

# Defenses in negligence: implications for tort feaseor care

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# Defences in negligence: Implications for tortfeasor care

Robert Young<sup>b,\*</sup>, Michael Faure<sup>a</sup>, Paul Fenn<sup>b</sup>

<sup>a</sup> *METRO, Maastricht, The Netherlands*

<sup>b</sup> *Nottingham University Business School, Jubilee Campus, Nottingham NG8 1BB, United Kingdom*

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## Abstract

An injurer avoids liability in negligence when any one of the ingredients of negligence is absent. A potential injurer therefore has a number of possible ‘defences’, each one corresponding to the absence of an ingredient. *Ex ante*, a rational potential injurer will take care up to, but only up to, the point at which the cheapest available defence is acquired. We consider here the defences of absence of duty, absence of breach, absence of causation and absence of foreseeability, in the first place without uncertainty as to the legal standard. Absence of breach, causation and foreseeability are all related to the amount of care. Comparing the amounts of care necessary to acquire each defence, our principal result is that the defence of absence of causation is always cheaper to acquire than that of absence of breach, implying that a potential injurer will respond to a socially optimal legal standard by taking less than socially optimal care. When the model is extended to include uncertainty as to the legal standard the privately optimal amount of care increases and approximates to the social optimum.

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## 1. Introduction

The established approach to negligence in the law and economics literature is to consider the conduct of a rational self-interested person making decisions in the shadow of the law. This person chooses her actions by anticipating their consequences, including those consequences created by the system of laws to which she is subject. The possibility of future application of the law, by way of litigation, casts a shadow on her current decisions

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\* Corresponding author. Tel.: +44 115 9515272.

E-mail address: [Robert.Young@nottingham.ac.uk](mailto:Robert.Young@nottingham.ac.uk) (R. Young).

and is intended, by those who make and apply the law, so to do. In this paper we consider the shape of the shadow.

A successful claim in negligence requires the claimant, at least in English law, to establish that the defendant owed the claimant a duty of care, that the defendant breached that duty, that the claimant suffered harm and that the breach of duty was the cause of the harm. The latter ingredient has two parts: the wrongful aspect of the defendant's conduct must have caused the harm in the sense that but for it the harm would not have occurred, and it must not have been unforeseeable that the harm would flow from this wrongful conduct.

Correspondingly, there is a defence against the claim if there is absence of any one of:

- (a) a duty of care;
- (b) breach of that duty;
- (c) causation; or
- (d) foreseeability.

In essence, defences such as these exist in all tort systems but their formulation varies from jurisdiction to jurisdiction. For instance, English law formulates a tort as a breach of a duty of care. The German/Austrian model is to very similar effect. Unlawfulness (*Rechtswidrigkeit*) is a basic condition for liability in tort. In Austria unlawfulness depends on the violation of a duty of care (a *Verhaltensgebot*)<sup>1</sup> and similarly in Germany.<sup>2</sup> In the French/Belgium system, on the other hand, tort law is not based on the principle that the tortfeasor owes a duty of care to others. Liability under the French and Belgian Civil Codes is formally simply based on the notion that the tortfeasor caused through his *fault* a damage to the victim.<sup>3</sup> Notwithstanding these formal differences between European tort law systems it is nevertheless held in the literature that 'although it would be too much to expect identical frameworks in all Europeans laws of delict, it is true that most of them are more occupied with the defendants duties than with the plaintiffs rights'.<sup>4</sup>

More striking is that from a legal perspective the defences are never discussed in the way presented here. A discussion of defences is usually limited to issues like self-defence, necessity (as far as the tortfeasor's behaviour is concerned), consent, assumption of risk or contributory negligence (as far as the victim's behaviour is concerned).<sup>5</sup> The four elements we set forth above are, in legal doctrine, formulated as positive conditions of liability; in economic terms the absence of one of those positive conditions would therefore certainly

<sup>1</sup> See on this issue for Austria Koziol, H., 'Wrongfulness under Austrian Law', in Koziol, H. (Ed.), *Unification of Tort Law: Wrongfulness*, The Hague, Kluwer Law International, 1998, 13–18 and Koziol, H., *Österreichisches Haftpflichtrecht*, Band I: Allgemeiner Teil, third edition, Vienna, Manz, 1997, 138–188.

<sup>2</sup> See on this concept of *Rechtswidrigkeit* in German Law Von Bar, Chr., *The Common European Law of Torts II*, Oxford, Clarendon Press, 2000, 235–237.

<sup>3</sup> The unlawfulness concept therefore has not succeeded in being introduced in systems like the Belgian one, which derives from French law, so holds Cousy, H., 'Wrongfulness in Belgian Tort Law', in Koziol, H. (Ed.), *Unification of Tort Law: Wrongfulness*, The Hague, Kluwer Law International, 1998, 31–38 and see for France Viney, G., 'Le "wrongfulness" en droit français', in Koziol, H. (Ed.), *Unification of Tort Law: Wrongfulness*, The Hague, Kluwer Law International, 1998, 57–64 and see Viney, G. and Jourdain, P., *Traité de droit civil, les conditions de la responsabilité*, second edition, Paris, LGDJ, 1998, number 477 and following.

<sup>4</sup> So Von Bar, Chr., *The Common European Law of Torts*, 239, number 215.

<sup>5</sup> For an overview see Von Bar, Chr., *The Common European Law of Torts*, 499–592.

constitute a defence even though it is not referred to as a ‘defence’ in legal terminology. Lawyers would simply hold that there is no liability because one of the fundamental conditions of liability is lacking.<sup>6</sup> From the perspective of a potential defendant, if one of these conditions is in fact lacking then in response to the bringing of a claim in negligence she would be able to defend the action on the ground of absence of a necessary condition and expect this defence to succeed.

There is a conceptual distinction between defences in the narrower sense and the four ‘defences’ we have set forth in that the former involve the presence of some condition (*e.g.* consent or necessity), whereas the latter depend on the absence of a condition (*e.g.* breach or causation). However, our principal concern in this paper is with the conduct of potential defendants and, from this perspective, the significance of the distinction falls away. Whether the defendant can argue presence of consent or absence of breach, there will be a reason to expect the claim to fail. It is this clear distinction between liability and no liability which characterises negligence law, and which produces such “sharp” incentives on the tortfeasor to deliver a particular level of care. Our concern is to emphasise that the level of care required to provide a defence (or deny liability) may vary depending on the arguments used.

Although there has been legal commentary on the (absence of a) duty of care<sup>7</sup> as well as on causation,<sup>8</sup> in legal practice the emphasis has primarily been on the absence of breach. A defendant to an action in tort will, in most European legal systems, primarily argue that he did not breach the duty of care (or was not at fault), instead of focussing on, for example, causation issues.<sup>9</sup>

Nevertheless, there have also been important cases in which defendants have relied upon absence of the other conditions. In English law, there has been a series of cases in which the courts have found an absence of duty. In the *locus classicus*, *Caparo Industries v Dickman* [1990] 2 AC 605, the Court of Appeal found to the effect that a duty of care would not be imposed on a defendant unless it was “fair, just and reasonable” so to do. That the harm suffered by the claimant must flow from that part or aspect of the defendant’s conduct which was wrongful, and from no other part or aspect of the defendant’s conduct, was confirmed by the Court of Appeal in *South Australia Asset Management Corporation v York Montague Ltd.* [1996] 3 All ER 365 [1997] AC 191. In *Bourhill v Young* [1943] AC 92, the Court set forth the test that the harm to the particular claimant must have been “reasonably foreseeable”.<sup>10</sup> Each of these authorities is concerned with some defence other than absence of breach.

<sup>6</sup> Note that in addition to the four elements of a tort that we identified above also the existence of damage is in legal literature formulated as a precondition for liability; see on this issue Von Bar, Chr., *The Common European Law of Torts*, 1–200 and Magnus, U. (Ed.), *Unification of Tort Law: Damages*, The Hague, Kluwer Law International, 2001.

<sup>7</sup> This more particularly refers to the usefulness of this unlawfulness concept. For an overview see Koziol, H. (Ed.), *Unification of Tort Law: Wrongfulness*, The Hague, Kluwer Law International, 1998.

<sup>8</sup> For an overview see Spier, J. (Ed.), *Identification of Tort of Law: causation*, The Hague, Kluwer Law International, 2000.

<sup>9</sup> For an overview of case law in the various European legal systems in this respect see Van Gerven, W., Lever, J. and Larouche, P., *Cases, Materials and Text on National, Supranational and International Tort Law*, Ius Commune Casebooks for the Common Law of Europe, Oxford, Hart, 2000.

<sup>10</sup> The English law relating to foreseeability and the related concept of remoteness is less settled than this may suggest. We consider how foreseeability or remoteness can be modeled in Section 5.

All other systems than the English also have similar tests, although the wordings may differ. In the Austrian/German tort systems where the “unlawfulness” requirement applies, liability would fail if the tortfeasor did not infringe on a specific protected interest.<sup>11</sup> Thus, all legal systems seem to keep liability within “reasonable” limits. In some cases it is through the notion of damage that tort liability is limited; some liability systems therefore refuse compensation for so-called pure economic loss.<sup>12</sup> In other legal systems liability is denied when no particular duty of care existed<sup>13</sup>; in other cases legal systems denied liability through the causation requirement, arguing that damage was caused through an intervening cause.<sup>14</sup> Moreover, all legal systems generally recognize a foreseeability (or proximity) criterion as one of the attributive criteria of causation.<sup>15</sup>

In summary, although the legal technique may differ, all legal systems seem to limit tort liability to the extent that liability should be “fair, just and reasonable”, albeit that one system may do this through the damage requirement, whereas another would use the causation issue to reach the same goal.

Considering a potential tort *ex ante*, a rational defendant would contemplate the availability of each of the prospective defences. As pointed out above, negligence law provides sharp incentives for care to be delivered at the threshold between liability and no liability. The defendant will recognize that this threshold will depend on the facts of the case. Where she chooses to do the primary act or activity from which the potentially tortious situation arises, this will be in the context of having anticipated the cost of availing herself of a defence (*i.e.* the costs of taking care up to the level required for that defence to be valid). However, all of the four defences are in use (even though the terminology used differs between the various legal systems) in the courts and there is no reason to suppose that a potential tortfeasor will anticipate only the defence of absence of breach. A rational person in such a position would prefer the defence which can be acquired at least cost.

The rational person does not explicitly choose a defence *ex ante*, but rather she chooses a level of care in full knowledge of what consequences flow from that choice. For instance, a driver may decide to travel at 80 mph because she believes that this speed is sufficiently close to the liability standard (say, 70 mph) such that a defence of absence of causation will be sustainable and liability will be avoided. Similarly a doctor may be operating in a field of medicine in which there are clear views on the standard of care required, but causation is subject to considerable uncertainty; in that case, the doctor may find her level

<sup>11</sup> See on that issue among others, Koziol, H., ‘Das Niederländische BW und der Schweizer Entwurf als Vorbilder für ein künftiges Europäisches Schadenersatzrecht’, *Zeitschrift für Europäisches Privatrecht*, 1996, 596 and following.

<sup>12</sup> See more particularly the contributions in Van Boom, W.H., Koziol, H. and Witting, Ch.A. (Eds.), *Pure economic loss*, Vienna, Springer, 2004.

<sup>13</sup> This is, *e.g.* the case in the Netherlands, where a so-called “relativity” requirement with respect to tort law applies. This has particularly played an important role in environmental liability cases; for further details see Betlem, G. and Faure, M., ‘Environmental toxic torts in Europe: trends in recovery of soil clean-up costs and damages for personal injury in the Netherlands, Belgium, England and Germany’, *The Georgetown International Environmental Law Review*, 1998, 855–890.

<sup>14</sup> See Cousy, H. and Vanderspikken, A., “Causation under Belgian law”, in Spier, J. (Ed.), *Unification of tort law: causation*, The Hague, Kluwer Law International, 2000, 23–37.

<sup>15</sup> For an overview see Von Bar, Chr., *The common European law of torts*, 474–476.

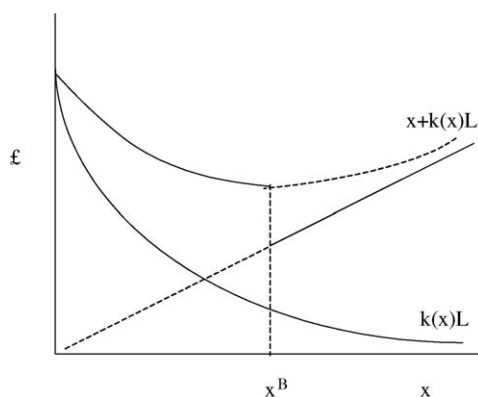


Fig. 1.

of care influenced by the prospect of a defence in causation (and indeed many areas of medicine do appear to be characterised by litigation primarily over causation). The same is of course potentially true for a manufacturer when deciding levels of safety to build in to a new product: it may be possible to avoid liability for defective products at lower cost once the possibility of a causation defence is taken into account. All of these examples are hypothetical situations where the required standard of care is well known; what leads to a rational choice to provide less care is the relative lack of certainty over causation, and the corresponding availability of a legal defence other than compliance with the standard of care.<sup>16</sup>

In this paper we address the question of which of the four possible defences minimises the expected costs to the tortfeasor in any particular case, and therefore determines the level of care chosen. In Section 2 we review briefly the established model for the defence of absence of breach. In Section 3 we extend this to address absence of duty, causation and foreseeability, respectively. Having considered each of these potential defences, the implications for privately and socially optimal expenditure on care are drawn together in Section 4, in which we consider cases with and without uncertainty over the legal standard of care. A final section concludes.

## 2. Absence of breach

Let  $x$  be expenditure on care,  $k(x)$  be the resultant probability of a harm and  $L$  the quantum of damages which would be payable. We assume that  $L$  is equal to the full value of loss to the victim and that a legal standard of care ( $x^B$ ) is set equal to the social optimum amount. The resultant position is summarised in Fig. 1.

Being equal to the socially optimal amount of care, the legal standard  $x^B$  corresponds to the minimum point on the cost of care plus expected cost of harm function. The solid lines

<sup>16</sup> Note that the interaction between uncertainty over the standard of care and causal uncertainty is a special case; we consider this toward the end of the paper when we explore the social efficiency implications of our analysis.

in Fig. 1 represent the private costs to a potential tortfeasor (say, T). A rational risk-neutral potential tortfeasor faced with this situation chooses to avoid liability by taking care up to the legal standard, thereby minimising her private expected cost. In so doing, she takes care in the socially optimal amount.

Put otherwise but equivalently, by spending on care up to the legal standard T avails herself of the defence of absence of breach. It is implicit in this analysis that there exists a duty of care and that no better, *i.e.* cheaper, defence is available to T. This is the standard result of the Brown/Shavell economic analysis of tort law where it has been proven that under negligence the tortfeasor has always incentives to come up to the legal standard of care on the condition that this is equal to the efficient standard of care.<sup>17</sup>

In this classic treatment of absence of breach there is a discontinuity of the private expected cost function at the legal standard  $x^B$ . Kahan (1989)<sup>18</sup> introduces to this analysis a treatment involving causation, arguing that as care falls below the legal standard liability is acquired gradually rather than discontinuously. The reason for this is that liability requires, in addition to breach, the ingredient of causation flowing from the wrongdoing (*i.e.* the shortfall in care). Therefore, where there is a small shortfall in care the expected liability is correspondingly small. The effect of this on the private cost function is that the cost of care line and the total cost function become connected rather than separated by a discontinuity. Thus, in Kahan (1989) the effect of causation being an ingredient of the tort is to modify the standard analysis of breach.

In Section 3 we take up the essence of Kahan's point about causation, that the harm must flow from the shortfall in care, and extend it by introducing the requirement for a successful suit in negligence that the plaintiff must demonstrate causation to the civil standard of proof. In other words, the proposition that but for the shortfall the harm would not have occurred must be true on a balance of probabilities, *i.e.* more probable than not. When this requirement is added to Kahan's argument the effect of causation becomes separated from the issue of breach, and the possibility of a discontinuity in the total cost function re-emerges (albeit at a different level from the legal standard of care).

In what follows we introduce notation to distinguish between the various defences available to tortfeasors, and as an aid to following the lines of argument we summarise this notation in the following table:

Notation	Description
$x$	Tortfeasor's level of care
$k(x)$	Probability in causality of harm conditional on $x$
$c(x)$	Probability in causation of harm conditional on $x$
$L$	Loss resulting from harm
$C(x)$	Expected total costs ( $x + k(x)L$ )
$x^B$	Level of care required for an absence of breach defence

<sup>17</sup> See Brown, J.P., "Toward a economic theory of liability", *Journal of Legal Studies*, 1973, 323–349; Calabresi, G., "Optimal deterrence and accidents", *Yale Law Journal*, 1975, 656–671 and Shavell, S., *Economic analysis of accident law*, Cambridge, Harvard University Press, 1987, 8.

<sup>18</sup> Kahan, M., 'Causation and Incentives to Take Care under the Negligence Rule', *Journal of Legal Studies*, 1989, 427–47. Micelli, T., *Economics of the Law*, Oxford University Press, 1997 and Shavell, S., *Foundations of Economic Analysis of Law*, 2003 present similar treatments.

Notation	Description
$x^C$	Level of care required for an absence of causation defence
$x_{A'}^F$	Level of care required for a foreseeability defence when tortfeasor's care affects only his own acts
$x_C^F$	Level of care required for a foreseeability defence when tortfeasor's care affects also other's acts
$q$	Probability of implicit event A'
$p$	Probability of implicit event C
$1 - \pi$	Probability of implicit event B
$f$	Probability that causal chain from the tortfeasor's act to the victim's harm is completed
$f^a$	Threshold level of $f$ below which court considers the harm "unforeseeable"
$k^*$	Threshold level of $k(x^B)$ below which court considers causation not proven

### 3. Alternative defences

#### 3.1. Absence of duty

In a series of judgements starting with *Donoghue v Stevenson* [1932] AC 562 and reaching its zenith with *Anns v London Borough of Merton* [1978] 1 AC 728, the English Court of Appeal extended the sphere of persons to whom a duty of care was owed. However, since *Anns* the trend has generally been in the reverse direction. Although the judgement of the Court of Appeal in *Caparo* may have been interpreted to a greater extent than intended as setting forth a test, subsequent judgements have followed the "fair, just and reasonable" guideline. Broadly, there are two justifications for this. The first is a floodgates argument and, in this, beyond the scope of our consideration here.<sup>19</sup> The second justification is that widespread duties of care might lead to a danger of overkill.

The judgement of the English Court of Appeal in *Rowling v Takaro Properties Ltd.* [1988] AC 473 includes the following passage:

"It is to be hoped that, as a general rule, imposition of liability in negligence will lead to a higher standard of care in the performance of the relevant type of act; but sometimes not only may this not be so, but the imposition of liability may even lead to harmful consequences. In other words, the cure may be worse than the disease".

In other legal systems also it is recognized (although the legal form may differ) that there should be an absence of duty-defence. The Austrian/German approach would probably be to argue in such a case that the tort was beyond the scope of protection awarded by tort law. In that respect German and English laws seem similar.<sup>20</sup> French law proceeds differently since there the question is not whether an interest or special relationship protected by the law is affected, but rather the inquiry proceeds immediately to the substance of the case, e.g. questions of fault, causation and damage.<sup>21</sup> In the Belgian/French systems there would

<sup>19</sup> This floodgates argument also receives a lot of attention in the legal literature. See *inter alia* Spier, J. (Ed.), *The limits of liability. Keeping the floodgates shut*, The Hague, Kluwer Law International, 1996 and Spier, J. (Ed.), *The limits of expanding liability*, The Hague, Kluwer Law International, 1998.

<sup>20</sup> See Van Gerven, W., Lever, J., Larouche, P., Von Bar, Chr. and Viney, G., *Cases, materials and texts on national, supranational and international tort law. Scope of protection*, Oxford, Hart, 1998, 52.

<sup>21</sup> Van Gerven and others, *Cases, materials and texts on national, supranational and international tort law. Scope of protection*, Oxford, Hart, 1998, 52–53.



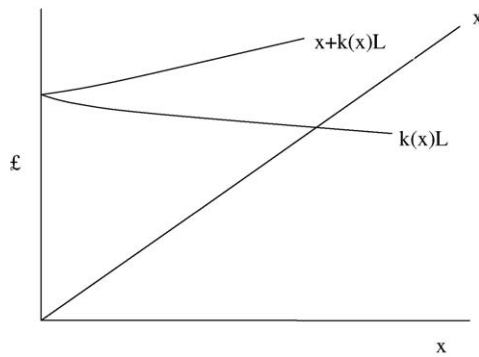


Fig. 2.

also be a limitation, although other legal techniques used would be other than the protected interest or the absence of duty.

Paraphrasing in economic terms, imposing a duty of care may lead to a social cost which exceeds its social benefit. If the consequence of this is that no duty should be imposed, then the social cost must exceed the social benefit irrespective of whatever legal standard might be set in respect of such a duty. The situation in which this is the case is illustrated in Fig. 2.

In Fig. 2,  $k'(0)L > -1$  so that the marginal reduction in the expected cost of harm is less than the marginal cost of care from the outset. Imposing a duty of care to a non-zero standard (say)  $x^*$  would induce T to take care in that amount but this would lead to social costs greater than those in the absence of care. Again this is a standard result of the Shavell model: if the costs of care (as a result of imposing a duty) would be higher than the social benefits this would result in inefficiency.<sup>22</sup> The difference is that we have rephrased the traditional Shavell finding in terms of a defence.

Alternatively, if the standard of care is set so high that  $x^* > k(0)L$ , T's optimal response will be to take no care and be in breach.<sup>23</sup> In the first instance, imposing a duty of care is a "cure . . . worse than the disease" in that it increases social cost. In the second case, a duty with a sufficiently high legal standard would merely transfer the cost of harm from the victim (say, V) to the tortfeasor T with no resultant social gain. Economic analysts, and especially Posner, have often held that a liability that merely transfers costs and has no additional value for the incentives for care is inefficient.<sup>24</sup> In either case, the effect of imposing a duty is other than "fair, just and reasonable" in economic terms.

From the perspective of T availing herself of a defence, the defence of absence of duty differs from that of absence of breach in that there is nothing T can do to acquire an absence of duty. Either the social cost function happens to be as illustrated in Fig. 2 or it is as in

<sup>22</sup> See Shavell, S., *Economic analysis of accident law*, 8.

<sup>23</sup> In this hypothesis we obviously assume that the judge sets an inefficient care standard. There may be other reasons why the determination of negligence may not always be optimal; see for a discussion of those Shavell, S., *Economic analysis of accident law*, 73–86.

<sup>24</sup> See, more particularly with respect to comparative negligence, Posner, R., *Economic analysis of law*, 6th edition, New York, Aspen, 2003, 174–175.

Fig. 1 and this question of fact is determined by the character, effect and cost of the available acts and activities of care rather than by T's choice among them.

### 3.2. Absence of causation

Suppose that T has done some potentially tortious act A and V has suffered some harm D and, in the course of doing A, T has taken care to the standard  $x^B$ . On these facts, there has been no tort because the standard of care has been satisfied. However, if T has failed to take care to the standard required then her conduct has been wrongful in that. There now arises the question of whether, in such a case, the wrongful aspect of T's conduct caused D.

Young *et al.* (2004)<sup>25</sup> distinguish between probabilities in causality and probabilities in causation. For example, in relation to T's act A the probability in causality is  $P(D|A) = k(x)$  and the probability in causation is the probability that but for A D would not have occurred. The latter probability can be shown to be, say,  $c = (P(D|A) - P(D|\sim A))/P(D|A)$ .

However, T's defence of absence of causation relates not to her primary act A but only to the shortfall in her care because if T had taken care up to  $x^B$  her conduct would not have been wrongful. The probability in causation attaching to the wrongful aspect of T's conduct (*i.e.* her shortfall in care) is

$$c(x) = \frac{k(x) - k(x^B)}{k(x)}, \quad \forall x < x^B \quad (3.1)$$

where  $c(x)$  is the probability that but for the care not taken (represented by the amount  $x^B - x$ ) the harm would not have occurred. The defence of causation relates to the amount of care taken because the difference between the care taken and the standard  $x^B$  represents the wrongful aspect of T's conduct.

The claimant has to prove the aforesaid 'but for' proposition to the usual civil standard. Putting aside any evidential uncertainty amounts to saying that the court can assess accurately  $c(x)$ . T will then be liable only if  $c(x) > 0.5$ . Let  $x^C$  be the value of  $x$  such that  $c(x^C) = 0.5$ . Then

$$\frac{k(x^C) - k(x^B)}{k(x^C)} = 0.5 \quad (3.2)$$

from which we have

$$k(x^C) = 2k(x^B) \quad (3.3)$$

If T takes care in any amount greater than  $x^C$  she escapes liability on the ground that there was not, on the balance of probabilities, causation. Since  $k(x^C) > k(x^B)$ , necessarily,  $x^C < x^B$ . It follows that T's privately optimal amount of care is  $x^C$ , not  $x^B$ . Adapting Fig. 1 accordingly we have Fig. 3.

Summing up, the defence of absence of causation is always achieved by taking care in an amount strictly less than that necessary for there to be absence of breach.

<sup>25</sup> Young, R., Faure, M., and Fenn, P., 'Causality and causation in tort law', *International Review of Law and Economics*, 24 (2004), 507–523.

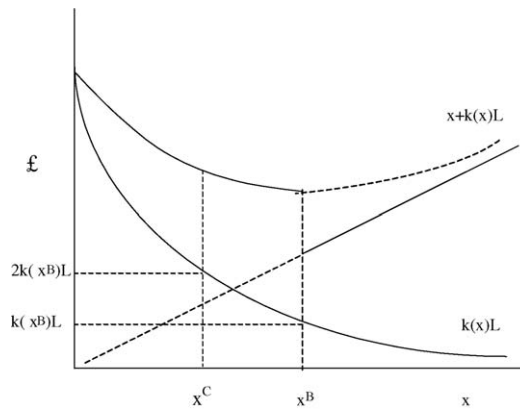


Fig. 3.

In terms of the tortfeasor's optimal choice of defence and the efficient level of care (see Section 4) this result has some significance. It is therefore worth observing that the essence of the result would be preserved even if the standard of proof were different. Suppose that the law were to be altered to the effect that a defendant claiming absence of causation bears a reversed burden of proof and that proof of the matter must be to the criminal rather than civil standard. Such law would disadvantage defences of absence of causation as much as may be imaginable without actually removing causation as an ingredient of the tort.

In such an extreme position, Eq. (4.2) would be replaced by

$$\frac{k(x^C) - k(x^B)}{k(x^C)} = p^* \quad (3.4)$$

where  $p^*$  is close to 0. From (3.4) we have

$$k(x^C) = \frac{k(x^B)}{1 - p^*} > k(x^B) \quad (3.5)$$

So the result that  $x^C < x^B$  is preserved even in this extreme conjecture.<sup>26</sup>

The result is also preserved if the burden of proof is reversed, as under the ruling of the Dutch Supreme Court that where negligence is established it falls to the defendant to prove absence of causation. In terms of a general threshold probability (say)  $p^{**}$ , reversing the burden of proof means that instead of the claimant having to prove that  $[k(x^C) - k(x^B)]/k(x^C) > p^{**}$  the defendant must prove that  $[k(x^C) - k(x^B)]/k(x^C) < p^{**}$ . In either case  $[k(x^C) - k(x^B)]/k(x^C) = p^{**}$  remains the threshold condition.

<sup>26</sup> This point emphasises the difference between our approach to causation and that taken by Kahan (1989): providing there is a known standard of proof, we show that there will be a discontinuity in the total cost function at some point below  $x^B$ . Kahan's approach is to assume that proof of causation has a zero probability at  $x^B$  but becomes increasingly likely as  $x$  falls below  $x^B$ .

### 3.3. Foreseeability

#### 3.3.1. Foreseeability in the causal chain

In English law, the question of foreseeability is part of the question of duty, which is whether the defendant owed a duty of care to such a claimant in respect of the defendant's act or omission. The principle is that the defendant did not owe a duty of care to persons to whom she could not have foreseen consequences of her act as complained of, nor to persons too remote.<sup>27</sup> So foreseeability along with (following *Caparo*) fairness, justice and reasonability goes to duty. The same applies for other legal systems. Although foreseeability is usually considered as an attributive criterion in causation, it is initially applied normatively in the context of the breach of duty. The court considers thus what the defendant ought reasonably to have foreseen.<sup>28</sup> In Section 3.1 we addressed the latter aspect of duty alone. For our purposes, it is convenient to consider foreseeability separately from fairness, justice and reasonability for the following reason.

Fairness, justice and reasonability relate directly to social efficiency. Foreseeability, on the other hand, is embedded in the causal relationship between the defendant's acts and the harm suffered by the claimant. The essence of the matter is that the claimant alleges that the defendant's act led, through some chain of events and circumstances, to the claimant's harm. The defence is to the effect that this chain of events was so long or unlikely that the defendant could not reasonably have foreseen the consequences of her act, or that as measured by the chain the claimant was so remote from the defendant that the defendant owed the claimant no duty of care in respect of the events complained of. In general, the defence is that the chain of events was too long and/or too unlikely. In legal terms this foreseeability requirement is often translated in the doctrine of "proximity". In the US proximate cause nowadays includes foreseeability of harm and proximity in space and time, but also policy elements; thus, proximity could lead to liability being excluded if it would be totally disproportionate to the defendant's negligence.<sup>29</sup> In the US most weight is given to foreseeability.<sup>30</sup> Also for English law foreseeability is the leading test of remoteness.<sup>31</sup> Other legal systems, like the French, use different criteria. These systems apply the so-called "theory of adequate causation", but the bottom line is that, e.g. in France, the damage has to be "immédiat, directe et prévisible", although the theory of proximate cause is formally rejected.<sup>32</sup>

Also economic theory has often held that there are sound economic reasons for a foreseeability requirement as an instrument to limit the chain of causation. The traditional economic

<sup>27</sup> In such instances there is of course also no breach, there being no duty.

<sup>28</sup> See Von Bar, Chr., *The common European law of torts*, 474.

<sup>29</sup> For an overview see Spier, J. and Haazen, O., "Comparative conclusions on causation", in Spier, J. (Ed.), *Unification of tort law: causation*, The Hague, Kluwer Law International, 2000, 131.

<sup>30</sup> See Schwartz, G.T., "Causation under US law", in Spier, J. (Ed.), *Unification of tort law: causation*, The Hague, Kluwer Law International, 2000, 123.

<sup>31</sup> See Rogers, W.V.H., "Causation under English law", in Spier, J. (Ed.), *Unification of tort law: causation*, The Hague, Kluwer Law International, 2000, 40–41.

<sup>32</sup> See Galand-Carval, S., "Causation under French law" in Spier, J. (Ed.), *Unification of tort law: causation*, The Hague, Kluwer Law International, 2000, 53–61 and Spier, J. and Haazen, O.A., 132.

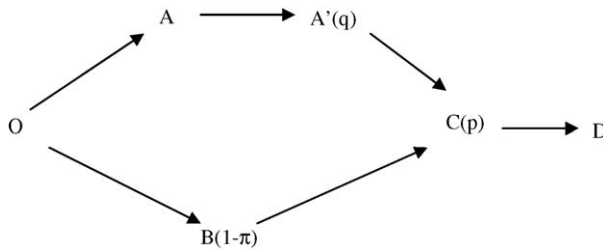


Fig. 4.

rationale is that holding a tortfeasor liable for damages which would be too remote or which he could not foresee would lead to overdeterrence.<sup>33</sup>

In the absence of uncertainty or mistake as to the probabilities of the events which make up the chain from the defendant's act A to the claimant's harm D, the defence of absence of foreseeability rests on the actual probability of the harm *flowing from* the act. This probability is distinct from the probability of harm *given* the act ( $P(D|A)=k$ ). Given that A is done, there are two ways in which D may come about:

- (a) D may flow from the act; or
- (b) notwithstanding that A is done, the potential causal chain leading from A to D may fail but D may happen for some other reason.

In the cases of interest for our purposes, possibility (b) is always present, because if it were not there would be no question of causation. The question of foreseeability is whether it was foreseeable that D would flow from A, not whether it was foreseeable that D would occur for some other reason.

In the model we have used to address the defences of absence of breach, duty or causation, a causal chain involving A and D is implicit. To address foreseeability we must model the causal chain expressly. The reason for this is that if we do not model the other events in the causal chain then we have only two events (A and D) and the two probabilities  $P(D|A)$  and  $P(D|\sim A)$ . In [Appendix A](#) we demonstrate that foreseeability, the probability that D flows from A, cannot be expressed in terms of  $P(D|A)$  and  $P(D|\sim A)$ .

Young *et al.* (2004) demonstrate that a necessary and sufficient structure of a causal chain is

$$D \Leftrightarrow [(A \cap A') \cup B] \cap C \quad (3.6)$$

where A', B and C are implicit (generally) compound events or sub-chains. This structure is represented in [Fig. 4](#).

In [Fig. 4](#),  $q$ ,  $p$  and  $1 - \pi$  are the probabilities of A', C and B, respectively. O is the origin of the causal chain: a starting position going back to a time at which there was no potentially culpable event or circumstance. The existence of some implicit event B allows for D occurring in the absence of A (which is necessary to the defence of absence of causation).

<sup>33</sup> See Landes, W.M. and Posner, R.A., "Causation in tort law: an economic approach", *Journal of Legal Studies*, vol. 12, 1983, 109.

A' and C allow for the possibility that D will not occur even if A is done and these are the components of the causal chain which accommodate care. Breaking the causal line from A to D into A' and C accommodates events which are necessary precursors to D when A is the source but not when B is the source.

In terms of this model, foreseeability is readily expressible as, say,

$$f = qp \quad (3.7)$$

Thus, defined,  $f$  is the probability that the line of causation from A to D will be completed. In contrast, the probability that D occurs given that A is done is

$$[q + (1 - \pi) - q(1 - \pi)]p > qp$$

### 3.3.2. Absence of foreseeability

Where absence of foreseeability is claimed the court must assess the probability  $f$  and compare it with some standard of unlikelihood. If this standard is  $f^*$ , the defence will succeed where

$$f = qp < f^* \quad (3.8)$$

In many cases where foreseeability is at issue the sequence of events leading from A to D, *i.e.* the events which make up A' and C, were not susceptible to T's influence. For example, in some instances the connection from A to D arises only because of a *novus actus interveniens*: a very unlikely act done by a third party.<sup>34</sup> However, the probability  $f$  is in some cases affected by possible acts or omissions on the part of T. For example, care by A may have influenced the conduct of the third party.

The effect of A's care is to reduce  $q$  and/or  $p$ . Where this is possible, the amount of care necessary to create a defence of absence of foreseeability is as follows. If the care is contained within A' then the necessary amount of care  $x_{A'}^F$  is such that

$$q(x_{A'}^F) = \frac{f^*}{p} \quad (3.9)$$

Care of this sort affects the probability of D flowing from A but not the probability of D flowing from B. If the available care affects the probability of D irrespective of the source then the care is contained within C and the amount of care necessary for the defence is

$$p(x_C^F) = \frac{f^*}{q} \quad (3.10)$$

## 4. Choice of defence and the care decision

### 4.1. Choice of defence

Among the four defences we have considered absence of a duty of care (on the basis of fairness, justice and reasonability) is distinguished from the others in that there is no way in which T can act so as to create it. If the circumstances happen to be such that the social

<sup>34</sup> See on the influence of acts by third parties on tort liability the contributions in Spier, J. (Ed.), *Unification of tort law: liability for damage caused by others*, The Hague, Kluwer Law International, 2003.

costs of imposing a duty would outweigh the social gain then T has such a defence. If this is not so then T does not have this defence.

The other three defences depend on T taking some amount of care. A rational T anticipating her defence, in other words considering how to avoid liability, will consider the cost of care in respect of each possible defence. We have labeled these costs  $x^B$  in respect of absence of breach,  $x^C$  in respect of absence of causation and  $x_A^F$  or  $x_C^F$  in respect of absence of foreseeability. In the absence of uncertainty as to probabilities T will choose whichever prospective defence involves the least cost of care and her private optimum will be to take care to that extent and no further.

In Section 4 *ante* we established that  $x^C$  is strictly less than  $x^B$ . It follows that T will never choose a defence of absence of breach because a defence of absence of causation will always involve a lesser cost of care. Already this finding may have important implications for social policy, although we will not focus on these now. Thus, T's decision reduces to choosing between absence of causation and absence of foreseeability.

Since foreseeability necessarily involves an explicit analysis of the causal chain it will be convenient to translate our analysis of causation into those terms, and since absence of causation relates to the standard of care in breach we translate that analysis also. A complete analysis of breach and causation in terms of the causal chain is given in [Appendix A](#). The principal results follow here.

The causal chain implies a distinction between two topologically distinct parts of the chain: A' and C. Care in A' reduces the probability of harm to V only where that harm flows from the potential tortfeasor's act A. It will be convenient to refer to this as tortfeasor-side care. Care in C reduces the probability of harm irrespective of the source of harm and we shall refer to this as victim-side care. In all instances, the care in question is care on the part of T (and, in particular, *not* care on the part of the victim V). As in the case of foreseeability, the effects of care in relation to breach and causation depend on whether the care in question is tortfeasor-side or victim-side. We now consider care in these two locations separately.

#### 4.1.1. Choice of defence given tortfeasor-side care

The effect of tortfeasor-side care is to reduce  $q$ , the probability of A' occurring. Absence of breach, causation and foreseeability are most conveniently expressed in terms of threshold values of  $q$ . Let  $q^B$ ,  $q^C$  and  $q^F$  be the maximum values of  $q$  such that a defence is established in absence of breach, causation and foreseeability, respectively. For example, if T through her care makes  $q < q^C$  she has the defence of absence of causation. Assuming that the effect of care on  $q$  is monotonic decreasing, T's most preferred defence is that which is established at the highest of the three threshold probabilities  $q^B$ ,  $q^C$  and  $q^F$ .

By the working in [Appendix A](#),

$$q^B = \frac{k^*}{\pi P} - \frac{1 - \pi}{\pi} \quad (4.1)$$

$$q^C = \frac{2k^*}{\pi p} - \frac{1 - \pi}{\pi} \quad (4.2)$$

$$q^F = \frac{f^*}{p} \quad (4.3)$$

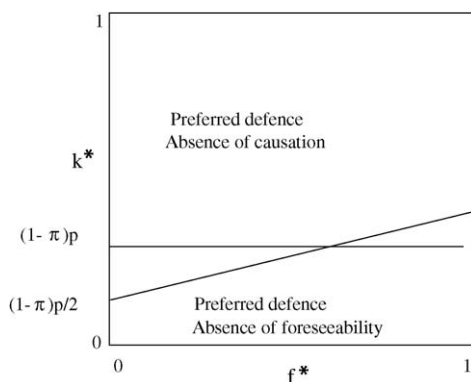


Fig. 5.

where  $k^*$  is the probability in causality ( $P(D|A)$ ) corresponding to the standard of care in breach  $x^B$ . As emerges, it is convenient to express this standard in terms of  $k$ .

Corresponding to the result in Section 4,  $q^B < q^C$  so T always prefers absence of causation to absence of breach. (The result that  $P(D|A)$  at the causation threshold is equal to twice that at the breach threshold is derived in Appendix A in terms of the causal chain.)

T will prefer the defence of absence of causation over absence of foreseeability if  $q^C > q^F$ . Referring to Eqs. (4.2) and (4.3), this condition reduces to

$$k^* > \frac{(1 - \pi)p}{2} + \left(\frac{\pi}{2}\right) f^* \quad (4.4)$$

The more preferred of the two defences therefore depends on the legal standards in breach and in foreseeability. This is illustrated in Fig. 5.

Fig. 5 illustrates that T will tend to prefer the defence of absence of foreseeability where the threshold of foreseeability is high, in other words where, to establish unforeseeability, the probability  $f$  need not be too small. Similarly, T will tend to prefer the defence of absence of causation where the standard of care in breach still leaves a comparatively large probability of harm occurring ( $P(D|A)$ ). This is because the higher the standard of care in breach, the greater the shortfall left by any amount of care less than the standard.

Assuming that unforeseeable really means very unlikely, our interest is in the left hand part of Fig. 5, i.e. with  $f^*$  relatively near to 0. We can also take it that the courts set a standard in breach which implies a relatively small  $k^*$ . However, there is a limit in fact as to how small  $k$  can be: whether or not T does A and whatever care T takes in  $A'$ ,  $k$  cannot become less than  $P(D|\sim A) = (1 - \pi)p$ . Corresponding, no reasonable legal standard can equate to a value of  $k^*$  less than  $(1 - \pi)p$ . In Fig. 5, we are constrained to values of  $k^*$  above the broken line. By condition (4.4), the intercept of the boundary line is  $(1 - \pi)p/2$ .

From this, we conclude that T will prefer the defence of absence of causation over the defence of absence of foreseeability unless the threshold in foreseeability is relatively high.



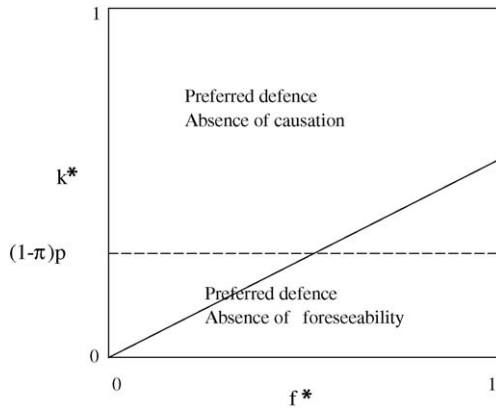


Fig. 6.

#### 4.1.2. Choice of defence given victim-side care

Where T's care is contained in C, the thresholds in respect of the defences are expressible in terms of  $p$  and, per [Appendix A](#), these are

$$p^B = \frac{k^*}{1 - \pi + q\pi} \quad (4.5)$$

$$p^C = \frac{2k^*}{1 - \pi + q\pi} \quad (4.6)$$

$$p^E = \frac{f^*}{q} \quad (4.7)$$

As before, the defence of absence of causation is always preferred to that of absence of breach.

The defence in causation is preferred to that in foreseeability iff

$$k^* > \frac{1 - \pi + q\pi}{2q} f^* \quad (4.8)$$

and corresponding to [Fig. 5](#) we have [Fig. 6](#).

The conclusion that T will prefer the defence in causation to the defence in foreseeability carries over to victim-side care.

There is a quantitative difference between the tortfeasor-side and victim-side situations. In the case of tortfeasor-side care, the minimum value of  $f^*$  required for a defence in foreseeability to be preferable (*i.e.* the point at which the boundary reaches the minimum reasonable value of  $k^*$ ) is (say)  $f^*(T)$ , where

$$f^*(T) = \frac{1 - \pi}{p\pi} \quad (4.9)$$

In the case of victim-side care, the corresponding value is (say)  $f^*(V)$ , where

$$f^*(V) = \frac{2(1 - \pi)pq}{1 - \pi + q\pi} \quad (4.10)$$

Comparing (4.9) and (4.10),  $f^*(V)$  is necessarily greater than  $f^*(T)$ . In other words, T is more likely to opt for absence of foreseeability (instead of absence of causation) where the available care is tortfeasor-side care.

## 4.2. The tortfeasor's care decision and efficiency

### 4.2.1. When the legal standard of care is certain

We have shown above that, when the legal standard of care  $x^B$  is known with certainty:

1. Tortfeasors will always find it optimal to choose a defence of causation or foreseeability over a defence of breach; hence, the level of care chosen will always be less than  $x^B$ .
2. The (private) optimality of defences of foreseeability or causation (and hence the level of care chosen) will depend on the standards of proof required by the courts for each defence, and whether or not the tortfeasor believes the likelihood of harm depends on the victim's actions.

The privately optimal level of care is therefore shown to be strictly less than  $x^B$  in an amount depending on the court's requirement for proof of causation/foreseeability. To consider the (social) efficiency implications of this result, we note that it is a standard result (reproduced in Section 2 *ante*) that care to the standard  $x^B$  is socially optimal. If the amount of care taken is  $x \neq x^B$  there is a social loss in the amount

$$S(x) = [k(x) - k(x^B)]L - (x^B - x) \quad (4.11)$$

If T opts for the defence of absence of causation she will take care in the amount  $x^C < x^B$  and  $x^C$  is such that  $k(x^C) = 2k(x^B)$ . It follows that there will be a social loss in the amount

$$S(x^C) = k(x^B)L - (x^B - x^C) \quad (4.12)$$

This net social loss is composed of a gain to T in the amount  $(x^B - x^C)$  and a loss to V in the amount  $k(x^B)L$ . In particular, the cost of harm to victims if T avoids liability by way of absence of causation is equal to twice what that cost would be if T were to avoid liability by avoiding breach of the duty of care.

If T chooses *ex ante* the defence of absence of foreseeability (where this is possible) it will be because this requires a lesser expenditure on care than is required for a defence in causation. Therefore, the social loss deriving from this defence, and the proportionate increase in cost of harm to victims, are necessarily greater than in the case of a defence in causation. Consequently, whether the potential defendant chooses to avail herself of a defence in causation or a defence in foreseeability, the result is that in every instance the amount of care required is less than the standard of care in breach and, in that, less than the socially optimal amount of care.

#### 4.2.2. When the legal standard of care is uncertain

The conclusion in the previous subsection implies that the availability of causation and foreseeability defences systematically creates socially suboptimal care. This raises the question of why such defences have continued to exist. One explanation is that the effect of the defence of absence of causation compares and contrasts with the effect of evidential uncertainty. Evidential uncertainty or uncertainty as to the legal standard of care has the effect of systematically causing excess care.<sup>35</sup>

Assume that the legal standard  $x^B$  is subject to uncertainty and define

$$x^A \equiv x^B + e$$

where  $x^A$  is the standard that the court will apply in the case and  $e$  is the deviation of this from the social optimum. The prospective tortfeasor will have provided herself with a defence in causation if and only if she has taken care up to the point where the shortfall  $x^A - x$  (rather than  $x^B - x$ ) cannot be shown to have caused the damage. Whenever  $e > 0$ , this will require an amount of care in excess of  $x^C$ .

More particularly, the defence of absence of causation will fail iff

$$\frac{k(x) - k(x^A)}{k(x)} > 0.5$$

Assuming that  $k(\cdot)$  is continuous and monotonic decreasing, this rearranges to the condition

$$e > k - 1(0.5k(x)) - x^B$$

The effect of uncertainty is that however much care T takes there is some non-zero probability that her defence will fail. This probability is (say)

$$p(x) = 1 - F(k - 1(0.5k(x)) - x^B)$$

where  $F(\cdot)$  is the distribution function of  $e$ .

T's expected cost of care plus damages function is (say)

$$C(x) = x + p(x)L$$

and her optimal amount expenditure on care is that which minimises  $C(x)$ .

Our objective here is to demonstrate that minimising  $C(x)$  can cause T to take care:

- (a) beyond the amount  $x^C$ ; and
- (b) in an amount either less than or more than  $x^B$ , the socially optimal amount.

<sup>35</sup> See Shavell, S., *Economic analysis of accident law*, pp. 93–99. The approach taken in this section of the paper brings together Shavell's analysis of uncertainty as to the legal standard with our analysis of uncertainty over causation. See also Diamond, P., "Single activity accidents", *Journal of Legal Studies*, vol. 3, 1974, 107; Calfee J. and Caswell R., "Deterrence and uncertain legal standards", *Journal of Law Economics and Organisation*, vol. 2, 1986, 279.

In general,  $p'(x) = -2f(2x - x^B)$ , where  $f(\cdot)$  is the density function corresponding to  $F(\cdot)$ . At a minimum of  $C(x)$ ,

$$f(2x - x^B) = \frac{1}{2L}$$

Assume that  $k(x) = k/x$  (where  $k > 0$ ) and that  $e \sim N(0, \sigma^2)$ . It follows from this that the expected cost minimising value of  $x$  is

$$x = 0.5 \left[ x^B + \sqrt{2 \log L - 2 \log \sigma - \log \left( \frac{1}{2} \right)} \right]$$

Under these conditions,  $x^C = 0.5x^B$ , provided that the variance of  $e$  is not too large, it follows that the privately optimal value of  $x$  is greater than  $x^C$  and may be unbounded above. It follows that the private optimum may be either less than or greater than  $x^B$ . The coexistence of causal uncertainty and evidential uncertainty results in an ambiguous effect on the chosen care level relative to the social optimum.

## 5. Conclusion

In this paper we have considered the optimal conduct (*i.e.* level of care) of a prospective tortfeasor who has available a set of defences: absence of duty, absence of breach, absence of causation and absence of foreseeability. The rational tortfeasor will choose a level of care which minimises the combined costs of care and compensation corresponding to each of these defences; the choice of care implies a choice of defence and *vice versa*. We argue that the question of whether there is absence of duty is beyond the influence of the prospective tortfeasor. Choosing among the remaining options, we find that absence of breach is always dominated by absence of causation as a privately optimal defence when the legal standard of care is known with certainty. It follows that the privately optimal level of care in that case will be socially sub-optimal.

We also consider the choice of defence when the legal standard of care is not known with certainty. It is well established in the literature that where the only prospective defence is absence of breach, uncertainty as to the legal standard leads to excess care.<sup>36</sup> Taking together the optional defence of absence of causation, and uncertainty as to the legal standard, we have shown that the prospective tortfeasor's private optimum is to plan to plead absence of causation but to take care in an amount in excess of that which would be necessary to establish this in the absence of uncertainty. Consequently, a potential tortfeasor provided with the possible defence of absence of causation but faced with uncertainty as to the legal standard will take care in an amount which may be either less than or more than the social optimum. In practical terms, therefore, while it is always privately optimal to act on the assumption of a defence of causation, the outcome may well be a situation in which the court's standard of care is complied with. This helps explain why the experience of most legal systems is one where many defendants argue on the basis of breach rather than causation.

<sup>36</sup> See Shavell, S., *Economic analysis of accident law*.

To conclude, the existence of the defence of absence of causation in negligence law may act as a partial correction to the inefficiency associated with uncertainty over the standard of care. In the absence of this defence, uncertainty over the standard of care would create systematic excess care. The defence of causation counter-balances this, creating care in an amount which may be closer to the social optimum.

## Acknowledgements

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## Appendix A

### A.1. Expressing foreseeability

There are three implicit events and, correspondingly, three probabilities which connect any pair of events A and D. If we do not introduce these implicit events then we have only two events and two probabilities:  $P(D|A)$  and  $P(D|\sim A)$ . These can be expressed in terms of the probabilities of implicit events as

$$P(D|A) = (1 - \pi + q\pi)p \quad (\text{A.1})$$

$$P(D|\sim A) = (1 - \pi)p \quad (\text{A.2})$$

In general, the three probabilities of implicit events cannot be retrieved from the two conditional probabilities of D. However, some expressions in  $p$ ,  $q$  and  $\pi$  can be so retrieved. In particular, the probability in causality ( $k$ ) is simply  $P(D|A)$  and the probability in causation ( $c$ ) is  $q\pi/(1 - \pi + q\pi) = [P(D|A) - P(D|\sim A)]/P(D|A)$ .

So although  $q$  and  $p$  cannot be retrieved from conditional probabilities there remains the possibility that foreseeability  $qp$  can be retrieved. In fact, it turns out that this is not the case.

**Theorem.** *There exists no function  $F(P(D|A), P(D|\sim A))$  such that  $f = F(P(D|A), P(D|\sim A))$ .*

**Proof.** By contradiction.

Assume that such a function does exist. (A.1) and (A.2)  $\Rightarrow$

$$P(D|A) - P(D|\sim A) = qp\pi \quad (\text{A.3})$$

where  $qp = f = F(P(D|A), P(D|\sim A))$ . Substituting for  $qp$  in (A.3) and rearranging

$$\pi = \frac{P(D|A) - P(D|\sim A)}{F(P(D|A), P(D|\sim A))}$$

Substituting this in (A.2),

$$p = \frac{P(D|\sim A)}{1 - [P(D|A) - P(D|\sim A)]/F(P(D|A), P(D|\sim A))}$$

Substituting for  $\pi$  and  $p$  in (A.1) we can then solve for  $q$ . Therefore, we can solve the two equations (A.1) and (A.2) for  $p$ ,  $q$  and  $\pi$ .  $\Rightarrow \Leftarrow$

Therefore, no function such as  $F(\cdot)$  exists and  $f$  cannot be expressed in terms of  $P(D|A)$  and  $P(D|\sim A)$ . In other words, foreseeability cannot be expressed without introducing probabilities of implicit events.  $\square$