CAUSATION AND UNDERDETERMINATION

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The Article exposes a legal setting in which the but-for test leads to two contradictory results: according to one, a negligent defendant is the likely cause of the plaintiff's injury, whereas according to the other she is not. I refer to this setting as "causal underdetermination." The Article argues against the practices used by courts when facing underdetermination, one of which treats the contradictory but-for test results as lack of causation, and therefore absolves negligent defendants of tort liability in such cases. It shows that this practice not only leaves the but-for test unresolved but may also lead to erroneous results, which in turn lead potential injurers to be under-deterred. The Article further offers solutions to contend with underdetermination in an efficient manner, and in particular, in a way that creates incentives for optimal level of care.

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INTRODUCTION

Proving that a defendant’s behavior was unreasonable is not enough to impose liability in negligence.¹ A plaintiff is also required to prove the existence of a causal link between the defendant’s wrongfulness² and the

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¹ In the traditional legal negligence action, a plaintiff usually must prove the following elements: (1) the existence of a duty or obligation recognized by law; (2) a failure on the part of the defendant to conform to that duty, or breach thereof; (3) a causal connection between the defendant's breach and the resulting injury; and (4) actual loss or damage suffered by the complainant. See, e.g., DeBender v. Albertson's, Inc., 2009 U.S. Dist. LEXIS 2981, 13-14 (D. Ariz. Jan. 7, 2009) (noting the necessary elements to plead an action in negligence); Dorsey v. Continental Assoc., 591 A.2d 716, 718 (Pa. Super. Ct. 1991) (same); Scaricamazzia v. Dinapoli, 2012 Phila. Ct. Com. Pl. LEXIS 280, 11 (Pa. C.P. 2012) (same); Brennen v. Eugene, 285 Ore. 401, 405-406 (Or. 1979) (same).

² Discussing wrongful behavior, the Article addresses both actions and omissions. Considering omissions as causes is a matter of controversy. See, e.g., David Armstrong, The Open Door: Counterfactual Versus Singularist Theories of Causation, in CAUSATION AND LAWS OF NATURE 175, 177 (Howard Sankey ed., 1999) (maintaining that "omissions and so forth are not part of the real driving force in nature. Every causal situation develops as it does as a result of the presence of positive factors alone."); Michael Moore, For What Must We
plaintiff’s injury. In keeping with this requirement, the defendant's negligence is considered the cause of the injury if and only if in its absence the outcome to the plaintiff would have been different. The subject of this Article is a distinct situation in which the latter counterfactual requirement yields not one but two contradictory results: according to one, the negligent defendant is the likely cause of the plaintiff's injury, whereas according to the other, she is not. The Article refers to such a situation as "underdetermination." The following example and ensuing discussion illustrate a possible setting of underdetermination.

**Example 1. The physician.** A physician performs a surgery to remove a tumor. There are two procedures a reasonable physician can perform under the circumstances: procedure $A_1$ or procedure $A_2$. Both procedures entail similar risks and costs. The physician however chooses to perform the surgery by procedure $A_3$, which costs the same as procedures $A_1$ and $A_2$, but entails a much higher risk for the patient – a clearly negligent choice. Subsequently, the patient dies.

Is the negligent physician the cause of death?

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*Pay? Causation and Counterfactual Baselines*, 40 San Diego L. Rev. 1181, 1222-27 (2003) (arguing that negative events cannot be considered as causes since “nothing comes from nothing”). For a different view that accepts absence as a cause in the law, see H.L.A. Hart & Tony Honore, Causation in the Law 38 (2nd ed. 1985) (stating that in the law, omissions can be perceived as factual causes, since they are "ways of describing the world . . . a real state of affairs, not just nothing"). An extended review of the negative-causes controversy is not within the scope of this Article.

3 Note that in order to impose legal liability in tort, a court must find both factual and proximate causation. While the former is considered to be based on questions of pure fact, hinging upon the result of the but-for test, the latter is perceived to be a matter of legal policy, such that it may limit the defendant’s responsibility for the damage caused. The focus of this Article is on a matter of factual causation. However, as shall be explained and illustrated throughout the Article, its theoretical framework, which is based on a contrastive reasoning of causation, associates both factual and policy considerations within the counterfactual inquiry of the but-for test.

4 See Restatement (Third) of Torts: Liability for Physical and Emotional Harm § 26 (2010) (stating that a conduct “is a factual cause of harm when the harm would not have occurred absent the conduct”).
Here is why the answer to this question could be both yes and no. Example 1 presents two different lawful behaviors the negligent physician could have followed to meet her duty of care toward the patient: administering procedure $A_1$ or procedure $A_2$. In this setting, underdetermination may arise if the evidence presented in court leads the factfinder to the following inferences: on the one hand, had the physician administered procedure $A_1$, it is likely that the patient would have recovered; on the other hand, had the physician administered procedure $A_2$, it is likely that the patient would have died anyway. Following these conclusions, the factfinder may potentially conclude both that the negligent physician is the factual cause of the patient’s death, and that she is not. Which one is it then?

Example 1 demonstrates the problem of underdetermination, which is at the center of this Article. The first objective of this Article is to expose the pattern of underdetermination in negligence cases and identify the distortions produced when courts ignore it. The second objective of this Article is to suggest appropriate means of correcting these distortions.

Underdetermination occurs in negligence settings, where the defendant’s breach of duty is clear enough to infer negligence, but normative (rather than factual) difficulties prevent the plaintiff from establishing the requirement of causation. These difficulties result from a unique quandary regarding the way the defendant should have acted instead of her negligent behavior. Specifically, this quandary appears in the following setting: there are several lawful behaviors the defendant could have followed to meet her duty of care toward the plaintiff; had she followed any of these behaviors she would not have been considered negligent in the first place; she followed none, and subsequently a damage occurred. The Article refers to cases that consist of this setting as Multiple Alternate Lawful Behavior (MALB) cases.
In an MALB case the defendant's negligence is indisputable. The only question left is that of causation.\(^5\)

Focusing on MALB cases makes it possible to underline the unique, largely neglected causal anomaly of underdetermination. This problem occurs when at least two of the lawful behaviors the defendant could have followed to meet her duty to the plaintiff lead to contradictory but-for results. The Article shows that whenever courts face the quandary of underdetermination they usually focus their efforts on avoiding it rather than contending with it. For instance, they may apply what is here termed the "no-causal-link solution," according to which if one of the possible alternate lawful behaviors leads to the conclusion that the defendant is not the likely cause of the plaintiff's damage, then the requirement of causation is not met, and correspondingly, the defendant should be exempted from tort liability. The Article shows that considering underdetermination, in and of itself, as an indication of absence of causation may lead to erroneous results, absolving a defendant of tort liability even when her negligence is in fact the likely cause of the injury. Consequently, it may lead potential injurers to be under-detennined, as they can expect to be absolved of tort liability in these cases, regardless of their negligence.

The Article discusses and analyzes three cases of underdetermination. Only one of them consists of circumstances that enable factfinders to resolve the problem of underdetermination by making a normative decision regarding the desirability of the alternate lawful behaviors the defendant

\(^5\) See Haft v. Lone Palm Hotel, 83 Cal. Rptr. 312 (Cal. Ct. App. 1970) (facing a MALB case, the California Court of Appeal stated that, as the negligent behavior of the defendant was "proved to the hilt," it is unquestionable that the only question left was one of causation). The Court of Appeal in Haft found for the defendants. However, the verdict was later reversed by the California Supreme Court. See Haft v. Lone Palm Hotel, 3 Cal. 3d 756 (Cal. Ct. Sup. 1970). Haft is further discussed in this Article to exemplify a 'normative certainty' case of underdetermination and its proposed solution. See, respectively, infra sections II.A and III.A.
could have followed to meet her duty toward the plaintiff (but, in fact, did not). This type of case is defined here as that which consists of "normative certainty." The other types of underdetermination presented in the Article consist of circumstances in which factfinders are unable to make a normative evaluation regarding the desirability of the alternate lawful behaviors. The Article refers to such cases as "normative equality" and "normative uncertainty" cases of underdetermination. In the former case a factfinder finds the alternate lawful behaviors that lead to contradictory but-for results equally desirable, while in the latter case a factfinder cannot distinguish which of these behaviors is more desirable because she lacks the information to do so. In both of these cases, a unique problem of underdetermination arises, such that cannot be resolved only by normative means. Subsequently, it is proposed that in both normative equality and normative uncertainty cases of underdetermination factfinders should turn to a unique form of probabilistic solution as suggested in the Article.

Finally, the desirability of the solutions to underdetermination considered in the Article is evaluated in light of efficiency considerations. On the assumption that the law's goal is to promote efficiency, an appropriate solution should not only resolve the problem of underdetermination, but also incentivize potential injurers in similar situations to adopt an optimal level of care.

The Article proceeds as follows. Part I presents the theoretical and doctrinal framework of the theory of contrastive causation applied to explain and methodize the causal analysis in the Article. In particular, the Article uses this causal theory as an infrastructure to introduce the pattern of MALB cases in which there is more than one alternate lawful behavior a defendant could have followed to comply with her duty of care toward a plaintiff and, thereafter, to introduce the unique MALB setting that creates the problem of
underdetermination – the subject of this Article. Part II suggests a distinction between three cases of underdetermination, referred to here as "normative equality," "normative certainty" and "normative uncertainty." It further explains and demonstrates why the current practices applied by courts when confronting the problem of underdetermination not only leave the causal problem unresolved, but may also create under-deterrence by distorting the defendants' assessment of risks that they impose on others. Part III proposes and demonstrates possible solutions for the different cases of underdetermination in light of efficiency considerations. It specifically offers solutions that contend with the problem while creating efficient incentives for an optimal level of care. The Conclusion summarizes the discussion.

I. THE CASE OF UNDERDETERMINATION

A. Multiple Alternate Lawful Behavior (MALB) Cases

The term "underdetermination" is an antonym of a familiar causal phenomenon commonly referred to as "overdetermination." Overdetermination is widely discussed in the literature on causation in the law to describe factual settings in which the but-for test fails. The familiar profile of such settings in negligence cases consists of two or more defendants, each of whom has behaved wrongfully, and each of their actions (or omissions) would have been sufficient on its own to produce the

6 Overdetermination may also referred to as duplicative or preemptive causation situations. To elaborate on situations of factual overdetermination and their suggested solutions both metaphysically and specifically in the law, see, for example, HART & HONORÉ, supra note 2, at 122-28, 235-49; David Lewis, Causation as Influence, 7 J. Phil. 182 (2000); Richard W. Wright, Causation, Responsibility, Risk, Probability, Naked Statistics, and Proof: Pruning the Bramble Bush by Clarifying the Concepts, 73 IOWA L. REV. 1001, 1018-23 (1988).

7 I.e., it is established that both defendants deviated from the standard of care, imposing unreasonable risk on the plaintiff/s.

8 For further discussion regarding the 'absence as causes' quandary, see supra note 2.
plaintiff’s injury.\footnote{Hart & Honoré, supra note 2, at 122-23.} Under these conditions, none of the defendants can be identified as the cause of the injury. To illustrate, imagine a scene in which a person is shot by two defendants who (independently) negligently fire in his direction;\footnote{This example is based on the famous case in the matter of Summers v. Tice, 199 P.2d 1 (Cal. 1948), with some plot changes. In Summers, the two negligent shooters inflicted two different injuries. It was impossible to determine whose shot hit the plaintiff’s right eye, and whose shot hit the plaintiff’s upper lip. The illustration in the text presents a somewhat different scenario in which two shooters inflict one injury.} each of these shots is sufficient to cause the plaintiff’s injury. The shooters illustration exemplifies circumstances in which the but-for test fails. Each of the defendants can claim that the plaintiff’s injury would have occurred but for his shot (for had his shot not hit the plaintiff, she would still have suffered the same outcome as a result of the other shooter’s bullet). Therefore, in such a case, the but-for test leads to the anomalous conclusion that neither of the shooters caused the plaintiff’s injury.\footnote{The court in Summers resolved the factual difficulty by imposing an alternative liability rule, according to which in such circumstances both shooters should be held liable. See Id., at 13-14.} The problem of underdetermination discussed in this Article also leads to the failure of the but-for test; however, the reason for this failure is essentially different from the reason for the familiar phenomenon of overdetermination.

Whereas the shooters example illustrates that overdetermination arises from purely factual reasons, the physician example which opened the Article showed that underdetermination arises from normative reasons. Underdetermination it is a product of a certain legal pattern, referred to here as Multiple Alternate Lawful Behaviors (MALB) cases, in which the negligent defendant could have met her duty of care toward the plaintiff in more than one lawful way. In other words, the problem of \textit{factual} underdetermination is a product of \textit{normative} overdetermination.

To discuss and demonstrate the phenomenon of causal
underdetermination and the difficulties it entails, the Article endorses the framework of the contrastive approach of causation. This view of causation, presented next, serves both as a theoretical infrastructure to describe causal inferences in the law and as a descriptive method to articulate the causal arguments presented in the Article.\textsuperscript{12}

According to the contrastive view of causation,\textsuperscript{13} a causal link is not a binary relation between $A$ (cause) and $B$ (effect). Rather, it expresses the counterfactual question: what if $A^*$ (the contrastive cause) rather than $A$ caused $B^*$ (the probable result of $A^*$) rather than $B$?\textsuperscript{14} In contrastive causation terms, the conclusion that there is a causal link between two separate events depends on the existence of a difference between $B$ and $B^*$ (i.e., if $B - B^* > 0$ there is such a causal link).\textsuperscript{15} For example, in order to

\begin{itemize}
  \item \textsuperscript{12}The contrastive language accompanying the text in the Article carries in itself a theoretical importance, as a medium in which the causal thinking is embodied. For a broader review regarding the importance of language to causal analysis, see, e.g., Derek Edwards & Jonathan Potter, Language and Causation: A Discursive Action Model of Description and Attribution, 100 PSYCHOL. REV. 23 (1993).
  \item \textsuperscript{13}For a review of philosophical contrastive theories of causation, see, for example, John Collins et al., Counterfactuals and Causation: History, Problems, and Prospects, in CAUSATION AND COUNTERFACTUALS 1, 2-12 (John Collins et al. eds., 2004) (describing the outline of the book that it opens, all devoted to exploration of the prospects of the counterfactual account of causation, specifically, what is commonly known as the Stalnaker-Lewis account of counterfactual inquiry); Christopher Read Hitchcock, The Role of Contrast in Causal and Explanatory Claims, 107 SYNTHESE 395, 400 (1996) (observing the differences between types of counterfactual theories based on "contrastive nature").
  \item \textsuperscript{14}For a broader review of the contrastive view's application in the law, see, for example, Alex Broadbent, Fact and Law in the Causal Inquiry, 15 LEGAL THEORY 173, 175-177 (2009) (suggesting the contrastive account of causation as a theoretical framework that enables us to distinguish matters of fact from matters of law within the cause-in-fact inquiry); Jonathan Schaffer, Contrastive Causation in the Law, 16 LEGAL THEORY 259 (2010) (observing that the law requires us to look for the specific alternate event for the actual cause, which is the hypothetical scenario in which the defendant acted lawfully instead of wrongfully) [hereinafter Schaffer, Contrastive Causation in the Law]; Jonathan Schaffer, Contrastive Causation, 114 PHIL. REV. 297 (2005) [hereinafter Schaffer, Contrastive Causation] (observing that the contrastive view of causation may resolve some paradoxes, one of which is the aforementioned "paradox of absence." See supra note 2.).
  \item \textsuperscript{15}The definition of a cause as "making a difference" has long been accepted by the scholarship. See, e.g., HART & HONORÉ, supra note 2, at 29 ("[T]he cause, though not a literal intervention, is a difference from the normal course which accounts for the difference in the outcome."); David Lewis, Causation, in CAUSATIONS AND CONDITIONALS 180, 181 (Ernest
prove the existence of a causal link between a plant that dried out and the fact that I forgot to water it, according to the contrastive view of causation, it should be shown that if instead of not watering the plant (A), I did water it (A*), it is likely that the plant would have survived (B*), instead of drying out (B). A positive difference between B and B* indicates that there is a causal link between the fact that I did not water the plant and the fact that the plant dried out. In particular, there is a causal link between A and B − B*, as the latter term defines the exact difference that my omission to water the plant actually caused to its vitality.16

The theory of contrastive causation emphasizes the relative nature of factual causation.17 According to its terms, the conclusion that some action, A, made a difference, and can thus be considered as a cause, can only be decided in comparison to a contrastive cause, A*, and its probable effect, B*.18 The problem is that there are countless ways to posit a contrastive cause. For instance, in the plant example,19 A* could denote the alternate behaviors of having watered the plant once a day, every day and a half, once

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16 See id.
17 For a broader review of the causal relativism observation, see, for example, Hitchcock, supra note 13, at 399 (proposing to take causation as an explanatory relevance relation); Peter Menzies, Difference Making in Context, in CAUSATION AND COUNTERFACTUALS, supra note 13, at 139, 139-42, 154, 172 (suggesting that David Lewis's counterfactual theory of causation be comprehended in a way that integrates contextual parameters into its conditions); and Peter Menzies, Causation in Context, in CAUSATION, PHYSICS, AND THE CONSTITUTION OF REALITY: RUSSELL'S REPUBLIC REVISTED 191, 192-93 (Huw Price & Richard Corry eds., 2007) (summarizing the contextual nature of the causal inquiry in the following words: "[Causal inference's] truth-value can vary from one context to another, depending on how a certain contextual parameter is set.").
18 See, e.g., Peter Lipton, INFERENCE TO THE BEST EXPLANATION 42 (2d ed. 2004) (indicating the necessity of contrastive dimension to infer causation).
19 See text accompanying supra note 16.
a week, and so forth. Since different $A^*$'s may lead to different $B^*$'s, the factual inference regarding the causal link between my omission to water the plant and its drying out may also change. Thus, it may be the case that whereas defining the contrastive cause as my having watered the plant once a week ($A_1$) leads to the contrastive result that the plant would have completely dried out ($B_1$), defining it as my having watered the plant once a day ($A_2$) leads to the contrastive result that the plant would have survived ($B_2$). While the former contrastive dimension ($A_1, B_1$) leads to the conclusion that my omission is not the cause of the plant’s drying out, since the plant would have dried out even if I had watered it, the latter dimension ($A_2, B_2$) leads to the opposite conclusion; i.e., that my omission to water the plant is the cause of its drying out. Which one is it then?

The difficulties in answering this question are not essentially different from the difficulties presented by the underdetermination illustrated in the physician example which opened the Article. Applying the contrastive view of causation to the law, the causal inquiry is expressed by the following counterfactual question: Would the plaintiff’s injury ($B$) have occurred if the defendant had acted lawfully ($A^*$), instead of the way that she did ($A$)?

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20 $\hat{A} = \{A_1, A_2, A_3, ..., A_n\}$, where $\hat{A}$ is the set of all the possible alternate events to denote the constructive cause, $A_1$ = water the plant once a day; $A_2$ = water the plant once in three days; $A_3$ = water the plant once a week; and so forth. $A^*$ represents the event eventually chosen from set $\hat{A}$.

21 Since the but-for result is expressed by $B - B^*$, and $B$ is fixed, different $B^*$'s will always lead to different but-for results. However, as explained later, in light of evidential rules such as the preponderance-of-the-evidence standard, in the law, different alternate results ($B_1, B_2, B_3, ..., B_n$) are not necessarily also contradictory to one another, i.e., in the law, when $B_1 \neq B_2$, it does not necessarily mean that $B - B_1 \neq B - B_2$.

22 Other possible results may, of course, be that the plant lost three quarters of its vitality, half of it, and so forth.

23 Since $B - B^* = 0$.

24 Since $B - B^* > 0$.

25 As the actual cause describes a wrong and the contrastive cause defines a lawful conduct, it is evident that $A \neq A^*$. 

This question can be answered only by figuring out the probable result of the lawful behavior (denoted by $B^*$). The indication of a causal link between the defendant's negligence and the plaintiff's injury is a positive difference between the alleged actual result of the plaintiff's negligence in reality, $B$, and the probable result of the lawful behavior she did not follow, $B^*$. That difference, $B - B^*$, represents the changes that can be attributed to the defendant’s wrongfulness, $A$.\(^{27}\)

The contrastive form of the but-for test was adopted by the Restatement of Torts.\(^{28}\) It is also routinely administered in practice.\(^{29}\) It is quite surprising, then, that the subject of MALB cases, where several lawful behaviors are candidates for being denoted $A^*$, have been almost entirely left out of the causal debate by both courts and legal scholarship. This absence is especially noteworthy considering the scholarship's extensive engagement in exploring causal phenomena concerned with the other elements of the

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\(^{26}\) Factfinders may infer $B^*$ using their judicial (and human) experience and common sense. For that matter, there is no essential difference between $B$ and $B^*$. Both are inferences based on inductive reasoning, and therefore matters of probability. See, e.g., Haft v. Lone Palm Hotel, 83 Cal. Rptr. 312, 329 (Cal. Ct. App. 1970) (observing that inferring what would have happened had defendants complied with their duties to the plaintiffs is a matter of speculation, but such that can be inferred from experience, reason and common knowledge); Rovegno v. San Jose Knights of Columbus Hall Ass'n, 108 Cal. App. 591, 595 (Cal. App. 1930) (same).\(^{27}\) See supra note 15.

\(^{28}\) RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL HARM § 26 cmt. e. ("The requirement that the actor's tortious conduct be necessary for the harm to occur requires a counterfactual inquiry. One must ask what would have occurred if the actor had not engaged in the tortious conduct.").

\(^{29}\) See, e.g., June v. Union Carbide Corp., 577 F.3d 1234, 1240 (10th Cir. Colo. 2009) (indicating the plaintiff's requirement to prove what would have been the outcome for him or her in the absence of the defendant's negligence); Gani v State of New York, 44 Misc. 3d 740, 760 (N.Y. Ct. Cl. 2014) (same); Watson v. Meltzer, 247 Ore. App. 558, 565-566 (Or. Ct. App. 2011) (observing that in legal malpractice cases, the plaintiffs must prove that, but for the defendant's malpractice, he or she would have obtained a more favorable result); Chocktoot v. Smith, 280 Ore. 567, 570 (Or. 1977) (same).
contrastive inquiry of causation, namely, $A$, $B$, and $B^\ast$.

The absence of MALB cases from the causal debate could be explained by an observation made by Wex Malone sixty years ago. Reviewing courts' decisions in the matter of factual causation, Malone found that although the counterfactual implementation of the but-for test is commonly accepted,

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30 When the question is $A =?$, e.g., when the identity of the causal factor is in question. Sindell v. Abbott Lab., 607 P.2d 924 (Cal. 1980), also familiar as 'the DES case,' demonstrates circumstances of unidentifiable wrongdoers. In Sindell, a drug named DES, designed to prevent miscarriages, was manufactured by many companies. Twenty-five years later, many of the DES users' daughters were diagnosed with uterine cancer. None of them could prove which particular manufacturer had sold her mother the drug. The California court resolved the problem of causation by applying what since then is commonly known as the "market share liability doctrine," which imposed on the manufacturers tort liability in accordance with their respective shares in the DES drug market. For another example in which the wrongdoer is unidentifiable, see supra note 10 and accompanying text. To elaborate on the unidentifiable wrongdoer category of cases, see Ariel Porat and Alex Stein, Tort Liability Under Uncertainty 58-69 (2001).

31 When the question is $B =?$, e.g., when the identity of the injured party is in question. A familiar example of such cases is when it is preponderantly proved that the defendant wrongfully inflicted damage upon certain unidentifiable individuals, and additionally, there are also individuals who were injured by a non-wrongful factor. There is no proof regarding which of the plaintiffs were actually injured by the wrongdoer and whose damage was not tortuous. To elaborate on the unidentifiable wrongdoer category of cases, see Porat & Stein, supra note 30, at 70-73.

32 When the question is $B^\ast =?$, e.g., when it is difficult to preponderantly prove the probable result that would have occurred had the defendant behaved lawfully. An example of cases that often involve questions regarding the indeterminacy of $B^\ast$ concerns the doctrine of informed consent. Applying the doctrine, the factfinder needs to infer what a reasonable person in the patient's shoes would have decided had the physician disclosed to him or her the information about the alternative treatments (to the treatment she actually performed on the patient). A result of a positive causal link between the physician's disclosure of information and the patient's resultant harm can only be inferred if the plaintiff succeeds in establishing that a reasonable person would have chosen against the treatment had she been informed about the alternate treatments. See, e.g., Canterbury v. Spence, 464 F.2d 772, 790 (D.C. Cir. 1972) (noting the hypothetical nature of finding $B^\ast$ in informed consent cases, and stating that "it hardly represents more than a guess"). See also Aaron D. Twerski & Neil B. Cohen, Informed Decision Making and the Law of Torts: The Myth of Justiciable Causation, 1988 U. ILL. L. REV. 607 (1988) (suggesting that the difficulties arising from the but-for test in informed consent cases be countered by focusing on the plaintiff's loss of value resulting from the withholding of adequate information). For further discussion on the subject of factual inferences in hypothetical settings, see, for example, Robert N. Strassfeld, If...: Counterfactuals in the Law, 60 WASH. L. REV. 339, 364-72 (1991); Barbara A. Spellman & Alexandra Kincannon, The Relation Between Counterfactual ('But For') and Causal Reasoning: Experimental Findings and Implications for Jurors' Decisions, 64 L. & CONTEMP. PROBS. 241 (2001).

33 Wex S. Malone, Ruminations on Cause-In-Fact, 9 STAN. L. REV. 60 (1956).
nevertheless, in practice, factfinders sometimes utterly ignore the contrastive
dimension (\(A^*, B^*\)). The incoherent implementation of the but-for test
revealed by Malone sixty years ago is evidently extant, as courts sometimes
still do not account for the contrastive "should-have dimension" when
deciding upon the presence of factual causation.\(^{34}\) On such occasions, the
decisions regarding the presence of a causal link concentrate only on the
actual dimension (\(A, B\)), regardless of the outcome that would have occurred
had the defendant acted lawfully (in contrastive terms, regardless of the
difference between \(B\) and \(B^*\)).\(^{35}\) As MALB cases, by definition, are
concerned with alternative courses of behavior, they can be exposed only in
the light of a two-dimensional counterfactual analysis of causation that
consists of both the actual and the contrastive dimensions. They would
therefore remain hidden from the eyes of factfinders who are not instructed
to administer a contrastive-counterfactual inquiry.

The second reason for the tendency to leave MALB cases out of the
causal discourse concerns the nature of \(A^*\), the normative element within the
contrastive but-for inquiry. \(A^*\) denotes a behavior – specifically in negligence
cases, a reasonable behavior – that the defendant should have followed to

\(^{34}\) See, e.g., Sinclair v. Berlin, 758 N.E.2d 442 (Ill. App. 2001) (where the defendant physician
negligently failed to examine the plaintiff's eyes despite her constant complaints of
experiencing pain in her right eye. Subsequently, the plaintiff became blind in her right eye.
The Appellate Court of Illinois held that the plaintiff in the case satisfied her burden of proving
that the defendant's negligence was the cause of her blindness, while observing that "the
plaintiff need not show a better result would have been obtained absent the doctor's alleged
negligence in order to establish proximate cause"); Morris v. Mark IV Constr. Co., 203
A.D.2d 922, 923 (N.Y. App. Div. 4th Dept 1994) (stating that the defendants' claims
regarding the outcome that could have occurred to the plaintiff had the defendant offered any
of the required safety measures, stipulated in NY CLS Labor § 240, "is not sufficient to raise
the Supreme Court of Oklahoma stated that even though the plaintiff failed to prove that her
chances of recovery were any different had she gotten the reasonable treatment that was
denied her, the defendant's conduct that was not reasonable should be accounted as the
substantial factor for the reduction of the plaintiff's chances of recovery or survival).

\(^{35}\) That is, on the question of whether \(A\) increased the probability of \(B^*\)'s occurrence.
meet her duty of care toward the plaintiff. Accordingly, $A^*$ is considered a matter of responsibility rather than causation.\textsuperscript{36} This Article does not contend against the normative nature of $A^*$. Nevertheless, in focusing on its being a component constructively located within the counterfactual inquiry of the but-for test, the Article proposes to shift the focus from $A^*$'s being a matter of responsibility to its possible implications on the factual inference.\textsuperscript{37}

To clarify, when a factfinder considers the several alternate lawful behaviors a defendant could have followed to fulfill her duty toward a plaintiff, she usually does so as part of the process of evaluating the defendant’s deviation from the standard of care.\textsuperscript{38} In contrastive terms, she is concerned with the question of whether $A$ (the actual behavior of the defendant) is in line with either $A_1$ or $A_2$ (where $A_1$ and $A_2$ are both considered reasonable forms of behavior in given circumstances). If the answer to this question is positive, the defendant is not considered negligent.


\textsuperscript{37} The integration of normative considerations within the factual inquiry of causation is a matter of controversy among the scholars in the field. See, e.g., Richard Wright, \textit{Causation in Tort Law}, 73 CALIF. L. REV. 1735, 1740, 1803 (1985) (arguing that the causal inquiry in the law is a pure matter of factual and empirical inferences, almost always kept distinct from policy considerations). The contrastive account of causation embraced in this Article enables to imbricate factual and normative elements within the counterfactual inquiry, on the one hand, and to distinguish facts from normativity, on the other hand). For a similar observation, see Broadbent, \textit{supra} note 14.

\textsuperscript{38} I.e., difficulties to define $A^*$, if discussed by courts, usually arise when they examine whether or not the defendant's behavior was negligent. See, e.g., Shectman v. Bransfield, 959 A.2d 278 (N.J. Super. 2008) (where a defendant's psychiatrist allegedly failed to monitor his patient and thus did not foresee his attempting to commit suicide. The Superior Court of New Jersey observed that, considering the circumstances, there were two possible medical schools the psychiatrist could have followed, each of them is reasonable. Having followed one of them, the psychiatrist met the duty of care.). See also Saks v. NG, 890 A.2d 983 (N.J. Super. 2008) (a case in which a failed eye surgery resulted in blindness. The court held that there were two different methods of anesthesia the physician could have chosen. Each of them is considered reasonable. Since the physician followed one of them, he was not held liable in tort.).
at all and should therefore be exempted from tort liability altogether. MALB cases, however, raise a different question. In such cases, it is indisputable that the defendant did not follow any of the alternate lawful behaviors and thus breached her duty toward the injured defendant. In contrastive terms, it is indisputable that \( A \) is not in line with either \( A_1 \) or \( A_2 \). Subsequently, the only question left open is that of causation.\(^{39}\)

Confronted with an MALB case, a factfinder has to address all of the lawful behaviors the negligent-defendant could have followed to meet her duty toward the plaintiff, and to examine whether the outcome would have been different had she followed each of them. This is exactly what the Florida Court of Appeal did in the matter of Posner v. Walker.\(^{40}\) Posner, the defendant physician, treated Walker who suffered from a chronic pain syndrome. Unaware that she was being treated by another doctor who prescribed her medicine as well, Posner continued to prescribe Walker more medicines. Subsequently, Walker died in her sleep from a drug overdose. A suit was filed against Posner. The plaintiffs alleged that Walker's treatment fell below the standard of care in several distinct ways, including: failing to provide Walker with an exit strategy from pain medicines; continuing to prescribe her pain medicine; not referring Walker to people who could help her with her addictions; failing to order a urinalysis of Walker; and failing to contact the pharmacies that Walker may have been using to fill her prescriptions. The plaintiffs argued that Posner was negligent for not taking any of these alternate courses of behaviors. The jury in the lower Court found for the plaintiffs.\(^{41}\) The Florida Court of Appeal, however, reversed the

\(^{39}\) See supra note 5 and accompanying text.

\(^{40}\) 930 So. 2d 659 (Fla. Dist. Ct. App. 3d Dist. 2006).

\(^{41}\) The jury divided the responsibility between Posner and Walker, attributing 30 percent of the unfortunate outcome to Walker's contributory negligence, and thus holding that Posner was only 70 percent responsible for Walker's death. See Id., at 664.
verdict on causal grounds. In particular, it was held that the plaintiffs did not prove what would have been the outcome had Posner followed any of the aforementioned alternate courses of behavior. As the plaintiffs failed to fulfil the requirement of causation, Posner was absolved of tort liability.

The Florida Court of Appeal left open the question that is at the center of this Article, namely: what would have been the but-for result had (at least) two of the considered alternate-behaviors led to contradictory factual inferences? For instance, would the requirement of causation have been fulfilled if the plaintiffs had been successful in proving that, on the one hand, had Posner stopped prescribing medications for Walker she would still be alive, but on the other hand, had he referred Walker to people who could have helped her with her addictions the same unfortunate result would likely have occurred? According to the former, Posner's negligence is the likely cause of Walker's death, whereas according to the latter, it is not. Which one was it then?

This quandary, referred to here as "underdetermination," is analyzed at length in the following section.

B. Revealing the Pattern of Underdetermination

As demonstrated by the plant example, it is generally the case that different alternate results lead to different, indeed contradictory, but-for results. In contrastive terms, when $A_1 \neq A_2$, then it is usually the case that $B_1 \neq B_2$, and therefore usually true that $(B - B_1) \neq (B - B_2)$. However, in the law not every difference in the but-for results necessarily leads to contradictory but-for results. To infer such a contradiction in civil law, an

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42 See Id., at 665. In addition, the Court of Appeal found that some of the alternate courses of behaviors claimed by the plaintiffs were not established as a minimum requirement expected from a reasonable physician to administer in similar circumstances. See Id., at 667.
additional requirement must be met. This requirement refers to the magnitude of probability \( (P) \) that each of the several lawful alternate behaviors \( (A_1, A_2, \ldots, A_i) \) would have led to its result (respectively denoted by \( B_1, B_2, \ldots, B_i \)). As in other factual matters in civil litigations, the plaintiff’s proof of causation is subject to the preponderance of the evidence standard, also known as “the \( P > 0.5 \) rule.” According to this rule, a fact is generally held established when it is more probable than not. Under the preponderance rule, an MALB case may lead to three possible outcomes, depending on the question of whether it is more likely than not that each of its lawful behaviors would have led to the plaintiff’s injury. First, it may be the case that all of its alternate lawful behaviors would have led to the result that the plaintiff’s injury would likely have occurred anyway. Second, it may be the case that had the defendant followed any of the alternate lawful behaviors, the plaintiff’s injury would likely not have occurred. In either of these two combinations, the but-for test does not lead to contradictory results. In civil litigation an MALB case may lead to contradictory but-for results if and only if at least one of its several alternate lawful behaviors would likely have led to the plaintiff’s injury and at least one of its other alternate lawful behaviors would likely have led to the opposite conclusion.

\[ \hat{A} = \{A_1, A_2, \ldots, A_i\}, \]  
\[ \text{where } A^* \text{ denotes the alternate behavior eventually chosen from the set } \hat{A}. \]

\[ B^*(A_i) \rightarrow B_i. \]

\[ \text{See, e.g., Dykes v. William Beaumont Hospital, 246 Mich. App. 471, 486-9 (2001) (where the Michigan Court of Appeal observed explicitly that the standard for causation is subject to the preponderance-of-the-evidence standard); Merrell Dow Pharm. v. Havner, 953 S.W.2d 707 (Tex. Sup. J. 1997) (where the Texas Supreme Court denied compensation in a mass tort case of children who suffered from limb deformities, since the plaintiffs failed to prove that the defendants increased the risk of such deformities by more than 50 percent); Dumas v. Cooney, 235 Cal. App. 3d 1593 (1991) (where the California Court of Appeals found the defendant’s late diagnosis of lung cancer negligent, but denied compensation since the probability that the harm would have been avoided but for the negligence was lower than fifty percent).} \]

\[ \text{PO RAT \& ST EIN, supra note 30, at 18.} \]

\[ \text{Id.} \]
i.e., that the plaintiff’s injury would likely not have occurred. When this latter combination occurs, a factfinder faces a case of underdetermination.

While both courts and scholarship have been deeply engaged in resolving cases in which the but-for test fails due to causal overdetermination, the pattern of underdetermination has been left out of the causal debate. Accordingly, as demonstrated in the next part, when courts are faced with underdetermination they may prefer to avoid it rather than contend with it. However, ignoring underdetermination does not make it go away, but merely leaves the possibility of contradictory but-for results unresolved. In addition, as illustrated in the next part, it may also lead to erroneous decisions, which, in turn, may lead potential injurers in similar circumstances to be under-deterred.

To conclude thus far, underdetermination in negligence cases consists of the following pattern: (1) a defendant engages in a negligent behavior, \( A \); (2) subsequently, a plaintiff suffers an injury, \( B \); (3) there are at least two lawful behaviors that the defendant could have followed (instead of her actual negligent behavior) to meet her duty of care toward the plaintiff, i.e., \( \hat{A} = \{A_1, A_2, \ldots A_i\} \); (4) had the defendant followed one of the lawful behaviors, it is more likely than not that the plaintiff’s injury would not have occurred \( A_1 \rightarrow B_1 \); (5) had the defendant followed another lawful behavior,

\[ 48 \text{ See, e.g., Malone, supra note 33, at 88-94 (discussing courts' use of the 'substantial factor test' to overcome cases of overdetermination); Wright, supra note 37 (suggesting to apply the 'necessary element of a sufficient set' test in cases of overdetermination due to duplicative and preemptive causation); SARAH GREEN, CAUSATION IN NEGLIGENCE 58-86 (2015) (discussing the effectiveness of a two stages 'necessary breach analysis' test to contend with, what she refer to, as the real and potential cases of duplicative causation).} \]

\[ 49 \text{ See supra notes 6-12 and accompanying text.} \]

\[ 50 \text{ As } \hat{A} \text{ represents the set of all the several lawful behaviors; where had the defendant followed any of these lawful behaviors, } A_1, A_2, \ldots A_i, \text{ she would not have been considered negligent in the first place. } A^* \text{ represents the lawful behavior eventually chosen from the set } \hat{A}. \text{ See supra note 20. Note that conditions 1-3 essentially describe the pattern of MALB cases, that may potentially lead to underdetermination.} \]

\[ 51 \text{ I.e., } A_1 \rightarrow B_1, \text{ where } P(A_1 \rightarrow B_1) > 0.5. \]
it is more likely than not that the plaintiff's injury would have occurred $A_2 \rightarrow B_2$;\footnote{\emph{i.e.}, $A_2 \rightarrow B_2$, where $P(A_2 \rightarrow B_2) > 0.5$.} finally, since $B_1 \neq B_2$, it is true that $(B - B_1) \neq (B - B_2)$.

Table 1 below summarizes the conditions required for the occurrence of underdetermination in negligence cases.

Table 1. The Pattern of Underdetermination

<table>
<thead>
<tr>
<th>$A_1 \rightarrow B_1$</th>
<th>$B_2$ = Occurrence of injury</th>
<th>$B_2$ = The injury would not have occurred</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A_2 \rightarrow B_2$</td>
<td>No causal link</td>
<td>Underdetermination</td>
</tr>
<tr>
<td>$B_1$ = Occurrence of injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$B_1$ = The injury would not have occurred</td>
<td>Underdetermination</td>
<td>Causal link</td>
</tr>
</tbody>
</table>

II. CONTENDING WITH UNDERDETERMINATION

This part presents and analyzes practices sometimes used by courts in the wake of underdetermination, and explains their failure to provide sufficient solutions to underdetermination both from economic and causal perspectives. It particularly focuses on two prominent practices: the first, based on evidentiary rather than causal reasons, proposes to shift the burden of proof to the defendant. The second dismisses the causal inconsistency of underdetermination by perceiving it as lack of causation.

Prior to presenting and analyzing any of these practices, however, three distinct cases of underdetermination should be introduced.

A. Three Cases of Underdetermination

The following examples demonstrate circumstances in which
underdetermination occurs. The first, which opened this Article to illustrate a possible case of underdetermination, is reiterated below with small changes:

*Example 1. The physician.* A physician performs a surgery to remove a tumor. There are two procedures the physician could have performed: procedure $A_1$ or procedure $A_2$. Both procedures entail a similar risk and cost the same. The physician chooses to perform the surgery by procedure $A_3$, which costs the same as procedure $A_1$ and $A_2$, but entails a much higher risk – a clearly negligent choice. Subsequently, the patient dies. An autopsy can prove that had the physician chosen to perform the surgery by procedure $A_1$, it is likely that the patient would have died anyway, whereas had the physician chosen to perform the surgery by procedure $A_2$, the patient would likely have fully recovered.

The next example presents an utterly different scenario, which is based, with some plot changes, on the celebrated case in the matter of *Haft v. Lone Palm Hotel.*

*Example 2. The swimming pool.* A swimming pool operator is required by law to provide either lifeguard services or a warning sign alerting guests to the fact that there is no lifeguard. A teenager who does not know how to swim enters the swimming pool very early in the morning, when no other person, including a lifeguard, is in sight, and drowns. No warning sign alerting guests to the absence of a lifeguard on duty was posted. It is established by the evidence that had a lifeguard been present at the time of drowning it is likely that the teenager would have survived; conversely, had a warning sign cautioning of the absence of a lifeguard been posted it is likely that the teenager would have entered the

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swimming pool and drowned to death anyway.

Both Examples 1 and 2 present cases of underdetermination. These cases, however, are essentially different from one another. In particular, they differ in the source of their normative duplicity: Example 2 presents circumstances in which the law expressly stipulates a particular rule of conduct, whereby a duty can be fulfilled in more than one way. Whenever a statute offers potential injurers a choice between several alternate lawful behaviors to avoid tort liability, if this statute is breached, an MALB case is created and, with it, a potential case of underdetermination. As aforementioned, Example 2 is based, with some plot changes, on the matter of *Haft*, in which a father and son drowned to death in a hotel swimming pool. It turned out that the California's Health and Safety Code explicitly enabled pool operators, such as the defendant in *Haft*, to choose one of two alternate lawful behaviors: they could either provide lifeguard services *or* post a warning sign alerting swimmers to the fact that there was no lifeguard at the pool. However, the defendant-hotel followed neither of these safety measures at the time of the drowning.

The plaintiffs in *Haft* realized that the failure to post a sign warning that there was no lifeguard was not necessarily a cause of the deaths, because the decedents may have been aware of the absence of a lifeguard and nonetheless entered the pool. They therefore argued that the causal inquiry should be administered in light of the statutory alternative of providing lifeguard services. For the same reason, the defendant argued that the counterfactual analysis should be administered from the point of view of the absence of a

54 *Id.*
55 Had the defendant taken either of these safety measures, he would not have been considered negligent.
56 See *Haft*, 83 Cal. Rptr. at 316.
sign, rather than the absence of a lifeguard.\textsuperscript{57}

Statutory MALB cases, such as California's Health and Safety Code, can be explained as an efficient mechanism tailored to contend with dynamic settings in which both the expected risk of harm and the cost of precautions necessary to lower that risk – both sides of the Learned Hand formula traditionally applied by courts to determine whether or not a defendant is in fact negligent –\textsuperscript{58} are constantly changing.\textsuperscript{59} In such cases, it is the potential injurer who is in the best position to conduct a cost-benefit analysis and decide accordingly whether or not to apply the less costly safety measure out of the alternate measures listed in the statute.\textsuperscript{60} Accordingly, in \textit{Haft} on which Example 2 is based, California law reflected the changing environment of public swimming pools, whereby a pool can be completely

\textsuperscript{57} Id.

\textsuperscript{58} The formula was first articulated in \textit{United States v. Carroll Towing Co.}, 159 F.2d 169 (1947), by Judge Learned Hand. It was later endorsed by courts as well as the Restatement of Torts. See \textit{RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL HARM} § 3 cmt. e (2010) (suggesting that negligence can be asserted by a risk-benefit test identical to the Hand formula). It should be noted that the original Hand formula is denoted in algebraic terms by $B<PL$, where $B$ stands for the burden of precaution, $P$ for the probability of harm, and $L$ for the loss. In this Article the formula is adjusted to the parameters defined for the counterfactual causal inquiry, thus $PB$ and $C$ respectively denote the expected injury and the costs of precautions against it.

\textsuperscript{59} The optimum level of social welfare is achieved when both sides of the Hand formula reach a marginal equivalency; namely, when the marginal costs of performing a lawful behavior are equal to the marginal reduction in the expected damages losses if such lawful behavior is not performed. See, e.g., GUIDO CALABRESI, \textit{THE COSTS OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS} 24-34 (1970) (arguing that the goal of accident law is to reduce the aggregate costs of accidents and the costs of their prevention); ROBERT COOTER & THOMAS ULEN, \textit{LAW & ECONOMICS} 349 (5th ed. 2008) (defining the standard of care by using the Hand formula); STEVEN SHAVELL, \textit{FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW} 178-79 (2004) (arguing that the social welfare optimum is achieved when the marginal cost of care is equal to the marginal reduction in expected accident losses).

\textsuperscript{60} See CALABRESI, supra note 59, at 135–173 (Using the term "cheapest cost avoider" to identify the party who is able to minimize the negative externalities of an accident most efficiently. According to this approach the objective of tort law is a reduction in the number of accidents and of the costs of those that occur.); Guido Calabresi and Jon T. Hirschoff, \textit{Toward a Test for Strict Liability in Torts}, 81 \textit{YALE L.J.} 1055 (1972) (suggesting the best decision maker test according to which, liability should be imposed on the entity that belongs to the group, that is in the best position to reach a decision).
empty of swimmers at a certain time of the day and crowded at another. The cost of lifeguard services may also change by the hour (not necessarily in correlation with the expected risk). In such a dynamic setting, it is inefficient to set only one static demand of lifeguard presence. If, for instance, a pool operator can reasonably evaluate that early in the morning the expected damage loss of drowning is 10 (0.001 probability for damage of 10000), she should not be considered negligent for deciding to post a warning sign that costs 2 instead of providing lifeguard services that cost 20. By contrast, when the expected damage increases above 20, a reasonable pool operator could be expected to provide lifeguard services in lieu of the less costly alternative of a warning sign. In light of this analysis, California's Health and Safety Code is an efficient tool for minimizing the expected costs of drowning accidents and the costs of their preventions.

Indeed, from an *ex-ante* perspective, a statutory mechanism that allows pool operators to choose between two safety measures enables them to calculate their protective behavior in an efficient manner. However, *retrospectively*, this mechanism entails implications on the causal inquiry in negligence cases in which *neither* of the listed statutory alternatives was applied by the defendant and thereafter a damage occurred. In such circumstances an MALB case is bound to be created, and subsequently a potential case of underdetermination – specifically, when as in Example 2, the alternate precautions stipulated in the statute lead to two opposite but-for results: in one, the damage would likely have occurred anyway, and in the other, it would likely have not. Faced with these two contradictory results, what should a factfinder infer? Is there a causal link between the pool

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61 For instance, it may be the case that in the middle of the night, when the pool is expected to be completely empty and the risk of drowning is at a minimum, the costs of a lifeguard's services are at a maximum.
operator's breach of duty to provide safety measures and the teenager's death by drowning?

Example 1 poses a similar quandary. It too represents a MALB case – one that is not a statute's creation, but rather can be inferred from the circumstances. On the one hand, had the physician chosen to perform the surgery by procedure $A_1$, the patient would likely have died anyway,\(^\text{62}\) i.e., regardless of the physician’s negligence. Consequently, a factfinder can infer that there is no causal link between the physician's negligence and the patient's death.\(^\text{63}\) On the other hand, had the physician chosen to perform the surgery by procedure $A_2$, the patient would likely have survived. Therefore, a factfinder can also infer that there is a causal link between the physician's negligence and the patient's death.\(^\text{64}\) Which one is it then?

This question is clearly a product of underdetermination that arises in both Examples 1 and 2. The two examples, however, share more than causal underdetermination: they both demonstrate cases in which a fact finder can make a normative assessment regarding the desirability of each alternate lawful behavior the negligent defendant could have followed to meet her duty toward the plaintiff under the circumstances.

Although the pattern of underdetermination is present in both examples, there is an essential difference between them. While in Example 2 a factfinder can point out which of the alternate behaviors that the defendant did not follow is more desirable under the circumstances, Example 1 illustrates circumstances in which none of the alternate behaviors is normatively superior to the others. They are all equally desirable. The former case of underdetermination demonstrates what is hereby termed "normative

\(^{62}\) $A_1 \rightarrow B_1$.

\(^{63}\) If $B = B_1$, then $B - B_1 = 0$

\(^{64}\) If $B \neq B_2$, then $B - B_2 > 0$
certainty," whereas the latter demonstrates what is hereby termed "normative equality." The implications of these differences shall be discussed later on.  

Prior to this discussion a third case of underdetermination should be presented.

*Example 3.* The same circumstances as in Example 1, with a minor change. There are still two alternate procedures (A1 and A2) considered reasonable given the circumstances, neither of which was followed by the physician, and each of which leads to an opposite but-for result under the circumstances. In addition, it is impossible to know, based on the evidence, which of the alternate procedures poses less risk to the patient, or which of the procedures is less costly to perform.

Example 3 illustrates a case of underdetermination that consists of normative uncertainty, whereby a factfinder lacks the information to conclude which of the two alternate procedures – each of which leads to an opposite but-for result – is normatively preferable under the circumstances.

The uncertainty in Example 3 may arise with respect to new or experimental medical methods that have not yet produced the necessary evidence to infer the potential costs and risks associated with their implementation. It may also result from an unresolved controversy over the expected risks associated with two or more familiar medical methods (when both are considered reasonable, but it is impossible to determine which of them would minimize the costs of the expected harm and its prevention).

Having illustrated the three different cases of underdetermination, the following sections proceed to discuss and illustrate two prominent practices applied by courts in the wake of possible overdetermination.

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65 Mostly in Part III.
B. What Do Courts Do When Confronted with Underdetermination?

As aforementioned, in the law, and specifically in negligence cases, evaluating which lawful behavior the defendant should have followed (instead of his wrongful behavior) is considered as a normative rather than a causal quandary.66 As explained earlier, courts are usually confronted with this dilemma when they question how the standard of care should be set under specific circumstances, and subsequently examine whether the defendant’s actual behavior deviated from it.67 However, the problem of underdetermination presents a different question. It occurs in MALB cases, in which a defendant has several alternate lawful ways to fulfill her duty toward a plaintiff. If the defendant followed none, and is thus unquestionably negligent, a factfinder retrospectively has several optional alternatives with which to apply the but-for test. When at least two of the alternatives lead to opposite results there is underdetermination. The following sections describe two practices applied by courts to contend with potential cases of underdetermination. The first consists of shifting the burden of proof to the defendant. The second perceives underdetermination as lack of causation. The sections further explain why these practices fail to produce sufficient results for underdetermination from both efficiency and causal perspectives.

1. Shifting the Burden of Proof

In Haft, the courts faced a claim of potential underdetermination. On the one hand, the plaintiffs argued that the but-for test should be administered in light of the statutory alternative of providing lifeguard services, but on the other hand, the defendants contended that it should have been administered

66 See supra notes 36-37 and accompanying text.
67 See supra note 38 and accompanying text.
in light of the absence of the warning sign alternative. Clearly, each party suggested applying the but-for test by the statutory alternative that (he believed) will align the causal inquiry with his side.

Both the Court of Appeal and the Supreme Court of California in *Haft* avoided this causal argument. The Court of Appeal absolved the defendant of tort liability on causal grounds. It held that the plaintiffs had not succeeded in proving that *neither* a warning sign *nor* a lifeguard would have changed the unfortunate result, and therefore did not meet the requirement of causation.\(^68\) The California Supreme Court reversed this decision. In particular, it held that the absence of a lifeguard denied the victims not only a safety measure, but also a witness to the accident. Subsequently, it decided to shift the burden of persuasion to the defendants.

Indeed, courts sometimes shift the burden of proof to contend with evidential difficulties created by negligent defendants, who clearly placed a plaintiff in an unfair position and destroyed their power of proof.\(^69\) However, this evidential mean is not enough to contend with the problem of underdetermination (though it might decrease the chances of its creation), which is a product of normative rather than factual reasons.\(^70\) Specifically, in *Haft*, the Supreme Court of California left completely open the question of what the but-for result should have been had the defendant been unable to lift the burden of persuasion regarding the likelihood of the teenager's being saved via the statutory lifeguard alternative, but had he been able to do so regarding the other statutory alternative of posting a warning sign.


\(^{69}\) See, e.g., *Summers v. Tice*, 199 P.2d 1, 4 (1948) and its Canadian twin, *Cook v. Lewis*, [1952] 1 D.L.R. 1, 3-4 (holding that each of the defendants is liable because "by confusing his act with environmental conditions, he has, in effect, destroyed the victim's power of proof.").

\(^{70}\) It should be noted, however, that underdetermination may be a product of evidential damage in cases of normative uncertainty resulting from the defendant's act or omission.
1. Underdetermination Equals No Causal Link

According to the no-causal-link practice, if one of the possible lawful behaviors the defendant could have followed to meet her duty of care leads to the conclusion that the defendant is not the likely cause of the plaintiff's damage, then the requirement of causation is not met, and the defendant should therefore be exempted from tort liability for her negligence. This practice was applied in the matter of Castro v. San Diego Gas & Elec.,\textsuperscript{71} where the plaintiff, who was working on a roof, sustained severe injuries from a high-voltage power line owned and operated by the defendant company. Suing for compensatory damages, the plaintiff alleged that the defendant operated its high-voltage line negligently. Specifically, he claimed that the defendant breached its duty of care toward him in four different ways, each of which might have prevented the resulting injury. At trial, the jury found that the defendant was indeed negligent; however, the plaintiff failed to prove that the negligence was in fact the cause of the plaintiff's injuries. The California Court of Appeal confirmed this decision. It specifically held that it is enough if only one of the several alternate lawful behaviors supports the conclusion of lack of causation between the defendant's negligence and the plaintiff's damage.\textsuperscript{72} Furthermore, it explicitly stated that this conclusion would not have changed even if the plaintiff had been able to successfully prove that any of the other three alternate lawful behaviors mentioned would have led to an opposite but-for result (i.e., that the negligent defendant was the cause of the injury).\textsuperscript{73}


\textsuperscript{72} The exact phrase used by the court to describe the different alternate lawful behaviors was "theories of negligence." See id., at 25. For additional examples of the use of this phrase, see supra note 36.

\textsuperscript{73} Id. For a similar observation, see Jonkey v. Carignan Constr. Co., 139 Cal. App. 4th 20, 25-26 (2006).
Subsequently, the negligent defendant was absolved of tort liability.  

The latter practice, termed here the "no-causal-link solution," presents a general rule according to which a defendant should be exempted from tort liability in any case of underdetermination. This practice, however, makes bad law for several reasons. First, ignoring a contradictory but-for result may lead to erroneous results, excusing from tort liability a negligent defendant who is actually the likely cause of an injury. To illustrate such an error, consider that in Example 1 the following probabilities were established by the evidence: 1) there is a 0.6 probability that the patient would have died had the physician reasonably performed the surgery by A1; 2) there is only a 0.2 probability that the patient would have died had the physician reasonably performed the surgery by A2. With the above probabilities, there is an overall 60 percent chance that the physician's negligence was the cause of the patient's death. Clearly, the preponderance requirement is met (0.6 > 0.5), and the physician thus should be held accountable for her negligence. In these circumstances, absolving the physician of tort liability only because one of the alternate-lawful-behaviors would have led to the patient's unfortunate death anyway is a mistake.

Second, absolving negligent defendants of tort liability when they are in fact the cause of the plaintiff's injury may also create a problem of under-

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74 Id., at 24-25.
75 Now remember, in reality, the physician performed none of these reasonable procedures. Had she performed one of them (reasonably) she would not have been considered negligent in the first place.
76 $1 - (0.6 + 0.2)0.5 = 0.6$.
77 Note that this calculation reflects circumstances in which the "normative weights" of the several lawful behaviors is equal.
78 Another option is to hold the defendant liable in proportion to her causal accountability in inflicting the plaintiff's injury. According to the above numerical illustration, proportional liability should be set at 60 percent of the patient's loss of life. Justifications and explanations for favoring the proportional result when resolving underdetermination in cases of normative-equality is discussed at length in Part III.
deterrence. To demonstrate why, consider Example 1 with a small change according to which there was only one reasonable procedure the physician could (and should) have administered to treat the patient's medical condition. Assume that this procedure would have exposed the patient to a risk of 100K (probability of 0.1 for harm of 1M). Consider further that the physician negligently chose to administer a different, riskier treatment, which exposed the patient to a risk of 200K (probability of 0.2 for harm of 1M), and that subsequently the harm of 1M materialized.

Under these circumstances, if the plaintiff could prove that had the physician behaved reasonably by administering the less risky procedure, this would have prevented the harm, then the physician would be held liable in tort. In light of economic goals, in such a case, the physician should be required to pay damages in the amount of 100K, which would make her internalize the unreasonable risk she imposed on the patient. No more, no less.

Now, should this result be any different if it turns out that there was

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79 For a similar argument, see, for example, David Kaye, The Limits of the Preponderance of the Evidence Standard: Justifiable Naked Statistical Evidence and Multiple Causation, 1982 AM. B. FOUND. RES. J. 487, 494-503 (1982) (recommending the preponderance of the evidence standard as the most appropriate mechanism to avoid systematic errors associated with the "expected value approach," expected in cases in which a long-run bias problem arises); and Saul Levmore, Probabilistic Recoveries, Restitution and Recurring Wrongs, 19 J. LEGAL STUD. 691, 693-96 (1990) (noting the problem of "recurring misses," where there is constant bias due to which the but-for result constantly leads to the conclusion that there is a more than 0 percent but never more than 50 percent chance that a defendant in similar circumstances is the cause of an injury. In these cases, the tortfeasors are under-deterred).

80 200K-100K=100K.

81 To incentivize future physicians in similar situations to adopt an optimal level of care, they should only be held liable for the harm generated by their negligence. See, e.g., Ariel Porat, Misalignments in Tort Law, 121 YALE L.J. 82, 9 (2011) ("to realize the economic goal, the negligent injurer should compensate the victim for the amount of the entire harm, no more and, more importantly, no less."); Ariel Porat, Offsetting Risks, 106 MICH. L. REV. 243 (2007) (offering courts to avoid over-deterrence by offsetting the risk a defendant imposes on a plaintiff by the risk that was not imposed on the plaintiff from the reasonable non-taken option in order to align the liability imposed on a defendant with the exact risk she imposed on plaintiff).
another, similarly reasonable medical treatment the negligent physician did not follow, only because it turns out that this other procedure, if it had been administered, would likely not have changed the unfortunate result? What message do we send physicians and potential injurers in general by implementing such a practice?

First, from an ex-ante perspective, they may infer that the greater the number of safety precautions to fulfill their duty toward their potential victims, the greater are their chances to avoid liability in taking none of them. This inference may distort the potential injurers' assessment of risks they impose on others. Going back to Example 1, being absolved of liability due to the no-causal-link practice, the physician will not internalize the risk of 100K she imposed on her patient by following neither of the two reasonable procedures. This in turn will lead other physicians in similar circumstances to underestimate the risks they impose on patients, and subsequently lead them to under-deterrence.

Lastly, it should be noted that the no-causal-link practice may also lead to problematic results from an ex-post perspective. The reason is that it may generate a strategic behavior among defendants to search for more alternate precautions they could have followed ex-ante (but did not) in order to increase their chances of escaping tort liability in retrospect.

III. PROPOSALS AND EXPLANATIONS

Contending with underdetermination by shifting the burden of proof to the defendant leaves the problem of underdetermination unresolved and may also create over-deterrence, as it increases the chances of imposing liability

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82 As the number of precautions increases so does the probability that one of them will negate the requirement of causation.
on negligent defendant. On the other hand, exempting negligent defendants from liability in cases of underdetermination for lack of causation may lead to mistaken results and severe under-deterrence. What is it then that courts should do when facing underdetermination?

Prior to presenting my suggestions for possible endeavors to resolve underdetermination, consider again the plant example discussed earlier. In this example there are numerous alternatives that can be used as a baseline to evaluate if my omission to water the plant, \( A \), was the cause of its drying out, \( B \). For instance, \( A^* \) can denote either \( A_1 = \) ‘watering the plant once a day’; \( A_2 = \) ‘watering it once every other day’; \( A_3 = \) ‘watering the plant once a week,’ and so forth. As each of these alternatives may lead to different but-for results, the key to inferring whether my omission was indeed the cause of the plant's drying out is to decide which of them should be the one that \( A^* \) defines. This conclusion is true _mutatis mutandis_ in regard to resolving the problem of underdetermination in the law. It all comes down to defining \( A^* \) with a _single value_. The question that remains is _how_?

To begin answering this question, one should first consider the suggestions that have been proposed in the literature on the theory of contrastive causation in the law, concerning the requirements for defining contrastive causes in the legal context. Jonathan Schaffer, a prominent writer in the field, proposed that in “legal practice” the contrastive cause, \( A^* \), should denote whatever is codified in the law. Schaffer’s proposal resembles Jane Stapleton’s earlier observation that \( A^* \) should denote an alternate behavior in which the defendant behaved just enough to conform to her duty as mandated

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83 See infra notes 15-24 and accompanying text.
84 In fact, there is an infinite number of alternatives for the factfinder to choose from. For simplicity, the assumption in the Article is that there is always a finite number of alternatives, at least in the legal context.
85 See Schaffer, _Contrastive Causation_, supra note 14, at 315.
As the problem of underdetermination occurs when the law itself enables one to define $A^*$ by more than one alternative, either explicitly or implicitly, both Schaffer's and Stapleton's proposals seem to leave the problem unresolved. Another suggestion for defining contrastive causes in the legal context is Alex Broadbent's proposal. According to the latter, in the law, a contrastive cause should be defined as an appropriate event in which the defendant meets her "mere duty of care," i.e., "not in some particular way beyond what the duty itself requires." Broadbent's suggestion also falls short of resolving the problem of underdetermination. It does not contend with the core difficulty of the problem, which is the duality of particular behaviors that a defendant could have followed to comply with her duty of care toward a plaintiff. To resolve cases of underdetermination, other solutions should be considered.

The next sections propose and demonstrate possible solutions that not only resolve cases of underdetermination, but also create incentives for an optimal level of care.

A. The Appropriate Alternate Behavior Solution: Cases of Normative Certainty

The appropriate lawful behavior solution offers that $A^*$ should denote the alternate behavior that, in the specific circumstances, best accords with the factfinder's normative perspective. This solution can therefore only be applied in cases of normative certainty, whereby a factfinder is capable of deciding which of the alternate lawful behaviors the defendant could have

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87 See Broadbent, supra note 14, at 189.
88 For further critiques on Broadbent’s proposal, see also Schaffer, *Contrastive Causation in The Law*, supra note 14, at 293-95.
taken to meet her duty toward the plaintiff was preferable under the circumstances. From an economic perspective, the appropriate lawful behavior is one that leads to social welfare maximization.\footnote{It should be noted that $A^*$'s responsive nature may lead factfinders to define it differently, in accordance with their normative perceptions. Since different $A^*$'s may lead to different $B^*$'s, the same counterfactual inquiry may lead to different factual results, depending on the normative view of the factfinder who applies it. Therefore, although the following analysis focuses on economic goals, it is indisputable that applying other policy considerations may lead to different choices regarding the appropriate definition of $A^*$, and subsequently to different but-for results.}

To this end, $A^*$ should denote the alternate behavior that will result in inducing future injurers to at least follow the less expensive alternative out of the alternate behaviors. The reason is that applying the but-for test with a more expensive alternate behavior, which reflects a greater amount of precaution, is more likely to lead to a positive inference of a causal link compared to applying it with the least-costly precautions. As the latter inference leads to imposing tort liability on negligent defendants it might incentivizes potential injurers in similar circumstances to \textit{at least} take the less expensive precaution.

Correspondingly, in \textit{Haft}, the case on which Example 2 is based, $A^*$ should define "providing a lifeguard" rather than "posting a warning sign."\footnote{It may be the case that distributive considerations may also lead a factfinder to posit the 'presence of a lifeguard' alternative as the contrastive cause, for instance, if her aim is to protect teenagers and children from their own recklessness.} As the former statutory alternative is assumed to lead, in most cases, to the result that a negligent pool operator is the likely cause of a drowning accident,\footnote{Defining $A^*$ as the single lawful behavior of providing lifeguard services, in the next stage of the causal inquiry the factfinder needs to conclude whether in the specific case providing such services would likely have prevented the teenager's death by drowning. Only a positive answer will confirm that the pool operator’s negligence was indeed the likely cause of the unfortunate death. Note that, as opposed to the assumptions presented in the \textit{swimming pool} example, in \textit{Haft v. Lone Palm Hotel}, 3 Cal. 3d 756 (Cal. Ct. Sup. 1970), the plaintiff failed to prove that had the defendant followed any of the safety measures, the unfortunate result would have been different. \textit{Haft} is, therefore, not a case of underdetermination; rather, it is merely an MALB case, in which the plaintiffs were not successful in proving a causal link} pool operators will expect to be held liable in tort in cases of
drowning if they do not take any of the statutory precautions to avoid it. They will therefore be induced to at least post a warning sign in the absence of a lifeguard.

By contrast, denoting $A^*$ by the latter, least costly alternative of a warning sign, which reflects a lesser amount of precaution, is more likely to lead to the result of no causal link, and subsequently to absolving negligent defendants of tort liability in similar cases. Denoting $A^*$ by the least costly alternative may align with the following reason: as it was left to the defendant's judgment to choose between several lawful alternatives before she chose the wrongful path of behavior, a similar choice should be available to the defendant retrospectively (i.e., after she committed a wrongdoing, by following none of the considerable alternatives to fulfill her duty of care). $A^*$ should therefore denote the least expensive precaution, which a rational defendant is expected to favor—in Example 2, this precaution is the statutory alternative of posting a warning sign.

Denoting $A^*$ by the least costly alternative may, however, result in what Saul Levmore observed as a systematic bias in favor of negligent defendants. Specifically referring to Haft, Levmore indicated that inquiring the question of causal link in light of the warning sign alternative (instead of lifeguard services) will recurrently miss the possibility of imposing tort liability on negligent defendants, and will therefore create a problem of

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92 It is reasonable to assume that if a victim of drowning saw that there was no lifeguard and nonetheless decided to enter the pool, a warning sign indicating the absence of a lifeguard would probably not have changed her mind, and the victim would likely have entered the pool and drowned anyway.


94 Levmore supra note 79, at 705-6.
under-deterrence.\textsuperscript{95}

To summarize thus far, Example 2 illustrates a particular MALB case in which the law generates causal underdetermination under conditions of normative certainty. These conditions enable factfinders to perform a normative evaluation, and thereafter define $A^*$ with the more expensive alternate behavior to avoid under-deterrence. The appropriate alternate behavior solution (or in its economic version, the "efficient behavior solution"), is not a sufficient means, however, to contend with underdetermination in cases of normative equality or normative uncertainty. In the latter cases, factfinders cannot define $A^*$ with a single lawful-alternate-behavior, either because the candidate alternate-behaviors are equally efficient, or because, in the given circumstances, the factfinder lacks the necessary information to evaluate which of them was more efficient to administer.

The last section proposes that in these latter cases, the problem of underdetermination should be resolved by probabilistic means. It further underlines the probabilistic solution that correlates best with efficiency considerations.

\textit{B. Probabilistic Solutions: Cases of Normative Equality and Normative Uncertainty}

Examples 1 and 3 describe a medical case that raises a causal problem of underdetermination. On the one hand, had the physician in these examples chosen to perform the surgery by procedure $A_1$, the patient would likely have died anyway, $B_1$, \textsuperscript{96} i.e., regardless of the physician’s negligence.

\textsuperscript{95} \textit{Id.} Note, that the most severe problem of under-deterrence remains still the aforementioned no-causal-link practice, according to which negligent pool operators can be expected to \textit{always} be excused from tort liability.

\textsuperscript{96} $A_1 \rightarrow B_1$. 
Consequently, a factfinder may infer that there is no causal link between the physician's negligence and the patient's death. On the other hand, had the physician chosen to perform the surgery by procedure \( A_2 \), the patient would likely have survived, \( B_2 \). A factfinder may therefore infer that there is a causal link between the physician's negligence and the patient's death.

In Example 1, \( A_1 \) and \( A_2 \) are described as equally desirable alternatives. By contrast, in Example 3 there is a factual uncertainty that prevents a factfinder of knowing which of these alternatives is more appropriate given the circumstances (or alternatively, whether she faces a case of normative equality, whereby \( A_1 \) and \( A_2 \) are equally desirable).

The underdetermination illustrated in Examples 1 and 3 cannot be resolved by means of normative judgment that enables a factfinder to favor one alternate-behavior over another according to efficiency considerations (or any other normative scale for that matter). And so, the question remains, how should a factfinder define \( A^* \) in these two last cases? This question is the subject of this last subsection.

The practices and solutions discussed thus far were based on an all-or-nothing reasoning. In the context of causal inquiry, this reasoning has two aspects. The first is the familiar use of the all-or-nothing conception, according to which the defendant's alternate lawful behavior serves as a comparative baseline to conclude whether the injury would more likely than not have occurred had the defendant acted lawfully (\( A^* \)) instead of negligently (\( A \)). A negative answer to that question leads to the conclusion that the negligent defendant is one hundred percent liable for the plaintiff's injury. A positive answer leads to the conclusion that the negligent defendant is not at all liable in tort for the injury.

\[^{97}\text{A}_2 \rightarrow B_2.\]
The probabilistic solutions discussed next concern a different, much less familiar aspect of all-or-nothing reasoning; namely, the conventional conception that $A^*$ can only denote an integer behavior.\footnote{The term 'integer' is used in algebra to describe a number written without a fractional component. Its origin is in Latin, where it means 'whole.' See Vaughan Pratt, Algebra, in The Stanford Encyclopedia of Philosophy (Edward N. Zalta ed., 2014), http://plato.stanford.edu/archives/spr2014/entries/algebra/. Such a behavior can be selected according to any normative scale (for instance, it can reflect either a pro-defendant or a most-appropriate solution).} According to this conception, the factfinders in Examples 1 and 3 can have $A^*$ denote only by either procedure $A_1$ or $A_2$. Conversely, the following probabilistic solution introduces a mechanism that challenges this traditional conception. It offers a new conception of behavior, according to which whenever a factfinder is unable to assign $A^*$ a single value by normative means, she should assign it a probabilistic synthesis of the two (or more) considerable alternate-lawful-behaviors; namely, a form of expected lawful behavior. The following discussion presents the latter solution, underlines its advantages in resolving underdetermination in efficient manner, and differentiates it from another probabilistic based solution, referred to here as the dominant lawful behavior:

Assume that a factfinder in either Example 1 or 3 is presented with evidence according to which, the statistics show that 60 percent of all physicians perform the needed surgery by $A_1$ and, respectively, only 40 percent perform it by $A_2$. The analogy in such a case is tossing a biased coin, with expected results of falling on $A_1$ in 60 out of 100 flips, and falling on $A_2$ in 40 out of 100 flips.\footnote{Defining $A^*$ according to probabilistic data inferred from the statistical evidence may be a matter of controversy. Some scholars believe that naked statistical evidence should not count as an indicator for proportional liability. See, e.g., Alex Stein, Foundations of Evidence Law, 238-241 (2005) (arguing that naked statistical evidence allocates the risk of error between the parties in an unequal fashion, and thus violates the basic notion of equality in civil litigation); Chris William Sanchirico, Character Evidence and the Object of Trial, 101 Colum. L. Rev. 1227, 1259-63 (2001) (arguing that leaning on data regarding statistical.
to resolve the underdetermination in Examples 2 and 3. The first is to have \( A^* \) denote the expected lawful behavior, calculated in accordance with the probabilities inferred from the statistical evidence. Accordingly, \( A^* \) should denote \( 0.6A_1 + 0.4A_2 \). In addition, consider the same probabilities used earlier to demonstrate the no-causal-link practice are established by the evidence (a 0.6 probability of the patient's death had the physician conducted procedure \( A_1 \), and a 0.2 probability of the patient's death had she conducted procedure \( A_2 \)). Subsequently, assuming that a court estimates the patient’s loss of life at 1 million dollars, one option is to hold that the physician's negligence is a 56 percent cause of the patient's loss of life, and therefore only 560K (out of 1M) can be causally attributed to it. Alternatively, based on the preponderance standard, the latter result could lead to the conclusion that the physician should be held one hundred percent liable for the patient's loss of life, and the sum of compensation should be therefore set at 1M.

Evidence, such as the defendant’s prior criminal conduct, may create distorted incentives for efficient behavior ex-ante.  

\[ 1 - (0.6 \times 0.6 + 0.4 \times 0.2) = 0.56. \]

\[ As \ 0.56 > 0.5. \]

\[ 102 \text{ Another way to measure the expected-alternate-behavior in cases of normative uncertainty is to ascribe equal weight to all the considerable alternate behaviors. Whereas in Example 1, ascribing equal probabilities to } A_1 \text{ and } A_2 \text{ can reflect the normative equality between the two alternate paths of actions, in Example 3 which demonstrates underdetermination that consists of normative uncertainty this probabilistic equality is more akin to the idea of tossing a fair coin. Ascribing equal probabilities to all the reasonable alternate behaviors (in both Example 1 and 3), } A^* \text{ should denote } 0.5A_1 + 0.5A_2 \text{. Thus, considering the probabilities that were established by the evidence in the former section, the physician’s negligence is in total a 0.6 cause of the patient's death. Subsequently, only 600K (out of the 1M's estimation of the patient's loss) should be causally attributed to the physician’s negligence. Another option is to interpret the physician's 0.6 probability of causing of the patient's death as such that meets the preponderance requirement, and therefore to hold the physician liable for a hundred percent of the patient's loss of life. In that case, the sum of compensation should be set at 1M. For a related argument of a fifty-fifty split between the litigating parties, see, for example, John E. Coons, Approaches to Court Imposed Compromise: The Uses of Doubt and Reason, 58 NW. U. L. REV. 750, 759 (1963) (arguing that, in some cases of factual uncertainty, courts should impose a compromise by dividing the sum claimed between the parties, assuming that the court assigns equal weight to every alternative); Gideon Parchomovsky et al., Of Equal Wrongs and Half Rights, 82 N.Y.U. L. }

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Another possible solution for underdetermination in the absence of normative certainty is to have $A^*$ denote the "dominant alternate behavior" based on the statistical evidence. Following this option, given the statistics, $A^*$ should denote $A_1$ since there is a greater chance that a reasonable physician in the defendant's shoes would have chosen to perform the surgery through it. Consequently, the but-for result in both Examples 1 and 3 would be that the physician's negligence is not the likely cause of the patient's death, and she should therefore be absolved of tort liability. Alternatively, if the 0.5 probability threshold is rejected and a proportional but-for result accepted instead, the physician could be held liable in tort for her partial contribution to the patient's loss of life, i.e., for being a 40 percent causal factor of the patient's death. Accordingly, only 400K (out of the 1M's estimation of the patient's loss) can be causally attributed to the physician’s negligence.

Though both, the expected lawful behavior mechanism and its contestant, the dominant alternate behavior, enable to resolve the inconsistency of underdetermination, through economic lenses, the former is

\[ B - B_1 = 1 - 0.6 = 0.4 \]
preferable for several reasons. First, statistical evidence reflects a rigid probabilistic division within a specific geographic region and historical period. Subsequently, under the dominant alternate behavior solution, the definition of $A^*$ is bound to remain permanent for any other similar case. This, in turn, may create a tendency to generate biased but-for results that systematically favor the same party, either by consistently negating the causal link (as in the physician example) or consistently confirming its existence.\textsuperscript{107}

Conversely, having $A^*$ denote an expected alternate behavior leads, on average, to accurate but-for results.\textsuperscript{108} Subsequently, it reduces the costs of judicial errors,\textsuperscript{109} and in addition, similar to the proportional liability rule, enables to impose liability on defendants in proportion to the damage that they actually inflicted on others. It therefore ensures that defendants will internalize exactly the expected losses that they create.

It should be noted, that notwithstanding their similar results, from

\textsuperscript{107}Unless the results of the statistically dominant behavior solution are proved to be distributed between defendants and plaintiffs in a symmetric manner. See Kaye, supra note 79, at 502. See also supra note 95 and accompanying text.

\textsuperscript{108}See, e.g., Kaye, supra note 79, at 501-502 (explaining that the results obtained from an expected value rule are exactly right on average; however, observing each of them separately they are wrong every time).

\textsuperscript{109}Minimizing the costs of judicial errors is considered the prominent economic goal of evidence law. See, e.g., Stein, supra note 99, at 141-43 (indicating that to maintain cost-efficiency, factfinders need to minimize the total cost of errors and error avoidance); Richard A. Posner, An Economic Approach to the Law of Evidence, 51 Stan. L. Rev. 1477 (1999) (suggesting a model that optimizes the amount of evidence, on the assumption that the social goal of the evidentiary process is to minimize the sum of the costs of error and the costs of error avoidance). It should be noted, however, that other economic considerations may sometimes override the goal of minimizing costs of errors. See, e.g., Sanchirico, supra note 99 (observing that judicial errors are justified when they generate efficient behaviors "outside the courtroom"). For a view, according to which the preponderance rule is a better costs-of-error minimizer than the proportional expected value rule, see, e.g., Kaye, supra note 79, at 500-503 (observing that, as long as the probabilities of errors are distributed across cases and parties in a symmetrical way, any discrepancies in the error rates tend to average out. Thus it is the preponderance rule that leads to "unbiased" results); Porat & Stein, supra note 30, at 19-22 (explaining that the preponderance rule both maximizes the number of correct decisions and minimizes the total amount of wrongful transfers).
causal perspective, the expected alternate behavior solution is preferable to the traditional proportional liability rule. The latter rule is discussed at length by the law and economics scholarship for its ability to establish a necessary factual inference when factual uncertainty prevents a plaintiff from establishing the requirement of causation under the preponderance rule.\footnote{See, e.g., Glen. O. Robinson, Probabilistic Causation and Compensation for Tortious Risk, 14 J. LEGAL STUD. 779, 779-80 (1985) (observing that in many tort cases causation is inherently hard to prove, particularly when the injury is the result of a combination of several causes, and isolating one of them as the cause is a difficult task); John Makdisi, Proportional Liability: A Comprehensive Rule to Apportion Tort Damages Based on Probability, 67 N.C. L. REV. 1063 (1988) (same); David Rosenberg, The Causal Connection in Mass Exposure Cases: A “Public Law” Vision of the Tort System, 97 HARV. L. REV. 849 (1984) (arguing that in mass exposure cases the court should award each potential victim compensation in proportion to the likelihood that her injury was caused by the defendant’s wrongful exposure); Daniel A. Farber, Toxic Causation, 71 MINN. L. REV. 1219 (1986) (same); J. David Prince, Compensation for Victims of Hazardous Substance Exposure, 11 WM. MITCHELL L. REV. 657 (1985) (same); Richard Delgado, Beyond Sindell: Relaxation of Cause-In-Fact Rules for Indeterminate Plaintiffs, 70 CALIF. L. REV. 881 (1982) (suggesting that the burden of proof for the factual causation should be reduced in cases of both indeterminate defendants and indeterminate plaintiffs).}

While the proportional liability rule allows a plaintiff to recover for risks the defendant inflicted upon her \textit{without} proving that the defendant actually caused the resulting injury,\footnote{Generally speaking, proportional liability determines recovery by multiplying the plaintiff’s total damages by the percentage chance that the defendant caused the damages.} the expected alternate behavior proposed mechanism provides both doctrinal and theoretical grounds for proportional liability that meets the requirement of factual causation.\footnote{That is, without waiving the preliminary requirement of establishing a causal link between the defendant's wrongfulness and the losses that resulted from it.}

\textbf{CONCLUSION}

The counterfactual causal inquiry in the law consists of four elements: 1) actual cause; 2) actual result; 3) the alternate-lawful-behavior the defendant should have followed instead of her actual, negligent behavior; and 4) the result of the latter lawful behavior. Whilst courts and scholarship widely discuss the causal implications of elements 1, 2 and even 4, the third
element is almost entirely absent from the causal debate on factual causation in the law. The main reason for this absence concerns with the nature of this element, which describes the reasonable behavior that the defendant should have followed to meet her duty of care toward the plaintiff, and therefore considered a matter of responsibility, rather than causation. This Article did not contend against the normative classification of the alternate-lawful-behavior element. However, acknowledging that it is also a component constructively located within the counterfactual inquiry, it suggested to focus on the less explored angle of its implications on the causal inference. This focus revealed the unique setting of Multiple Alternate Lawful Behaviors (MALB) cases, in which there is more than one lawful alternate behavior that the defendant could have followed to comply with her duty of care toward the plaintiff. When at least two of these alternate behaviors lead to contradictory factual results, a question of underdetermination arises.

As long as factual causation is a preliminary requirement for imposing legal liability, courts must both recognize and resolve the problem of underdetermination when they are confronted with it. This Article fulfills both of these needs: first, by proposing guidance for identifying the pattern of underdetermination in negligence settings, and second, by discussing and illustrating possible solutions for different cases of underdetermination that not only resolve the pattern of its inconsistency, but also incentivize potential injurers to behave in accordance with the optimal level of care.