligence in the sense of existence of a cost-justified untaken precaution.

**Proof:** Consider any S-restricted interaction such that $M$ is a singleton. Let $M = \{(c^*, d^*)\}$. Let the due care for the injurer be $d^*$.

Let $(c, d)$ be such that $c \leq c^* \land d \leq d^*$.

Suppose injurer is negligent (sf) at $(c, d)$, i.e., $d < d^*$.

$d < d^* \rightarrow L(c^*, d) - L(c^*, d^*) > d^* - d$ as TSC are uniquely minimized at $(c^*, d^*)$  \hspace{1cm} (1)

$c \leq c^* \rightarrow L(c, d) - L(c, d^*) \geq L(c^*, d) - L(c^*, d^*)$, as the interaction is S-restricted.  \hspace{1cm} (2)

$(1) \land (2) \rightarrow L(c, d) - L(c, d^*) > d^* - d$.

Thus, at $(c, d)$, $d^*$ is a cost-justified untaken precaution and therefore the injurer is negligent (up).

**Remark 5** Proposition 4 has shown that if (i) the interaction is such that there is a unique care configuration $(c^*, d^*)$ at which TSC are minimized; (ii) the interaction is S-restricted; and (iii) the victim’s care level $c$ is not greater than $c^*$, then from injurer’s negligence (sf) it can be inferred that he is negligent (up). If any of the three assumptions fails to hold then it is possible for injurer to be negligent (sf) and nonnegligent (up), as the following three examples illustrate:
Example 1: The interaction considered in Proposition 1 is $S$-restricted (also $D$-restricted) and there is a unique TSC-minimizing care-configuration, namely $(1, 1) = (c^*, d^*)$. At $(c, d) = (2, 0)$ we do not have $c \leq c^*$; and, as was mentioned earlier in the proof of Proposition 1, at $(c, d) = (2, 0)$ the injurer is negligent (sf) as $0 = d < d^* = 1$ and nonnegligent (up) as at $(c, d) = (2, 0)$ the set $D^u(c, d)$ is empty.

Example 2: Consider the following interaction which is $S$-restricted (also $D$-restricted). Let $C = \{0, 1\}, D = \{0, 1, 2\}$; and let $L(c, d), (c, d) \in C \times D$, be as given in the following array:

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<tr>
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<td>7.0</td>
</tr>
<tr>
<td>1</td>
<td>8.0</td>
<td>6.5</td>
<td>5.5</td>
</tr>
</tbody>
</table>

TSC are minimized at $(1, 1)$ and $(1, 2)$. Let $(c^*, d^*) = (1, 2)$. At $(1, 1)$, injurer is negligent (sf) but nonnegligent (up).

Example 3: Let $C = \{0, 1\}, D = \{0, 1\}$; and let $L(c, d), (c, d) \in C \times D$, be as given in the following array:

<p>| | | |</p>
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<tbody>
<tr>
<td>0</td>
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<td>9.5</td>
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<tr>
<td>1</td>
<td>9.5</td>
<td>0</td>
</tr>
</tbody>
</table>

TSC is uniquely minimized at $(1, 1)$. Let $(c^*, d^*) = (1, 1)$. This interaction is not $S$-restricted (although $D$-restricted). At $(0, 0)$, we have $c \leq c^* \land d \leq d^*$; but injurer is negligent (sf) but nonnegligent (up).

Remark 6 Under the conditions of Proposition 4 from the negligence (up), negligence (sf) cannot be inferred as is clear from the interaction considered in the proof of Proposition 1. At $(0, 1)$ injurer is negligent (up) but nonnegligent (sf).

The following proposition follows immediately from Propositions 3 and 4.

**Proposition 5** If a unilateral care (injurer-care) interaction is (i) $D$-restricted; (ii) $S$-restricted; (iii) and is such that TSC are minimized uniquely at $(0, d^*)$, where $d^*$ is the injurer’s due care then at $(0, d), d \in D$, the injurer is negligent (sf) iff he is negligent (up).

4. Summary and Conclusions
In view of the discussion of the previous section the relationship between the notion of negligence as shortfall from due care (due care being appropriate from the perspective of total social costs minimization) and the notion of negligence as existence of a cost-justified untaken precaution can be summarized as follows:

(i) In general, the two notions are logically completely independent of each other.

(ii) In the literature on the efficiency of liability rules the following three assumptions are usually made: (a) Successive units of care are non-increasing in their effectiveness in reducing expected loss, the other party’s care level being fixed. (b) The effectiveness of care does not increase with the care level of the other party. (c) There is a unique care-configuration at which the total social costs are minimized. The complete logical independence between the two notions continues to hold even if some or all of these three assumptions are made.

(iii) In the special case of unilateral care interactions also in general the two notions are completely independent of each other.

(iv) In the context of unilateral care interactions, the complete logical independence between the two notions continues to hold even if (a) or (c) or both hold. Also, the complete logical independence between the two notions continues to hold even if (b) or (c) or both hold.

(v) In the context of unilateral care interactions, the two notions are not logically independent if it is assumed that both (a) and (b) hold. Given that both (a) and (b) hold, in the context of unilateral care (injurer-care) interactions injurer’s negligence in the sense of existence of a cost-justified untaken precaution implies injurer’s negligence in the sense of shortfall from due care. It is, however, possible for the victim to be negligent in the sense of existence of a cost-justified untaken precaution notwithstanding that in a unilateral care (injurer-care) case the victim can never be negligent in the sense of shortfall from due care. Similarly, given that both (a) and (b) hold, in the context of unilateral care (victim-care) interactions victim’s negligence in the sense of existence of a cost-justified untaken precaution implies victim’s negligence in the sense of shortfall from due care. It is, however, possible for the injurer to be negligent in the sense of existence of a cost-justified untaken precaution notwithstanding that in unilateral care (victim-care) case the injurer can never be negligent in the sense of shortfall from due care.

In the context of real interaction cases the assumption of uniqueness of care-configuration at which total social costs are minimized is not particularly restrictive; it will rarely be the case that they are minimized at more than one care-configuration. Also, in the kind of cases which are actually litigated, it is highly unlikely that one of the two parties’ actual care level will be in excess of the level at which total social costs are minimized. While in the context of litigated cases complementarities in the cares of the parties cannot be
ruled out, one expects that in most instances the assumption of effectiveness of care not increasing with the care level of the other party will be satisfied. Consequently, it follows in view of Proposition 4 that, if in a litigated case one party has been found to be negligent in the sense of shortfall from due care then in all likelihood the party will be negligent in the sense of existence of a cost-justified untaken precaution as well.

Actual court judgments can be divided into four categories: (i) Judgments where a party has been found to be negligent because of failure to take at least the due care. (ii) Judgments where a party has been found to be nonnegligent because the party’s actual care level has been adjudged to be greater than or equal to the due care. (iii) Judgments where a party has been found to be negligent because of existence of a cost-justified untaken precaution. (iv) Judgments where a party has been found to be nonnegligent because of failure to find any cost-justified untaken precaution. Assuming that courts use liability rules satisfying the condition of negligence liability and that due care levels are chosen appropriately from the perspective of total social costs minimization, court decisions will be efficient in cases (i) and (ii). In view of Proposition 4, in most cases of category (iv) also court decisions are likely to be efficient. With respect to category (iii) cases, it is not possible to make any inference regarding efficiency of court decisions. It is possible for a verdict of negligence decided on the basis of existence of a cost-justified untaken precaution to be inefficient. In fact, inefficiency is quite likely in cases where the cares of the two parties are substitutes for each other.

In case an interaction is unilateral care (injurer-care); successive units of care are non-increasing in their effectiveness in reducing expected loss, the other party’s care level being fixed; effectiveness of care does not increase with the care level of the other party; and there is a unique care-configuration at which the total social costs are minimized; then given that victim is taking no care, injurer would be negligent in the sense of not having taken at least the due care iff he would be negligent in the sense of not having taken some cost-justified precaution. Similarly, in case an interaction is unilateral care (victim-care); successive units of care are non-increasing in their effectiveness in reducing expected loss, the other party’s care level being fixed; effectiveness of care does not increase with the care level of the other party; then given that injurer is taking no care, victim would be negligent in the sense of not having taken at least the due care iff he would be negligent in the sense of not having taken some cost-justified precaution. In these special cases, in all four categories of cases court decisions will be efficient. These special cases are however not of much value as most litigated cases tend to be of the bilateral type.

Thus, with respect to efficiency of court decisions the following broad conclusion
emerges: In cases where court uses a liability rule satisfying negligence liability, negligence is defined in terms of shortfall from due care, and due care is chosen appropriately from the perspective of total social costs minimization; the court decisions will be efficient. Given that a liability rule satisfying negligence liability is used, the court cases where verdict of nonnegligence is reached using the untaken precaution approach are likely to be efficient. In other cases there is no reason to presume that the court decisions will be efficient.

References


