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Optimal Liability for Libel

Oren Bar-Gill and Assaf Hamdani *

Abstract

Courts justify the constitutional law of libel with consequential reasoning, yet they fail to arrive at an optimal liability regime. Previous literature, relying on the nature of information as a public good, concurs with the courts about the inadequacies of strict liability, but fails to devise an optimal regime. The present study aims to fill this void, and formally study optimal liability for libel taking into account the unique nature of information. We first demonstrate that a single damage measure for publication of false libelous information cannot simultaneously induce socially optimal decisions regarding both pre-publication verification and publication. We then propose a two-dimensional strict liability rule, which can induce the first-best outcome. Interestingly, the first dimension of the optimal rule, which applies when some positive level of verification is socially desirable, sets the damage award equal to the social *benefit* from truthful publication.

Keywords: Libel, Externalities, Liability, Tort Law, Constitutional Law.

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I. INTRODUCTION

The jurisprudence of libel – the tort committed when one damages another’s reputation by publishing false information – poses a puzzling contradiction. In devising the constitutional rules governing liability for libel, courts have been explicitly motivated by consequential concerns. Nevertheless, they have adopted doctrines that are, on their face, inconsistent with economic theory.

The most prominent example is the seminal decision of the Supreme Court in *New York Times v. Sullivan*.¹ In *Sullivan*, the Court extended constitutional protection to false speech concerning a public figure. Under *Sullivan*'s reading of the First Amendment, false speech could only give rise to liability if the speaker's statements stemmed from "actual malice", *i.e.* knowledge or recklessness with respect to the falsity of the publication. The Court explicitly grounded its decision in the fear that strict liability for false speech would make "would-be critics of official conduct [become excessively] deterred from voicing their criticism". As Robert Post observed, the purpose of this actual malice requirement is to “attain the specific end of minimizing the chill on legitimate speech” (Post (1995), p. 153).

The Court's concern that strict liability for false speech over-deters appears to be at odds with the economic theory of liability. As has been shown, strict liability for torts should result both in the optimal level of care (Landes & Posner (1987), Shavell (1987)) and in the optimal level of effort to obtain information (Shavell (1992)).

Addressing this apparent inconsistency, previous literature (Farber (1991), Hylton (1996), Posner (1998), Cooter (2000)) has explained that libel differs from

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¹ 376 U.S. 254 (1964).

the tort underlying the standard model of liability because the information conveyed by speech is a public good. That is, a newspaper publishing a story is unable to capture, through the price it charges its readers, the story's full social value.^{2, 3} Since speakers cannot capture the full social *benefit* of their conduct, holding them strictly liable for the full social *harm* they cause will result in over-deterrence. Previous literature thus concurs with the *Sullivan* Court about the inadequacies of strict liability for libel. This literature, however, has not formally studied the optimal structure of liability for libel. Instead, it has remained within the *Sullivan* framework, making general proposals for substituting negligence for strict liability.⁴

This paper develops a model to study the optimal liability for libel, emphasizing the quality of speech as a public good. The model is based upon a two-level decisionmaking process for publishers. When a newspaper receives information about a story, it faces two sequential decisions: first, whether and how much to invest in verifying the accuracy of the information; second, given the information the newspaper holds, whether to publish the story. The challenge is to design a liability regime that will provide newspapers with optimal incentives for both verification and publication. As we shall show, focusing on the two

² There are two main reasons for a newspaper's inability to capture the full social benefit it produces *via* publication. First, a newspaper publishing a news item can neither prevent competing newspapers from publishing the item nor exclude the public from learning the information conveyed by the item (Posner (1998), 733-34). In theory, this problem could be solved if newspapers offered lower prices to the group of potential readers who attach relatively little value to the timely reading of new news items. A newspaper, however, will generally be unable to engage in perfect price discrimination because it will often be unable to identify those readers (or even if identification does not pose a serious problem, price discrimination may be prohibited by law).

The second reason for a newspaper's inability to capture the full social benefit from publication concerns the invaluable yet intangible benefits derived from the free flow of ideas guaranteed by the First Amendment. For example, the social benefits associated with the deterrent effect of investigative journalism on corruption by public officials will not necessarily be reflected in readers' willingness to pay for a newspaper.

³ Libel differs from other torts on another dimension. In general, tort doctrine defines strict liability as imposing liability whenever the victim suffers harm. In contrast, according to existing libel doctrine, truth is a good defense against a claim of libel, regardless of the harm to the victim. We retain this distinctive feature of libel doctrine throughout the main part of our analysis. Nevertheless, we do explore the implications of conventional strict liability. See Appendix B.

⁴ Other noteworthy contributions include Renas et al. (1983) and Garoupa (1999a,b). Renas et al. (1983) analyze a formal model of liability for libel, using a decision-making model different from the one studied in the present paper. Moreover, Renas et al. examine a limited set of liability rules, and thus focus on second-best solutions, whereas we derive a liability regime capable of inducing the first-best outcome. In addition, Garoupa (1999a,b) studies the tort of defamation, but from a different angle, focusing on the effect of libel law on the ability and incentives of the press to expose and deter political corruption.

distinct decisions made by publishers provides new insights concerning the precise effect of both the quality of speech as a public good and the liability on publishers' incentives.

The anti-strict-liability approach adopted by the *Sullivan* Court and endorsed by the legal literature in its aftermath focuses solely on the decision whether to publish. Under this approach, relaxing the standard of liability is necessary in order to mitigate the chilling effect of liability, *i.e.*, to ensure a sufficiently high level of publication. This approach, however, overlooks the effect of liability on the verification decision. As this paper shows,⁵ the nature of information as a public good has markedly different implications for the verification and publication decisions. While publishers will be over-cautious in their publication decisions, they will tend to under-invest in verifying the accuracy of the stories they publish. In many cases,⁶ therefore, an optimal level of verification can be induced only if the publisher faces *increased* liability for publication of false information.

In order to remain faithful to current libel doctrine, we study a liability regime under which a publisher will be held liable whenever the information turns out to be false. Ideally, we seek a single policy variable -- the level of damages for publishing false information -- that can achieve the first-best outcome on both levels, *i.e.*, the first-level decision to verify the information, and the second-level decision to publish the story.

Our first finding is that no single penalty can induce socially optimal decisions on both the verification and publication levels. Given the two-dimensional structure of the libel problem, we need a two-dimensional liability rule. We therefore turn to study a regime under which the penalty imposed on the publisher depends on whether it was socially optimal for the publisher to verify the accuracy of the information prior to publication. We show that this regime can induce the first-best outcome on both levels.

The first measure of damages for false publication, imposed when it is socially optimal to verify the information, should be set at the social *benefit* from publication. As it defies a basic tenant of tort law, setting damages to equal the benefit (and not the harm) produced by the regulated activity clearly needs some justification. We therefore show that this unconventional damage measure leads to optimal verification. We then explain that given optimal verification, the optimal publication decision will follow.

The intuition underlying the above result is as follows. The social return to verification equals the (net) benefit from publication of truthful information. With inadequate verification, truthful information might not be published, giving way to false information or to no publication at all. If a publisher could capture the

⁵ See Section V *infra*.

⁶ In particular, where the level of the positive externality, the benefit from publication, exceeds the negative externality, the harm from publication.

social benefits from truthful publication, she would have optimal incentives to invest in verification. But, as we have seen, the public good nature of information precludes this solution. Can we mimic this full internalization ideal *via* a liability rule? This can be achieved by exploiting the following symmetry. Focusing on the publisher's incentives to invest in verification, an award for publishing true information is equivalent to a fine for publishing false information. Therefore, setting damages for false publication to equal the (net) benefit from publication of truthful information, will achieve socially optimal verification.

Having ensured optimal verification, we must still show that setting damages to equal the benefit guarantees an optimal publication decision. If it is socially desirable to invest in verification, and optimal verification is indeed achieved, then an optimal level of publication will necessarily follow. To see this, note that a publisher that invests in verification will base her publication decision on the results of the verification process (otherwise, she will not waste money on verification). Therefore, given optimal verification, the level of publication will also be socially optimal.

The 'damages equal to benefit' rule is optimal when it is socially desirable to invest in verification prior to publication. There are, however, cases in which it is optimal for the publisher to forgo verification and either to publish or to refrain from publication. These cases are characterized by what we call ineffective verification. Verification is ineffective when the quality of the initial information is especially high, or, more importantly, when the available verification measures are not cost-effective. What is the optimal liability rule in such cases?

As it turns out, it is quite simple to ensure no verification (which is the socially optimal result), and the challenge is to induce an optimal publication decision. Therefore, the liability rule must be sensitive to the relative magnitudes of the expected benefit and harm resulting from publication. If the expected benefit is dominant it is socially optimal to publish without verification. This can be achieved by setting a sufficiently low level of damages (or even zero damages). On the other hand, if the harm is dominant it is socially optimal not to publish, again without verification. This can be achieved by setting a sufficiently high level of damages.^{7, 8}

To summarize, we show that, in theory, a two-dimensional liability regime would be superior to the current standard of liability for libel. The first dimension

⁷ The distinction between scenarios with higher expected benefits from publication (relative to harm) and scenarios with lower expected benefits (relative to harm) resembles the doctrinal distinction in libel law between information pertaining to public figures and information pertaining to private figures. See Section VI, *infra*.

⁸ Generally, optimal decisions can be induced by setting the level of damages according to a simple formula. According to this formula the optimal level of damages is a function of the publisher's profit from publication, plus the difference between the harm from publication and the expected benefit from the publication of a true story (multiplied by a positive constant). See Section V, *infra*.

would apply to cases where it is socially desirable for the publisher to invest in verification prior to publication. In these cases, the first-best verification and publication decisions can be induced by setting damages to equal the (net) benefit from publication of truthful information. The second dimension would address the remaining class of cases, where no verification is optimal. In this class of cases, the optimal rule would impose either zero damages or high damages, based upon a comparison between the expected benefit and harm from publication.

By focusing on the two distinct decisions made by publishers, this paper develops a framework to evaluate the precise effects of liability on the prevalence of speech, and provides insights as to the relevant considerations for devising an optimal liability regime for libel. The analytical results derived in this paper do not immediately translate into doctrinal rules. Nevertheless, using our new framework, we are able to formulate modest practicable proposals for reform in libel doctrine.

The remainder of the paper is organized as follows. Section II presents an informal analysis, which highlights the main results and their underlying intuitions. Section III lays out the framework of the formal analysis. Section IV solves for the socially optimal levels of verification and publication. Section V studies the newspaper's problem. Section VI derives the optimal liability regime. Section VII draws the implications of the analysis for libel doctrine. Section VIII concludes. The proofs of the propositions presented in the paper are relegated to an appendix.

II. INFORMAL ANALYSIS

A. Setup

We begin the analysis by discussing an informal example. A newspaper receives a tip from a source indicating that a certain politician is involved in an extramarital affair. The newspaper knows that information from the source is true with a probability of 70% and false with a probability of 30%. Upon receiving the information, the newspaper must choose from the following possible courses of action: (1) not to publish the information; (2) publish the information without any further efforts at verification; or (3) invest in verification, and base the publication decision on the results of the verification efforts. Of course, if option (3) is chosen, the newspaper must also choose how much to invest in verification. For simplicity, assume that the newspaper can pay an investigator either \$10,000 or \$20,000 as an investment in verification. These differing verification investments reflect different levels of comprehensiveness in the investigation. Following her investigation, the investigator reports to the newspaper whether she believes the information is true or false.

The probability of the investigator's report being correct increases with the funds supplied for the investigation. In particular, we assume that if the newspaper invests only \$10,000, there is a probability of 60% that the investigator's report will be informative, and a probability of 40% that the report will be uninformative. However, if the newspaper invests \$20,000, there is a probability of 80% that the report will be informative, and a probability of 20% that the report will be uninformative. By an informative report, we mean a report that is correct with respect to the truthfulness (or inaccuracy) of the initial tip. By an uninformative report, we mean a report based on evidence that is no more valuable than the original source that produced the tip. In such a case, the likelihood that the report will be accurate will be identical to the likelihood that the tip provided by the original source was accurate.

Regardless of its level of investment, once the newspaper orders an investigation and report, it will rely upon the accuracy of the report.

B. Socially Optimal Verification and Publication

Let us first consider the socially optimal verification and publication decisions, *i.e.*, the decisions that maximize social welfare without specific reference to the newspaper's profits. The social optimum depends on the social costs and benefits of publication. We assume that if the information is published, the politician will suffer a harm of h . Also, we assume that if the information is true, its publication entails a social benefit of b . The optimal strategy is chosen from the following three alternatives: (1) publish the information without further verification, (2) do not publish the information (without verification), or (3) invest in verification and base the publication decision on the investigator's report. To facilitate a comparison between these three alternatives, we now calculate the social welfare given each one of the three available courses of action.

The level of social welfare when the newspaper does not publish the information (without any verification) is normalized to zero. If the newspaper chooses to publish the information without any verification, the expected level of welfare is $70\% \cdot b - h$. The expected welfare in the case of verification is less easily encapsulated. To calculate the expected social welfare when verification is chosen, we must first derive the socially optimal level of verification. In the present example, the choice is between investing \$10,000 in verification and investing \$20,000 in verification.

Consider first an investment of \$10,000, with the resulting 60% probability of obtaining an informative report. If the information is true, the *ex post* expected social welfare (not including verification costs) is:

$$(60\% + 40\% \times 70\%) \times (b - h) + 40\% \times 30\% \times 0 = 88\% \times (b - h).$$

The information will be published in two cases. The first case is when the investigation uncovers the true nature of the information. This will occur with a

probability of 60%. The second case is when the investigator's report is not informative – this will occur with a 40% probability – but by chance the investigator correctly reports that the information is true - this will occur with a 70% probability (conditional on the non-informativeness of the report).⁹ Thus, the information will be published with probability $60\% + 40\% \times 70\%$, leading to a benefit, b , and a harm, h . If the investigator errs and indicates that the information is false (as in 30% of the non-informative reports), the newspaper will refrain from publishing the information.

If the information is false, the *ex post* expected social welfare is:

$$(60\% + 40\% \times 30\%) \times 0 + 40\% \times 70\% \times (-h) = 28\% \times (-h).$$

With a probability of 60%, the investigator will reveal the false nature of the information, thus preventing publication. Also, the information will not be published when the investigator's report is not informative – this will occur with a 40% probability – but by chance the investigator correctly reports that the information is false - this will occur with a 30% probability (conditional on the non-informativeness of the report). Otherwise, the newspaper will publish the false information, leading to a harm, h .

Based upon the previous results, the *ex ante* expected social welfare, given an investment of \$10,000 in verification, is:

$$70\% \times (88\% \times (b - h)) + 30\% \times (28\% \times (-h)) - 10,000 = 61.6\% \times b + 70\% \times (-h) - 10,000$$

Next, consider an investment of \$20,000, with the resulting 80% probability of obtaining solid information. If the information is true, the *ex post* expected social welfare is:

$$(80\% + 20\% \times 70\%) \times (b - h) + 20\% \times 30\% \times 0 = 94\% \times (b - h).$$

If the information is false, the *ex post* expected social welfare is:

$$(80\% + 20\% \times 30\%) \times 0 + 20\% \times 70\% \times (-h) = 14\% \times (-h).$$

Thus, the *ex ante* expected social welfare, given an investment of \$20,000 in verification, is:

$$70\% \times (94\% \times (b - h)) + 30\% \times (14\% \times (-h)) - 20,000 = 65.8\% \times b + 70\% \times (-h) - 20,000$$

By comparing the *ex ante* expected social welfare under the two investment levels, we can easily derive the optimal investment in verification (presuming that verification is itself optimal). If $b > \$238,095$, it is socially optimal to invest \$20,000 in verification. Otherwise, an investment of \$10,000 is optimal.

The above comparison demonstrates that the level of investment in verification affects only the probability of enjoying the social benefit, b . Increasing the investment in verification has no effect on the probability of publication, and thus it has no effect on the probability that the harm, h , will be incurred. This counterintuitive result merits further discussion. Increasing the investment in verification raises the probability of discovering whether the information is true or

⁹ Recall that a non-informative report is as reliable as the original source, and the *ex ante* 70% - 30% ratio dictates the content of the investigator's report.

false. Thus, the probability of making the right publication decision clearly increases with the level of verification. However, increasing the probability of making the *right* publication decision does affect the overall probability of publication. If the information is true, a higher level of investment in verification increases the probability of publication. On the other hand, if the information is false, a higher level of investment in verification reduces the probability of publication. These opposite effects cancel out. Verification has no effect on the overall probability of publication.¹⁰ It does, however, increase the likelihood of a *socially desirable* publication.

We now proceed to compare the expected welfare under the three courses of action: (1) no publication (without verification); (2) publication without verification; and (3) publication (or no publication) based on verification. In the remainder of this example, since the particular level of harm (from the range of possible levels of harm) is less important for our present purpose, we set $h = \$150,000$.

Consider first the scenario where $70\% \times b > 150,000$ or $b > \$214,286$. In this scenario, the choice is between publication without verification and publication (or no publication) based on verification. The strategy of publication without verification yields the expected welfare level $70\% \times b - 150,000$. The expected welfare given the alternative strategy of publication (or no publication) based on verification depends on the optimal level of verification. If $b > \$238,095$, optimal investment in verification is \$20,000, and the corresponding expected social welfare is $65.8\% \times b - 125,000$. Thus, if $\$238,095 < b < \$595,238$, it is optimal to invest \$20,000 in verification, and to base the publication decision on the results of the verification process. And, if $b > \$595,238$, it is optimal to publish the information without further verification. Now, if $b < \$238,095$, optimal investment in verification is \$10,000, and the corresponding expected social welfare is $61.6\% \times b - 115,000$. Thus, if $\$214,286 < b < \$238,095$, it is optimal to invest \$10,000 in verification, and to base the publication decision on the results of the verification process.¹¹

Consider next the scenario where $70\% \times b < 150,000$ or $b < \$214,286$. In this scenario, the choice is between no publication (without verification) and publication (or no publication) based on verification. The strategy of no publication (without verification) yields zero welfare. The expected welfare given the alternative strategy of publication (or no publication) based on verification depends on the optimal level of verification. Since $b < \$214,286 < \$238,095$, optimal investment in verification is \$10,000, and the corresponding expected

¹⁰ More accurately, given that a positive investment in verification is optimal, the precise level of verification has no effect on the overall probability of publication.

¹¹ Given an investment of \$10,000 in verification, verification is socially preferable to publication without verification as long as $b < \$416,667$.

social welfare is $61.6\% \times b - 115,000$. Thus, if $b < \$186,688$, it is optimal to refrain from publication without further verification. And, if $\$186,688 < b < \$214,286$, it is optimal to invest \$10,000 in verification, and to base the publication decision on the results of the verification process. Figure 1 summarizes the socially optimal verification and publication decisions.

*** Insert Figure 1 Here ***

Moving from left to right on the b -axis, for low levels of b , it is optimal to avoid verification and refrain from publication. As the magnitude of the benefit increases, the optimal investment in verification rises to \$10,000 and then to \$20,000, reflecting the increased value of publishing true information. However, moving further to greater levels of b , optimal investment in verification drops back to zero, as the significant benefits from publication outweigh any expected harm from false publication, thus making publication without verification the preferable course of action.

C. Inducing Optimal Verification and Publication Decisions

We now shift our focus from the socially optimal decisions – that is, those decisions that maximize social welfare – to the actual verification and publication decisions likely to be made by the newspaper. To do so, we must first define the relevant elements of the newspaper’s private payoff or profit function. Most importantly, the newspaper cannot capture the entire social benefit from a truthful publication. In addition to transmitting information to readers, a truthful publication produces several positive externalities, such as the contribution to the marketplace of ideas and the improvement of the democratic process. Indeed, information is the quintessential public good; once newspaper readers have obtained the information, they may retransmit it at minimal cost to an unlimited number of additional persons. The newspaper obtains no profit from subsequent uses of the information unless it is transmitted in a form over which the newspaper has copyright protection. Most subsequent uses of information thus lie outside the newspaper’s profit function. We therefore assume that the newspaper enjoys a profit of p if it publishes the information, regardless of whether the information is true or false. We further assume that p is lower than b , the societal benefit enjoyed when the information is true.

The second element that influences the newspaper’s expected profits is the liability regime governing libelous publications. We initially consider a strict liability rule, according to which the newspaper faces a monetary sanction of d whenever the information it publishes turns out to be false.

The newspaper chooses among three plausible courses of action: (1) no publication (and no verification); (2) publication without verification; and (3) publication (or no publication) based on verification. If the newspaper simply ignores the information (no publication), it earns zero profits. If the newspaper

chooses to publish the information without any verification, its expected profits are $p - 30\% \times d$. The third course of action includes verification prior to the publication decision. Accordingly, we must first derive the newspaper's optimal level of verification.

In the present example, the choice is between investing \$10,000 in verification and investing \$20,000 in verification. Consider first an investment of \$10,000, with the resulting 60% probability of obtaining solid information. If the information is true, the *ex post* expected profit (not including verification costs) is:

$$(60\% + 40\% \times 70\%) \times p + 40\% \times 30\% \times 0 = 88\% \times p .$$

The information will be published in two cases. The first case is when the investigation uncovers the true nature of the information. This will occur with a probability of 60%. The second case is when the investigator's report is not informative – this will occur with a 40% probability – but by chance the investigator correctly reports that the information is true – this will occur with a 70% probability (conditional on the non-informativeness of the report). Thus, with probability $60\% + 40\% \times 70\%$, the newspaper will publish the information and enjoy a profit, p . Otherwise, the newspaper will not publish the information.

Following the above logic, if the information is false, the *ex post* expected profit is:

$$(60\% + 40\% \times 30\%) \times 0 + 40\% \times 70\% \times (p - d) = 28\% \times (p - d) .$$

Based upon the previous results, the *ex ante* expected profit, given an investment of \$10,000 in verification, is:

$$70\% \times (88\% \times p) + 30\% \times (28\% \times (p - d)) - 10,000 = 8.4\% \times (-d) + 70\% \times p - 10,000 .$$

Next, consider an investment of \$20,000, with the resulting 80% probability of obtaining solid information. If the information is true, the *ex post* expected profit is:

$$(80\% + 20\% \times 70\%) \times p + 20\% \times 30\% \times 0 = 94\% \times p .$$

If the information is false, the *ex post* expected profit is:

$$(80\% + 20\% \times 30\%) \times 0 + 20\% \times 70\% \times (p - d) = 14\% \times (p - d) .$$

Thus, the *ex ante* expected profit, given an investment of \$20,000 in verification, is:

$$70\% \times (94\% \times p) + 30\% \times (14\% \times (p - d)) - 20,000 = 4.2\% \times (-d) + 70\% \times p - 20,000 .$$

By comparing the *ex ante* expected profit under the two investment levels, we can easily derive the newspaper's verification decision. If $d > \$238,095$, it is optimal for the newspaper to invest \$20,000 in verification. Otherwise, an investment of \$10,000 is optimal.

The above comparison demonstrates that the level of verification affects only the probability that the newspaper will bear the liability cost, d . Increasing the investment in verification has no effect on the probability of publication (it does, however, increase the likelihood of a *liability free* publication), and thus it has no effect on the probability that the newspaper will enjoy the profit, p .

Note the parallel role played by the damage level, d , in the newspaper's private decision, and by the social benefit, b , in the socially optimal choice of

verification. A high level of verification is optimal when $b > \$238,095$, and such a high level of verification will indeed be chosen if $d > \$238,095$. Proposition 3 below builds on the intuition presented here to prove the general result that damages for libel should be set to equal the social benefit (when verification is effective). Since the particular profit level (from the range of possible profit levels) is less important for our present purpose, we set $p = \$50,000$ in the remainder of this example.

We can now proceed to compare the newspaper's expected profit under the three courses of action: (1) no publication (without verification); (2) publication without verification; and (3) publication (or no publication) based on verification. For convenience, we divide the comparison into the following two scenarios. First, we consider the scenario where $p > 30\% \times d$ or $d < \$166,667$. In this scenario, the newspaper will choose between publication without verification and publication (or no publication) based on verification. Since $d < \$166,667 < \$238,095$, optimal investment in verification is \$10,000, and the corresponding expected profit is $8.4\% \times (-d) + 25,000$. Thus, the newspaper will verify the information if and only if $d > \$115,741$.

Consider next the scenario where $p < 30\% \times d$ or $d > \$166,667$. In this scenario, the choice is between no publication (and no verification) and publication (or no publication) based on verification. If $d < \$238,095$, the optimal investment in verification is \$10,000, and the corresponding expected profit is: $8.4\% \times (-d) + 25,000$. Thus, if $d < \$238,095$, verification will always be desirable.¹² If $d > \$238,095$, optimal investment in verification is \$20,000, and the corresponding expected profit is $4.2\% \times (-d) + 15,000$. Thus, the newspaper will verify the information if and only if $d < \$357,143$. Figure 2 summarizes the newspaper's verification and publication decisions.

*** Insert Figure 2 Here ***

Moving from left to right on the d -axis, for low levels of damages, the newspaper will publish the information without verification. As the level of damages increases, the newspaper's optimal investment in verification rises to \$10,000 and then to \$20,000, reflecting the increased sanction accompanying false publication. However, moving further to higher levels of d , the newspaper's optimal investment in verification drops to zero, as the high sanction outweighs any profit and prevents publication even pursuant to verification.

A comparison of optimal versus actual verification and publication decisions (through an examination of figures 1 and 2) completes the informal analysis. When verification is socially effective, *i.e.* when $\$186,688 < b < \$595,238$, it is possible to induce the first best outcome by setting $d = b$, in the range $\$186,688 < b < \$357,143$. When verification is ineffective and it is socially desirable for the

¹² Given an investment of \$10,000 in verification, the newspaper would prefer verification to no publication without verification as long as $d < \$297,619$.

newspaper to publish without verification, *i.e.* when $b > \$595,238$, a low level of damages, $d < \$115,741$ or simply $d = 0$, would induce the optimal outcome. When verification is ineffective and it is socially desirable for the newspaper to refrain from publication without verification, *i.e.* when $b < \$186,688$, a high level of damages, $d > \$357,143$, would induce the optimal outcome. Note that the first best outcome cannot be achieved in the range $\$357,143 < b < \$595,238$. We now turn to designing an optimal liability regime by using a formal model based on assumptions similar to those in the example.

III. FRAMEWORK OF ANALYSIS

Our analysis proceeds within the following framework. A newspaper N is considering whether to publish information pertaining to a certain individual. The information may be either true or false, *i.e.* $i \in \{t, f\}$. Assume that there is an exogenous probability, f , that the information received by the newspaper is true, such that $\Pr(i=t) = f$ and $\Pr(i=f) = 1-f$. If N publishes the information, the individual will suffer a harm of h . Also, if the information is true, its publication will create a social benefit, b .¹³ The newspaper N enjoys a profit of p if it publishes the information, regardless of whether the information is true or false.¹⁴ We assume that $p < b$ to capture the idea that the newspaper cannot capture the full social value of publication.

The newspaper may invest in verifying the content of the information it receives. Formally, N can invest $x \in \mathfrak{R}^+$ and obtain a signal $s \in \{t, f\}$, such that with probability $P(x)$ the signal uncovers the true content of the information, *i.e.*, $s = i$, and with probability $1-P(x)$ the signal is not informative, *i.e.* $\Pr(s=t) = f$ and $\Pr(s=f) = 1-f$. It is natural to assume that $P(0) = 0$; in other words, there is no signal when there is no investment in verification, $x = 0$. Also, as is conventional, we assume that investments in verification suffer from decreasing marginal productivity, *i.e.* $P'(x) > 0$ and $P''(x) < 0$. Also, to avoid corner solutions, we assume $P'(0) \rightarrow \infty$.¹⁵

¹³ The framework can be readily extended to allow for social harm suffered following a false publication.

¹⁴ The framework can be readily extended to allow for different profit levels depending on the *ex post* revealed truthfulness (or falsehood) of the published information. Smaller profits following the publication of false information can represent a reputational loss to the newspaper. Other extensions and alternative specifications are examined in Appendix B.

¹⁵ It is often argued that value of the information is contingent upon its timely publication. This temporal effect can be explicitly modeled by defining the social benefit as a function of time, *i.e.* $b = b(t)$. However, our model, with the constant b , also captures the need for timely publication, but through the specification of the verification technology. Assume that the verification process can always be accelerated albeit with an additional cost. Hence, if timely publication is important, this will translate in our model either to (1) a higher optimal level of

The exogenous probability f can be viewed as the newspaper's prior. If the newspaper decides to invest in verification, it obtains a signal s and updates its prior according to Bayes's rule. If $s = t$, the newspaper's posterior is:

$$\Pr[i = t | s = t] = P(x) + (1 - P(x))f = \left[1 + \frac{1-f}{f} P(x) \right] \cdot f.^{16}$$

The prior f is updated by a multiple of $m(x, f) = 1 + \frac{1-f}{f} P(x)$. Clearly, if $s = t$ the posterior is greater than the prior, and indeed $m(x, f)$ is always larger than one. Also, as can be expected, the amount of updating is increasing in the level of verification, *i.e.* $\frac{\partial m(x, f)}{\partial x} > 0$. Finally, the amount of updating is decreasing in the prior, *i.e.* $\frac{\partial m(x, f)}{\partial f} < 0$. The intuition behind this observation can be best

understood from an analysis of two extreme cases. Consider first the extreme case where the initial information is 100% reliable, namely where $f = 1$. Clearly, there is no room for an upward update of f . Next, consider the extreme case where the initial information is completely unreliable, *i.e.* $f \rightarrow 0$. If a truthful signal is observed, the zero prior can no longer be maintained, hence $m(x, f) \rightarrow \infty$.

If $s = f$, on the other hand, the newspaper's posterior is:

$$\Pr[i = t | s = f] = [1 - P(x)] \cdot f.^{17}$$

The prior f is updated by a multiple of $\tilde{m}(x) = 1 - P(x)$. Clearly, if $s = f$ the posterior is smaller than the prior, and indeed $\tilde{m}(x)$ cannot exceed one. Also, as can be expected the amount of updating (in absolute value) is increasing in the

verification; or, if the verification technology is less effective, to (2) a choice between publication and no publication without verification.

¹⁶ Specifically,

$$\begin{aligned} \Pr[i = t | s = t] &= \frac{\Pr[(i = t) \cap (s = t)]}{\Pr[s = t]} = \frac{\Pr[i = t] \cdot \Pr[s = t | i = t]}{\Pr[s = t]} = \\ &= \frac{f[P(x) + (1 - P(x))f]}{f[P(x) + (1 - P(x))f] + (1 - f)(1 - P(x))f} = P(x) + (1 - P(x))f = \\ &= \left[1 + \frac{1-f}{f} P(x) \right] \cdot f \end{aligned}$$

¹⁷ Specifically,

$$\begin{aligned} \Pr[i = t | s = f] &= \frac{\Pr[(i = t) \cap (s = f)]}{\Pr[s = f]} = \frac{\Pr[i = t] \cdot \Pr[s = f | i = t]}{\Pr[s = f]} = \\ &= \frac{f[(1 - P(x))(1 - f)]}{f[(1 - P(x))(1 - f)] + (1 - f)[P(x) + (1 - P(x))(1 - f)]} = [1 - P(x)] \cdot f \end{aligned}$$

level of verification, i.e. $\frac{\partial \tilde{m}(x)}{\partial x} < 0$. Note that, contrary to $m(x, \mathbf{f})$, $\tilde{m}(x)$ is not a function of the prior \mathbf{f} .

IV. SOCIALLY OPTIMAL VERIFICATION AND PUBLICATION

The newspaper should choose from the following three strategies: (1) invest in verification and publish *if and only if* $s = t$; (2) refrain from any verification and publish the information; and (3) refrain from any verification and not publish the information. Clearly, if investment in verification is socially desirable, then it is optimal to make use of the added information generated by the verification process, and publish *if and only if* $s = t$. If it is optimal to publish regardless of the signal, or not to publish regardless of the signal, then there is no point investing in verification. We now derive the conditions, under which each one of the three strategies is optimal.

If the newspaper invests x in verification, and publishes the information *if and only if* $s = t$, the expected social welfare is

$$W^V(x) = \mathbf{f} \cdot [(P(x) + (1 - P(x)) \cdot \mathbf{f}) \cdot (b - h) + (1 - P(x)) \cdot (1 - \mathbf{f}) \cdot 0] + (1 - \mathbf{f}) \cdot [(P(x) + (1 - P(x)) \cdot (1 - \mathbf{f})) \cdot 0 + (1 - P(x)) \cdot \mathbf{f} \cdot (-h)] - x$$

or

$$W^V(x) = \mathbf{f} \cdot (\mathbf{f} \cdot b - h) + \mathbf{f} \cdot (1 - \mathbf{f}) \cdot b \cdot P(x) - x$$

If the newspaper does not invest in verification, but nevertheless publishes the information, the expected social welfare is $W^P = \mathbf{f} \cdot b - h$. If the newspaper does not invest in verification, and does not publish the information, the expected social welfare is $W^{NP} = 0$. Based on these observations, the following proposition characterizes the socially optimal investment in verification, as well as the socially optimal publishing decision.

Proposition 1: Define \tilde{x} as the level of investment, which satisfies the condition

$$(1) \quad \mathbf{f} \cdot (1 - \mathbf{f}) \cdot b \cdot P'(\tilde{x}) = 1.$$

The optimal investment, x^* , and publishing decision are -

- (i) If $\max\{W^V(\tilde{x}), W^P, W^{NP}\} = W^V(\tilde{x})$, then $x^* = \tilde{x}$ and N should publish the information *if and only if* $s = t$.
- (ii) If $\max\{W^V(\tilde{x}), W^P, W^{NP}\} = W^P$, then $x^* = 0$ and N should publish the information *regardless of the signal* s .
- (iii) If $\max\{W^V(\tilde{x}), W^P, W^{NP}\} = W^{NP}$, then $x^* = 0$ and N should *not* publish the information *regardless of the signal* s .

Remarks: The intuition for this result, which is proved in the appendix, is as follows.

Starting with condition (1), a central observation is that investment in verification does not affect the probability of publication, which is also the probability that harm will occur. This is a phenomenon that we encountered earlier, in the informal analysis of Section II. While a higher investment in verification increases the probability that true information will be published, it also reduces the probability that false information will be published. It turns out that these two effects are of equal magnitude, and thus cancel out.¹⁸ As a result, the overall probability of publication is unaffected by the level of verification.

While the overall probability of publication, and thus also the probability of inflicting harm, is unaffected by the level of verification, the probability of making (*ex post*) correct publication decisions are certainly affected by the newspaper's verification efforts. As the level of investment in verification rises, the probability of publishing true information increases, and the probability of publishing false information decreases. In particular, the probability that true information will be published equals $f \cdot [P(x) + (1 - P(x)) \cdot f]$, where f is the probability that the information is true, $P(x)$ is the probability that an informative signal will obtain and $(1 - P(x)) \cdot f$ is the probability of a correct random signal. A higher investment in verification increases the probability of receiving an informative signal and publishing the true information, but it also reduces the probability receiving a non-informative signal and publishing the true information. Still, the former effect dominates, so that the investment in verification increases the overall probability that true information will be published. The net effect of the level of investment in verification, x , on the probability that true information will be published is $f \cdot (1 - f) \cdot P(x)$. Indeed, the level of investment in verification affects social welfare only by determining the probability that true information will be published, which in turn results in a social benefit of b . As long as the marginal increase in welfare,

¹⁸ Consider the following two cases. First, considering true information, the newspaper will publish the information with probability $f \cdot [P(x) + (1 - P(x)) \cdot f]$, where f is the probability that the information is true, $P(x)$ is the probability that an informative signal will obtain and $(1 - P(x)) \cdot f$ is the probability of a correct random signal. Second, considering false information, the newspaper will publish the information with probability $(1 - f) \cdot (1 - P(x)) \cdot f$, where $1 - f$ is the probability that the information is false and $(1 - P(x)) \cdot f$ is the probability of an incorrect random signal. A higher investment in verification increases the probability of receiving an informative signal and publishing the true information, but it also reduces the probability of receiving a non-informative signal and publishing either true or false information. These effects cancel out, such that overall the investment in verification does not affect the probability that the harm will be incurred. It should be noted, however, that this results depends on our assumptions regarding the verification technology. In particular, we assume symmetric verification in the sense that the verification technology is identical for true information and for false information. With an asymmetric verification technology, the level of verification may affect the overall probability of publication.

$f \cdot (1 - f) \cdot b \cdot P'(x)$, is greater than the marginal cost of verification, 1, the newspaper should increase the level of verification. This result is captured by condition (1), which defines \tilde{x} .

Parts (i)-(iii) of proposition 1 follow immediately from the definitions of $W^V(x)$, W^P and W^{NP} , coupled with the optimality of \tilde{x} , given the social desirability of verification. Part (i) of the proposition states the condition under which it is socially optimal to invest in verifying the information. Part (ii) of the proposition states the condition under which it is socially optimal to publish the information without any verification. Finally, part (iii) of the proposition states the condition, under which it is socially optimal not to publish the information (without verification).

A simple comparative statics exercise based on condition (1) confirms the following intuitions. First, the positive welfare effect of verification increases in the magnitude of the benefits derived from publication of true information, *i.e.* b . Hence, $\frac{\partial \tilde{x}}{\partial b} > 0$. Second, the effect of verification decreases as the prior distribution of true versus false information becomes more informative. In particular, the benefits of verification disappear as f approaches either zero or one, and these benefits are maximal when $f = \frac{1}{2}$, *i.e.* when the prior distribution is completely non-informative. Hence, $|f - \frac{1}{2}| \uparrow \Rightarrow \tilde{x} \downarrow$. Further insight into the implications of proposition 1 are summarized in the following corollaries.

Corollary 1:

- (i) When $f \cdot b > h$, $W^P > W^{NP}$, and thus the choice is between investing in verification and publishing when $s = t$, and not investing at all and publishing the information nevertheless.
- (ii) When $f \cdot b < h$, $W^{NP} > W^P$, and thus the choice is between investing in verification and publishing when $s = t$, and not investing at all and not publishing the information.

Remarks: The proof of *corollary 1* is immediate from proposition 1, in light of the definitions of W^P and W^{NP} . The intuition for this result is as follows.

(i) When the *ex ante* expected benefits from publication, $f \cdot b$, exceed the harm caused by such publication, h , the strategy of publishing without verification dominates the strategy of not publishing (with zero verification). Therefore, the remaining choice is between, on the one hand, verification followed by a publication decision which depends on the results of the verification process, and, on the other hand, publication without verification. The choice between these two strategies depends on the effectiveness of the verification process.

(ii) When the *ex ante* expected benefits from publication, $f \cdot b$, are smaller than the harm caused by such publication, h , the strategy not publishing (with zero

verification) dominates the strategy of publishing without verification. Therefore, the remaining choice is between, on the one hand, verification followed by a publication decision which depends on the results of the verification process, and, on the other hand, simply no publication (without verification). Again, the choice between these two strategies depends on the effectiveness of the verification process.

The optimal verification and publication decisions depend on the benefit from truthful publication, b , on the level of harm, h , and on the *a-priori* probability of truthfulness, f , as described in the following corollary.

Corollary 2: $\exists \underline{b}, \bar{b}$ ($\underline{b} < \bar{b}$) such that -

- (i) $\forall b \in [0, \underline{b}]$ *it is socially optimal to refrain from publication without any verification.*
- (ii) $\forall b \in (\underline{b}, \bar{b})$ *it is socially optimal to verify the information and base the publication decision on the results of the verification process; in this region the optimal level of verification is increasing in b , specifically $\frac{\partial \tilde{x}}{\partial b} = -\frac{P'(\tilde{x})}{b \cdot P''(\tilde{x})} > 0$.*
- (iii) $\forall b \geq \bar{b}$ *it is socially optimal to publish the information without any verification.*

The threshold values, \underline{b} and \bar{b} , are functions of h , satisfying:

$$\frac{\partial \underline{b}}{\partial h} = \frac{1}{f + (1-f)P(\tilde{x})} > 0, \quad \frac{\partial^2 \underline{b}}{\partial h^2} < 0$$

$$\frac{\partial \bar{b}}{\partial h} = \frac{1}{f \cdot (1-P(\tilde{x}))} > 0, \quad \frac{\partial^2 \bar{b}}{\partial h^2} > 0.^{19}$$

Remarks: The proof of *corollary 2* is immediate from proposition 1, in light of the definitions of W^P , W^{NP} and $W^V(x)$. The intuition for this result is based on the preceding observations.²⁰

The results stated in corollary 2 are represented graphically in figures 3 and 4.

*** Insert Figure 3 Here ***

*** Insert Figure 4 Here ***

¹⁹ The threshold values, \underline{b} and \bar{b} , are also functions of f . The functional relationship between the threshold values and f is, however, more subtle and less instructive.

²⁰ Threshold values similar to \underline{b} and \bar{b} can be derived on the h dimension as well as on the f dimension. However, the b dimension is of special interest, as explained below.

V. THE NEWSPAPER'S PROBLEM

Section V studies the newspaper's verification and publication decisions under a regime of strict liability. Under strict liability, when N decides to publish information, it faces a monetary sanction of d if the published information turns out to be false.²¹ We assume that courts are able to determine, *ex post*, the value of i , and that they can therefore implement the strict liability rule. Note that this is not a standard strict liability rule. While we assume that harm is caused even by a truthful publication, the newspaper is liable only if the information turns out to be false. Yet, the rule we examine is akin to strict liability in the sense that courts are not required to set a standard of care, which in the present framework would correspond to a due level of verification. Thus, assuming that *ex post* it becomes apparent whether the information is true or false, the implementation of the proposed rule should be as simple as the implementation of a standard strict liability rule.²²

The newspaper will choose from the following three strategies: (1) invest in verification and publish *if and only if* $s = t$; (2) refrain from any verification and publish the information; and (3) refrain from any verification and not publish the information. Clearly, if investment in verification is optimal for the newspaper, it will use the added information generated by the verification process, and publish *if and only if* $s = t$. If it is optimal for the newspaper to publish regardless of the signal, or not to publish regardless of the signal, then it will not invest in verification. We now derive the conditions under which the newspaper will choose each one of the three strategies.

If the newspaper invests x in verification, and publishes the information *if and only if* $s = t$, its expected profits are

$$\begin{aligned} \Pi^V(x) = & \mathbf{f} \cdot [(P(x) + (1 - P(x)) \cdot \mathbf{f}) \cdot \mathbf{p} + (1 - P(x)) \cdot (1 - \mathbf{f}) \cdot 0] + \\ & + (1 - \mathbf{f}) \cdot [(P(x) + (1 - P(x)) \cdot (1 - \mathbf{f})) \cdot 0 + (1 - P(x)) \cdot \mathbf{f} \cdot (\mathbf{p} - d)] - x \end{aligned}$$

or

$$\Pi^V(x) = \mathbf{f} \cdot (\mathbf{p} - (1 - \mathbf{f}) \cdot d) + \mathbf{f} \cdot (1 - \mathbf{f}) \cdot d \cdot P(x) - x$$

If the newspaper does not invest in verification, but nevertheless publishes the information, its expected profits are $\Pi^P = \mathbf{p} - (1 - \mathbf{f}) \cdot d$. If the newspaper does not invest in verification, and does not publish the information, its expected profits are $\Pi^{NP} = 0$. Based on these observations, the following proposition characterizes the

²¹ The newspaper may also suffer an extra-legal, reputational sanction following the publication of false information. The analysis can be readily adjusted to allow for this possibility. All that is needed is to subtract the monetary equivalent of the extra-legal sanction from the optimal damage award derived below.

²² Standard strict liability cannot achieve the first best in the present context. See Section VI, *infra*. Moreover, in allowing for liability, which is contingent on the *ex post* verifiable truthfulness of the information, we follow existing legal doctrine.

newspaper's verification and publishing decisions, as a function of the damage measure, d .

Proposition 2: Define \tilde{x}^N as the level of investment, which satisfies the condition

$$(2) \quad f \cdot (1-f) \cdot d \cdot P'(\tilde{x}^N) = 1.$$

The newspaper's investment in verification, x^N , and publishing decision are as follows.

- (i) If $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^V(\tilde{x}^N)$, then $x^N = \tilde{x}^N$ and N will publish the information if and only if $s = t$.
- (ii) If $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^P$, then $x^N = 0$ and N will publish the information regardless of the signal s .
- (iii) If $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^{NP}$, then $x^N = 0$ and N will not publish the information regardless of the signal s .

Remarks: The intuition for this result, which is proved in the appendix, is as follows.

Starting with condition (2), a central observation is that investment in verification does not affect the probability of publication, which is also the probability that the newspaper will make a profit. As explained in the remarks following proposition 1, a higher investment in verification increases the probability that true information will be published, but it also reduces the probability that false information will be published. It turns out that these two effects are of equal magnitude, and thus cancel out. As a result, the overall probability of publication is unaffected by the level of verification.

While the overall probability of publication, and thus also the probability that the newspaper will make a profit, is unaffected by the level of verification, the probability that the newspaper will make (*ex post*) correct publication decisions is undoubtedly affected by its verification efforts. As the level of investment in verification rises, the probability of publishing true information increases, and the probability of publishing false information decreases. Indeed, verification efforts affect the newspaper's expected profits only by reducing the probability that false information will be published leading to a damage payment of d . As long as the marginal increase in profits, $f \cdot (1-f) \cdot d \cdot P'(x)$, is greater than the marginal cost of verification, 1, the newspaper will increase the level of verification. This result is captured by condition (2), which defines \tilde{x}^N .

Parts (i)-(iii) of proposition 2 follow immediately from the definitions of $\Pi^V(x)$, Π^P and Π^{NP} , coupled with the optimality of \tilde{x}^N , given that verification is optimal for the newspaper. Part (i) of the proposition states the condition under which the newspaper will invest in verifying the information. Part (ii) of the proposition states the condition, under which the newspaper will publish the information without any verification. Finally, part (iii) of the proposition states

the condition under which the newspaper will not publish the information (without verification).

A simple comparative statics exercise based on condition (2) confirms the following intuitions. First, the profit-enhancing effect of verification increases in the magnitude of the damage award, d . Hence, $\frac{\partial \tilde{x}^N}{\partial d} > 0$. Second, the effect of verification decreases as the prior distribution of true versus false information becomes more informative. In particular, the benefits of verification to the newspaper disappear as f approaches either zero or one, and these benefits are maximal when $f = \frac{1}{2}$, *i.e.*, when the prior distribution is completely non-informative. Hence, $|f - \frac{1}{2}| \uparrow \Rightarrow \tilde{x}^N \downarrow$. Further insights into the implications of proposition 2 are summarized in the following corollaries.

Corollary 3:

- (i) *When $p > (1-f) \cdot d$, $\Pi^P > \Pi^{NP}$, and thus the newspaper's choice is between investing in verification and publishing when $s = t$, and not investing at all and publishing the information nevertheless.*
- (ii) *When $p < (1-f) \cdot d$, $\Pi^{NP} > \Pi^P$, and thus the newspaper's choice is between investing in verification and publishing when $s = t$, and not investing at all and not publishing the information.*

Remarks: The proof of *corollary 3* is immediate from proposition 2, in light of the definitions of Π^P and Π^{NP} . The intuition for this result is as follows.

(i) When the its profits from publication, p , exceed the expected amount of damages that the newspaper faces given publication of unverified information, $(1-f) \cdot d$, the strategy of publishing without verification dominates the strategy of not publishing (with zero verification). Therefore, the remaining choice is between verification followed by a publication decision, which depends on the results of the verification process, and publication without verification. The choice between these two strategies depends on the effectiveness of the verification process.

(ii) When the newspaper's profits from publication, p , are smaller than the expected amount of damages that it faces given publication of unverified information, $(1-f) \cdot d$, the strategy of not publishing (with zero verification) dominates the strategy of publishing without verification. Therefore, the remaining choice is between verification followed by a publication decision (which depends on the results of the verification process), and simply not publishing (without verification). The choice between these two strategies depends on the effectiveness of the verification process.

As described in the following corollary, the newspaper's verification and publication decisions depend on the damages from false publication, d , on the profit level, \mathbf{p} , and on the *a-priori* probability of truthfulness, \mathbf{f} .

Corollary 4: $\exists \underline{d}, \bar{d}$ ($\underline{d} < \bar{d}$) such that -

- (i) $\forall d \in [0, \underline{d}]$ the newspaper will publish the information without any verification.
- (ii) $\forall d \in (\underline{d}, \bar{d})$ the newspaper will verify the information and base its publication decision on the results of the verification process; in this region the newspaper's privately optimal level of verification is increasing in d , specifically $\frac{\partial \tilde{x}^N}{\partial d} = -\frac{P'(\tilde{x}^N)}{dP''(\tilde{x}^N)} > 0$.
- (iii) $\forall d > \bar{d}$ the newspaper will refrain from publishing the information without any verification.

The threshold values, \underline{d} and \bar{d} , are functions of \mathbf{p} satisfying:

$$\frac{\partial \bar{d}}{\partial \mathbf{p}} = \frac{1}{(1-\mathbf{f})(1-P(\tilde{x}^N))} > 0, \quad \frac{\partial^2 \bar{d}}{\partial \mathbf{p}^2} > 0$$

$$\frac{\partial \underline{d}}{\partial \mathbf{p}} = \frac{1}{(1-\mathbf{f}) + \mathbf{f} \cdot P(\tilde{x}^N)} > 0, \quad \frac{\partial^2 \underline{d}}{\partial \mathbf{p}^2} < 0.^{23}$$

Remarks: The proof of *corollary 4* is immediate from proposition 2, in light of the definitions of Π^P , Π^{NP} and $\Pi^V(x)$. The intuition for this result is based on the preceding observations.²⁴

The results stated in corollary 4 are represented graphically in figures 5 and 6.

*** Insert Figure 5 Here ***

*** Insert Figure 6 Here ***

VI. INDUCING OPTIMAL VERIFICATION AND PUBLICATION DECISIONS

Section VI explores an optimal regime of liability for libel.²⁵ It demonstrates that a no fault regime may be designed to induce optimal behavior for a wide class

²³ The threshold values, \underline{d} and \bar{d} , are also functions of \mathbf{f} . The functional relationship between the threshold values and \mathbf{f} is, however, more subtle and less instructive.

²⁴ Threshold values similar to \underline{d} and \bar{d} can be derived on the \mathbf{p} dimension as well as on the \mathbf{f} dimension. As explained below, however, the d dimension is of special interest.

²⁵ Actually, as shown in section VII, our approach can be interpreted as requiring relatively small adjustments relative to current libel doctrine. Thus, the analysis can be viewed as

of cases. We first show, in subsection A, that setting damages equal to harm, as current doctrine requires, cannot achieve the socially desirable outcome. We further demonstrate that any one-dimensional damage measure cannot achieve the first-best outcome. Then, in subsection B, we proceed to derive a dual-damage strict liability rule that can induce socially optimal behavior on both verification and publication dimensions.

A. One-Dimensional Damages Measures

We first demonstrate that the traditional liability rule, which sets a damage award equal to harm whenever the published information turns out to be false, cannot achieve the first best outcome.

Proposition 3: *A liability rule that sets $d = h$, induces the following inefficient outcomes:*

- (i) *If the verification process is effective, i.e. $x^* = \tilde{x}$ and $x^N = \tilde{x}^N$, then $d = h$ leads to sub-optimal verification when $h < b$, and to excessive verification when $h > b$.*
- (ii) *If the verification process is ineffective, i.e. $x^* = 0$, then*
 - *if $f \cdot b > h$, then $d = h$ can lead to excessive verification and to insufficient publication;*
 - *if $f \cdot b < h$, then $d = h$ can lead to excessive verification and to excessive publication.*

Remarks: The intuition for this result, whose proof follows immediately from a comparison of the results stated in propositions 1 and 2, is as follows.

(i) When the verification process is effective, it is socially optimal to invest \tilde{x} in verification, and to publish the information *if and only if* the verification process confirms the information (proposition 1(i)). Since the verification process is effective, the newspaper will invest in verification and publish the information *if and only if* the verification process confirms the information (proposition 2(i)), but the newspaper's investment will be \tilde{x}^N . Comparing conditions (1) and (2), it is clear that when $d = h$, $\tilde{x}^N = \tilde{x}$ *if and only if* $b = h$. Moreover, if the harm is smaller than the social benefit, *i.e.*, $h < b$ then the newspaper will invest too little in verification, *i.e.* $\tilde{x}^N < \tilde{x}$, and if the harm is larger than the social benefit, *i.e.*, $h > b$, then the newspaper will invest excessively in verification, *i.e.* $\tilde{x}^N > \tilde{x}$.

(ii) When the verification process is ineffective, it is socially desirable to refrain from verification. Instead, it is desirable to base the publication decision on a comparison between the expected benefit from publication and the harm caused by publication (proposition 1, parts (ii) and (iii)). However, if damages are set equal to harm, and the harm is sufficiently large, the newspaper may be induced

providing a theoretical foundation for the existing law (subject to several aspects where the law can still be improved).

to invest in verification. Moreover, even if the newspaper does not invest in verification, its publications decisions will generally be distorted. If the harm is sufficiently large, the newspaper may fear liability and refrain from publication, even when the expected benefit from publication is greater than the harm. Conversely, when the magnitude of the harm is low, the newspaper may publish the information, even when the relatively small harm is still greater than the expected benefit from publication.

While proposition 3 focuses on the traditional one-dimensional damage measure, $d = h$, its logic clearly extends to any one-dimensional damage measure. The complexity of the libel problem renders such an inflexible rule inadequate. As emphasized above, the combination of positive and negative externalities in the libel context require legal intervention to control two decisions, the verification decision and the publication decision. A single damage measure cannot induce optimal behavior on both the verification and publication dimensions.

B. Optimal Liability for Libel

Having confirmed that setting damages to equal harm (or to any other one-dimensional measure) cannot induce optimal behavior, we now proceed to characterize the optimal liability regime.

Proposition 4: *Socially optimal verification and publication can be induced using the following liability regime:*

- (i) *If the verification process is effective (both socially and privately), i.e. $x^* = \tilde{x}$ and $x^N = \tilde{x}^N$, then the damage award should be set to equal the benefits from truthful publication, i.e. $d = b$.*
- (ii) *If the verification process is ineffective, i.e. $x^* = 0$, then the damage award should be set to equal $d = \frac{P}{1-f} + a \cdot (h - f \cdot b)$, where $a > 0$, or alternatively*
 - *if $f \cdot b > h$, then no damages should be awarded, i.e. $d = 0$;*
 - *if $f \cdot b < h$, then the damage award should be set sufficiently high to ensure $\max \{ \Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP} \} = \Pi^{NP}$.*

Remarks: The intuition for this result, which is proved in the appendix, is as follows.

(i) If the verification process is sufficiently effective, then it is both socially optimal and privately profitable for the newspaper to verify the information, and to condition publication on the results of the verification process (namely to publish *if and only if* $s = \dagger$). Given that verification is profitable for the newspaper, the condition $d = b$ guarantees that the newspaper will choose the optimal level of investment in verification, $x^N = \tilde{x}^N = \tilde{x} = x^*$. Formally, this last result follows

directly from the identity between conditions (1) and (2), which is achieved by substituting $d = b$ into condition (2).

The intuition behind the ‘damages equal to benefit’ result can be explained as follows. Verification is socially desirable to the extent that it increases the probability of enjoying b . In other words, the social role of verification is to reduce the probability that true information will not be published. Thus, the social effect of verification is given by $f \cdot [(1 - P(x)) \cdot (1 - f)] \cdot b$, where f is the *ex ante* probability that the information is true and $[(1 - P(x)) \cdot (1 - f)]$ is the probability that a non-informative report will prevent publication.

Similarly, verification is privately profitable to the newspaper to the extent that it reduces the probability that d will be incurred. Put differently, the private effect of verification is to reduce the probability that false information will be published. Thus, the private effect of verification is given by $(1 - f) \cdot [(1 - P(x)) \cdot f] \cdot d$, where $(1 - f)$ is the *ex ante* probability that the information is false and $[(1 - P(x)) \cdot f]$ is the probability that a non-informative report will lead the newspaper to publish this false information.

Comparing the social effect of verification, $f \cdot [(1 - P(x)) \cdot (1 - f)] \cdot b$, and the private effect of verification, $(1 - f) \cdot [(1 - P(x)) \cdot f] \cdot d$, it is clear that the investment in verification affects the probability of enjoying b in the social optimization problem in precisely the same way that it affects the probability of incurring d in the newspaper’s optimization problem.

(ii) If the verification process is ineffective, then it will often be both socially and privately (for the newspaper) optimal not to verify the information. Still, given zero verification, the question remains: should the newspaper publish the information? If $f \cdot b > h$, it is socially optimal for the newspaper to publish the information (without verification) (proposition 1(ii) and corollary 1(i)). The newspaper will publish the information (without verification), if $p - (1 - f) \cdot d > 0$

or $d < \frac{P}{1 - f}$ (proposition 2(ii) and corollary 2(i)). Setting the damage award equal

to $d = \frac{P}{1 - f} + a \cdot (h - f \cdot b)$ guarantees that $d < \frac{P}{1 - f}$ whenever $f \cdot b > h$. A similar

result can be achieved by including an exemption from liability, i.e. $d = 0$, when the expected benefits from publication outweigh the resulting harm and verification is ineffective.

If $f \cdot b < h$, it is socially optimal for the newspaper to refrain from publication (without verification) (proposition 1(iii) and corollary 1(ii)). The newspaper will not publish the information (without verification), if

$p - (1 - f) \cdot d < 0$ or $d > \frac{P}{1 - f}$ (proposition 2(iii) and corollary 2(ii)). Setting the

damage award equal to $d = \frac{p}{1-f} + a \cdot (h - f \cdot b)$ guarantees that $d > \frac{p}{1-f}$ whenever $f \cdot b < h$.

The liability regime set forth in proposition 4 may often achieve the first-best outcome with respect to both verification and publication decisions. It must be recognized, however, that the proposed regime will not always achieve the first-best outcome. The results stated in proposition 4 are conditional on the premise that when verification is effective it will be both socially and privately optimal to invest in verification, and conversely that when verification is ineffective it will be both socially and privately optimal not to invest in verification. But this premise may not always be valid. For example, when damages equal the social benefit from publication, it is possible that, while verification is socially desirable, the newspaper will find it privately optimal not to publish the story (without verification).²⁶ Nevertheless, since both the social and the private utility from verification depend on a common factor, the effectiveness of the verification process, the proposed liability regime will generally induce the first-best outcome.

VII. DOCTRINAL IMPLICATIONS

The systematic analysis of liability for libel sheds new light on existing libel doctrine and may identify potential avenues for legal reform. While putting forward a detailed proposal for reform is beyond the scope of this paper, this section outlines several doctrinal implications of our model.

It is useful to begin by comparing the current law of libel to our model of the optimal libel regime. Current libel doctrine is based on a distinction between true and false information.²⁷ The law provides a complete defense for the publication of truthful information, however harmful (or beneficial) this information turns out to be. Next, and focusing on false information, the law distinguishes between information pertaining to public figures (or public issues) and information pertaining to private figures (or private issues).²⁸ This distinction determines the

²⁶ This may happen if the social benefit from publication, and accordingly also the damage measure, are very large compared to the newspaper's profits from publication. On the other hand, if the social benefit from publication, and accordingly also the damage measure, are small compared to the newspaper's profits from publication, the newspaper may publish the story without verification, when it is socially optimal to invest in verification. However, since presumably the newspaper's profits are positively correlated with the benefit from publication, the proposed regime will generally induce the first-best outcome.

²⁷ Clearly, we do not claim to provide a complete account of the law of libel. We only sketch the main contours of the doctrine to facilitate a comparison with our proposed regime.

²⁸ The doctrinal distinctions here are much more subtle. See text accompanying notes 30-33, *infra*.

severity of the fault required as a precondition for the imposition of liability. While negligence is sufficient in the “private” category,²⁹ “actual malice” is required in the “public” category. Of course, whenever liability is imposed, the damage award equals the harm caused by the false publication. The diagram presented in figure 7 summarizes the main features of current libel doctrine.

*** Insert Figure 7 Here ***

Even without going beyond the contours of current doctrine, the framework developed in this paper may assist courts in applying existing law. As noted above, the main distinction drawn by the current libel doctrine is the public – private distinction. However, the courts have been struggling to understand the true essence of this distinction. The *Sullivan* court stressed the distinction between public figures and private figures. This distinction was soon refined in *Curtis Publishing*³⁰ where the Court differentiated between official public figures (for whom the “actual malice” requirement applies) and non-official public figures (for whom a “gross negligence” standard is sufficient). The plurality opinion in *Rosenbloom v. Metromedia, Inc.*³¹ then deviated from the public figure – private figure distinction, placing more weight on the question whether the information pertains to matters of public concern (even when not concerning public figures). In *Gertz v. Robert Welch, Inc.*³² the Court repudiated the *Rosenbloom* holding shifting the focus back to the distinction between public figures and private figures. Later on the Court ruled that “limited-purpose public figure” is sufficient to trigger the “actual malice” requirement.³³

This paper’s analysis can provide some guidance to the courts in their attempt to delineate the proper boundary between “public” and “private”. Our analysis has shown that the most important parameter, from a social perspective, is the benefit from truthful publication, *b*. Generally, this benefit will be greater when the information pertains to public figure and/or public issues, but there may be exceptions. Adopting the benefit test may promote coherence in the application of the current law.

The benefit test may indeed assist courts in the application of libel doctrine as it currently stands. However, the analysis presented in this paper suggests that a more fundamental reform in libel law may be warranted. While a key step under current doctrine is the public – private distinction, the main step in our regime focuses on the effectiveness of the verification process. When the verification process is effective, our model imposes damages equal to the benefit from truthful publication. When verification is ineffective, our model chooses between no

²⁹ In *Gertz v. Robert Welch, Inc.*, 418 U.S. 323 (1974) the Court rules that strict liability is unconstitutional even in the “private” category.

³⁰ *Curtis Publishing Co. v. Butts and Associated Press v. Walker*, 388 U.S. 130 (1967).

³¹ 403 U.S. 29 (1971) (Brennan, J.).

³² 418 U.S. 323 (1974).

³³ *Time, Inc. v. Firestone*, 424 U.S. 448 (1976).

liability (or zero damages) and high damages, according to the magnitude of the benefit from truthful publication. The diagram presented in figure 8 summarizes the main features of the proposed regime.

*** Insert Figure 8 Here ***

Comparing figures 7 and 8 it might seem that our model ventures far away from current law. The proposed liability regime indeed departs from current libel doctrine in several key dimensions. Nevertheless, the distance between our proposal and the current state of the law is not as large as it may first seem. In fact, with an appropriate definition of the “private” category,³⁴ figure 8 can be redrawn as follows:

*** Insert Figure 9 Here ***

Comparing figures 7 and 9, our proposal can be viewed as following current law not only in the first true – false distinction but also in the second public – private distinction. Nevertheless, the required reform is still substantial. First, we dispense of the fault requirement in the “private” category. Second, in the “public” category, we replace the “actual malice” test with the verification question. And, finally, when verification is effective, we advocate a seemingly revolutionary damage measure, namely setting damages equal to the benefit (from truthful publication) rather than to the harm.³⁵

VIII. CONCLUSION

This paper studies the optimal liability regime for libel. Existing literature has generally recognized that the nature of speech as a public good might produce overdeterrence of publishers. By explicitly considering the two distinct decisions faced by publishers – the verification and the publication decisions – our model demonstrates that the incentives faced by publishers are far more complicated than previously acknowledged. While publishers will be over-cautious in their

³⁴ In particular, we define the “private” category as including information the publication of which can be (and should be) deterred by setting damages equal to harm. This reinterpretation of our proposed liability regime assumes that damages equal to harm are sufficiently high to prevent publication, without verification, whenever such inaction is socially optimal. Clearly, this will be the case for information with a relatively high h and a relatively low b . Note also the close relationship between information covered by our “private” category and the type of information that falls into the domain of privacy law.

³⁵ But, is this finding that damages should be set equal to the benefit from truthful publication really surprising? Comparing our libel analysis with conventional economic analysis of torts, publication of false information may be viewed as the tortuous act and verification as the means of exercising precaution. Taking this broader perspective, the social harm caused by the tortuous act, *i.e.* by publication of false information, is the lost benefit from truthful publication. If the point of reference is taken to be truthful publication, the social loss from publishing false information instead is exactly b (recall that h is incurred regardless of the truthfulness of the published information).

publication decisions, they will tend to under-invest in verifying the accuracy of the stories they publish.

The model developed in this paper provides several findings concerning the optimal libel regime. First, a regime based on a single damages measure cannot ensure both optimal verification and optimal publication decisions. Furthermore, as a matter of theory, inducing publishers to exercise socially optimal verification might require courts, under certain circumstances, to set damages to equal the social benefits produced by a truthful publication. Finally, a key step in implementing the optimal regime we derive in this paper is inquiring about the effectiveness of verification prior to publication. Turning these findings into practical legal rules is undoubtedly a difficult task. Nevertheless, the insights provided by our model can play a valuable role in any attempt to reform the puzzling jurisprudence of libel.

APPENDIX A - PROOFS

Appendix A collects the proofs of the propositions that were presented in the paper.

Proof of Proposition 1:

Condition (1), which defines the optimal investment in verification, when verification is socially desirable, is simply the FOC of the optimization problem $\max_x W^V(x)$, where $W^V(x) = \mathbf{f} \cdot (\mathbf{f} \cdot b - h) + \mathbf{f} \cdot (1 - \mathbf{f}) \cdot b \cdot P(x) - x$. Given the optimal non-zero level of verification, \tilde{x} , the corresponding expected social welfare, $W^V(\tilde{x})$, can be compared with W^P and W^{NP} to determine the overall optimal verification and publication decisions. QED

Proof of Proposition 2:

Condition (2), which defines the optimal investment in verification, when verification is indeed profitable for the newspaper, is simply the FOC of the optimization problem $\max_x \Pi^V(x)$, where

$$\Pi^V(x) = \mathbf{f} \cdot (\mathbf{p} - (1 - \mathbf{f}) \cdot d) + \mathbf{f} \cdot (1 - \mathbf{f}) \cdot d \cdot P(x) - x.$$

Given the optimal non-zero level of verification, \tilde{x}^N , the corresponding expected profits, $\Pi^V(\tilde{x}^N)$, can be compared with Π^P and Π^{NP} to determine the newspaper's verification and publication decisions. QED

Proof of Proposition 3:

(i) If $x^* = \tilde{x}$ and $x^N = \tilde{x}^N$, the liability regime need only ensure that $\tilde{x} = \tilde{x}^N$. Comparing conditions (1) and (2), it is clear that setting $d = b$ guarantees $\tilde{x} = \tilde{x}^N$.

(ii) If $x^* = x^N = 0$, it remains to ensure optimal publication decisions. If $f \cdot b > h$, it is socially optimal to publish (without verification). Setting $d = \frac{P}{1-f} + a \cdot (h - f \cdot b)$ guarantees that $d < \frac{P}{1-f}$ or $p - (1-f) \cdot d > 0$, which by proposition 2(ii) and corollary 2(i) ensure an optimal publication decision. Clearly, setting $d = 0$ also guarantees that $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^P$. If $f \cdot b < h$, it is socially optimal not to publish (without verification). Setting $d = \frac{P}{1-f} + a \cdot (h - f \cdot b)$ guarantees that $d > \frac{P}{1-f}$ or $p - (1-f) \cdot d < 0$, which by proposition 2(iii) and corollary 2(ii) ensure an optimal publication decision. Clearly, setting a sufficiently high d , whenever $f \cdot b < h$, also guarantees that $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^{NP}$. The positive constant a should be calibrated to ensure that the newspaper will not find it (privately) optimal to invest in verification. QED

APPENDIX B – ALTERNATIVE SPECIFICATIONS

In this appendix we reexamine some of our underlying assumptions, and explore several variations on our basic setup. We begin with an analysis of traditional strict liability. We next consider the case where only true information causes harm. Finally, we analyze the case where only false information causes harm.

1. Traditional Strict Liability

Following existing doctrine, we have restricted liability for libel to false publications. We now examine the standard strict liability rule, under which damages are set equal to harm, regardless of whether the published information turns out to be true or false. As explained below, this rule cannot achieve the first best.

Under a traditional strict liability rule, a newspaper that publishes a certain story receives a certain profit, p , and is subject to a certain liability cost, h . The newspaper will compare these two values, and base its publication decision on this comparison. If $p > h$, the newspaper will publish the information without any verification; and if $p < h$, the newspaper will not publish the information (without any verification). Note that verification is worthless to the newspaper, since neither its profits nor its liability cost are contingent on the truthfulness of the story. Hence, when verification is socially desirable, we cannot count on the traditional strict liability rule. Further, note that while the newspaper completely internalizes the social cost of its actions, it does not capture the entire benefit, b ,

generated by its actions. Therefore, the standard strict liability rule cannot even induce an optimal publication decision.

Formally, under the standard strict liability rule, if the newspaper invests x in verification, and publishes the information *if and only if* $s = t$, its expected profits are:

$$\begin{aligned} \Pi^V(x) = & \mathbf{f} \cdot [(P(x) + (1 - P(x)) \cdot \mathbf{f}) \cdot (\mathbf{p} - d) + (1 - P(x)) \cdot (1 - \mathbf{f}) \cdot 0] + \\ & + (1 - \mathbf{f}) \cdot [(P(x) + (1 - P(x)) \cdot (1 - \mathbf{f})) \cdot 0 + (1 - P(x)) \cdot \mathbf{f} \cdot (\mathbf{p} - d)] - x \end{aligned}$$

or

$$\Pi^V(x) = \mathbf{f} \cdot (\mathbf{p} - d) - x$$

If the newspaper does not invest in verification, but nevertheless publishes the information, its expected profits are $\Pi^P = \mathbf{p} - d$. If the newspaper does not invest in verification, and does not publish the information, its expected profits are $\Pi^{NP} = 0$. Based on these observations, the following proposition characterizes the newspaper's verification and publishing decisions, when damages are set equal to harm, *i.e.*, when $d = h$.

Proposition B.1: *A liability rule, which sets $d = h$ not only when the published information turns out to be false, but also when it turns out to be true, induces the following inefficient outcomes:*

- (i) *If $\mathbf{p} > h$, the newspaper will publish the information without any verification.*
- (ii) *If $\mathbf{p} < h$, the newspaper will not publish the information (without any verification).*

Remark: The intuition for this result, whose proof is immediate from the preceding observations, is as follows. For the newspaper, publication entails the following: (1) a certain profit, \mathbf{p} ; and (2) a certain liability cost, h . The newspaper will compare these two values, and base its publication decision on this comparison. Note that verification is worthless to the newspaper, since neither its profits nor its liability cost are contingent on the truthfulness of the story. Further, note that while the newspaper completely internalizes the social cost of its actions, it does not capture the entire benefit, b , generated by its actions. Therefore, the standard strict liability rule cannot achieve the first-best outcome.

It can be argued, however, that the traditional strict liability rule, when properly modified, and supplemented with an appropriate subsidy for verification, can achieve the socially desirable outcome.³⁶ First, to induce an optimal publication decision the damage measure must ensure that publication is privately optimal for the newspaper if and only if it is socially optimal. Now publication is socially desirable if and only if the expected benefit from publication, \bar{b} , exceeds the harm, h . We have seen that setting the damage

³⁶ We are grateful to Steven Shavell for pointing out this possibility.

measure equal to the harm, h , fails to induce optimal publication decisions. But, if damages are set at $d = \frac{p}{b} \cdot h$, then the newspaper will publish if and only if $p > \frac{p}{b} \cdot h$, i.e. if and only if $\bar{b} > h$. We have thus guaranteed an optimal publication decision.

Unfortunately, the above adjustment of the damage measure is not as simple as it may seem. The expected benefit from publication, \bar{b} , is a function of the socially optimal level of verification. If no verification is optimal, then \bar{b} is a function of the prior f , namely $\bar{b} = f \cdot b$. If, on the other hand, a positive level of verification is socially desirable, then \bar{b} is a function of the posterior formed by Bayesian updating following verification. Therefore, \bar{b} , and the adjusted damage measure, cannot be calculated without an explicit derivation of the optimal verification level. It would seem unreasonable to subject courts to the demanding task of finding the socially optimal level of verification. Moreover, if courts are asked to calculate the optimal level of verification, they might as well apply a negligence rule. Finally, since the optimal posterior cannot be formed without optimal verification actually taking place, optimal publication cannot be achieved without first guarantying optimal verification.

We thus turn to the problem of inducing an optimal verification decision. One way to achieve optimal verification is to apply a negligence rule, as suggested above. Alternatively, can a subsidy be designed to align the private and the social gains from verification? At least a standard subsidy will not do the trick. When a positive level of verification is socially desirable, then we know from Proposition 1 that the social gain from verification is $f \cdot (1-f) \cdot b \cdot P(x)$. If the newspaper had something to gain from verification, say $g \cdot P(x)$, then a subsidy of $1 - \frac{g}{f \cdot (1-f) \cdot b}$ per dollar investment in verification would induce optimal verification. But, under the traditional strict liability rule there are no private gains from verification.³⁷ We can still induce the newspaper to invest optimally in verification by handing out a sufficiently large lump sum “subsidy” if the optimal verification level is chosen. But, this is merely the inverse of a negligence of a negligence-type scheme. In short, there is no simple way of adjusting the traditional strict liability rule so that it will achieve the socially desirable outcome.

³⁷ If no verification is socially optimal, we have no problem.

2. Only True Information Causes Harm

It seems that publication of libelous information generally causes harm regardless of whether the story is true or false. This understanding has dictated our assumption regarding the infliction of harm following publication. Nevertheless, it may be argued that true information is more harmful, perhaps since false stories can be more easily rebutted. This hypothesis is captured by Lord Mansfield's famous maxim, "the greater the truth the greater the libel" (as cited in Keeton et al. (1984), p. 840). Therefore, we now examine the case where publication causes harm only if the story is actually true.

First note that since both the benefit and the harm from publication accrue only in case the information turns out to be true, the optimal publication decision depends on the relative magnitudes of b and h . If $b > h$ it is optimal to publish, and if $b < h$ it is optimal to refrain from publication. Interestingly, verification is never optimal if harm only results from truthful publications.

Formally, if the newspaper invests x in verification, and publishes the information *if and only if* $s = t$, the expected social welfare is:

$$W^V(x) = f \cdot [(P(x) + (1 - P(x)) \cdot f) \cdot (b - h) + (1 - P(x)) \cdot (1 - f) \cdot 0] + \\ + (1 - f) \cdot [(P(x) + (1 - P(x)) \cdot (1 - f)) \cdot 0 + (1 - P(x)) \cdot f \cdot 0] - x$$

or

$$W^V(x) = f \cdot (b - h) \cdot [P(x) + (1 - P(x)) \cdot f] - x$$

or

$$W^V(x) = f^2 \cdot (b - h) + f \cdot (1 - f) \cdot (b - h) \cdot P(x) - x$$

If the newspaper does not invest in verification, but nevertheless publishes the information, the expected social welfare is $W^P = f \cdot (b - h)$. Note that if $b > h$, then $\max\{W^V(\tilde{x}), W^P, W^{NP}\} = W^P$. If the newspaper does not invest in verification, and does not publish the information, the expected social welfare is $W^{NP} = 0$. Note that if $b < h$, then $\max\{W^V(\tilde{x}), W^P, W^{NP}\} = W^{NP}$. Based on these observations, the following proposition characterizes the socially optimal investment in verification, as well as the socially optimal publication decision.

Proposition B.2: *The optimal investment, x^* , and publication decision are -*

- (i) *If $b > h$, then $x^* = 0$ and N should publish the information regardless of the signal s .*
- (ii) *If $b < h$, then $x^* = 0$ and N should not publish the information regardless of the signal s .*

Remark: The proof of this result, as well as its underlying intuition, follow from the preceding observations.

The alternative assumption that only true information causes harm alters the socially optimal verification and publication decisions, as described above. The newspaper's problem, however, remains unchanged, and proposition 2 continues to characterize the newspaper's verification and publication decisions.³⁸ The goal is, therefore, to set damages so as to (i) prevent the newspaper from investing in verification, and (ii) induce optimal publication decisions. This can be achieved with a two-dimensional damage measure. If $b > h$, then no damages should be awarded, *i.e.*, $d = 0$. If $b < h$, then the damage award should be set sufficiently high to ensure that $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^{NP}$. These results are stated formally in the following proposition.

Proposition B.3: *Socially optimal verification and publication can be induced by setting the amount of damages as follows:*

- *If $b > h$, then no damages should be awarded, *i.e.*, $d = 0$;*
- *If $b < h$, then the damage award should be set sufficiently high to ensure that $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^{NP}$.*

Remark: The proof of this result, as well as its underlying intuition, follow from the preceding observations.

3. Only False Information Causes Harm

We have studied liability for libel when harm occurs regardless of whether the story is true or false, and when only true information causes harm. The remaining possibility is that only false information causes harm.

We begin the analysis by deriving the socially optimal verification and publication decisions in this setting.

If the newspaper invests x in verification, and publishes the information *if and only if* $s = t$, the expected social welfare is

$$W^V(x) = \mathbf{f} \cdot [(P(x) + (1 - P(x)) \cdot \mathbf{f}) \cdot b + (1 - P(x)) \cdot (1 - \mathbf{f}) \cdot 0] + (1 - \mathbf{f}) \cdot [(P(x) + (1 - P(x)) \cdot (1 - \mathbf{f})) \cdot 0 + (1 - P(x)) \cdot \mathbf{f} \cdot (-h)] - x$$

or

$$W^V(x) = \mathbf{f} \cdot [\mathbf{f} \cdot b - (1 - \mathbf{f}) \cdot h] + \mathbf{f} \cdot (1 - \mathbf{f}) \cdot (b + h) \cdot P(x) - x.$$

If the newspaper does not invest in verification, but nevertheless publishes the information, the expected social welfare is $W^P = \mathbf{f} \cdot b - (1 - \mathbf{f}) \cdot h$. If the newspaper does not invest in verification, and does not publish the information, the expected social welfare is $W^{NP} = 0$. Based on these observations, the following proposition characterizes the socially optimal investment in verification, as well as the socially optimal publishing decision.

³⁸ This would not be true if we assume that the occurrence of harm is a precondition for the imposition of liability.

Proposition B.4: Define \tilde{x} as the level of investment, which satisfies the condition

$$(B1) \quad \mathbf{f} \cdot (1 - \mathbf{f}) \cdot (b + h) \cdot P'(\tilde{x}) = 1.$$

The optimal investment, x^* , and publishing decision are as follows:

- (i) If $\max\{W^V(\tilde{x}), W^P, W^{NP}\} = W^V(\tilde{x})$, then $x^* = \tilde{x}$ and N should publish the information if and only if $s = t$.
- (ii) If $\max\{W^V(\tilde{x}), W^P, W^{NP}\} = W^P$, then $x^* = 0$ and N should publish the information regardless of the signal s .
- (iii) If $\max\{W^V(\tilde{x}), W^P, W^{NP}\} = W^{NP}$, then $x^* = 0$ and N should not publish the information regardless of the signal s .

Since harm occurs only if the published story turns out to be false, we consider liability rules, which impose an amount of damages, d , on the newspaper if it published false information.

If the newspaper invests x in verification, and publishes the information if and only if $s = t$, its expected profits are

$$\begin{aligned} \Pi^V(x) = & \mathbf{f} \cdot [P(x) + (1 - P(x)) \cdot \mathbf{f}] \cdot \mathbf{p} + (1 - P(x)) \cdot (1 - \mathbf{f}) \cdot 0] + \\ & + (1 - \mathbf{f}) \cdot [P(x) + (1 - P(x)) \cdot (1 - \mathbf{f})] \cdot 0 + (1 - P(x)) \cdot \mathbf{f} \cdot (\mathbf{p} - d)] - x \end{aligned}$$

or

$$\Pi^V(x) = \mathbf{f} \cdot [\mathbf{p} - (1 - \mathbf{f}) \cdot d] + \mathbf{f} \cdot (1 - \mathbf{f}) \cdot d \cdot P(x) - x.$$

If the newspaper does not invest in verification, but nevertheless publishes the information, its expected profits are $\Pi^P = \mathbf{p} - (1 - \mathbf{f}) \cdot d$. If the newspaper does not invest in verification, and does not publish the information, its expected profits are $\Pi^{NP} = 0$. Based on these observations, the following proposition characterizes the newspaper's verification and publishing decisions, as a function of the damage measure, d .

Proposition B.5: Define \tilde{x}^N as the level of investment, which satisfies the condition

$$(B2) \quad \mathbf{f} \cdot (1 - \mathbf{f}) \cdot d \cdot P'(\tilde{x}^N) = 1.$$

The newspaper's investment in verification, x^N , and publishing decision are as follows:

- (i) If $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^V(\tilde{x}^N)$, then $x^N = \tilde{x}^N$ and N will publish the information if and only if $s = t$.
- (ii) If $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^P$, then $x^N = 0$ and N will publish the information regardless of the signal s .
- (iii) If $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^{NP}$, then $x^N = 0$ and N will not publish the information regardless of the signal s .

We next characterize the optimal liability regime in the present setting.

Proposition B.6: *Socially optimal verification and publication can be induced using the following liability regime:*

- (i) *If the verification process is effective, i.e., $x^* = \tilde{x}$ and $x^N = \tilde{x}^N$, then the damage award should be set equal to the benefits from truthful publication, i.e., $d = b + h$.*
- (ii) *If the verification process is ineffective, i.e. $x^* = x^N = 0$, then the damage award should be set equal to $d = \frac{P}{1-f} + a \cdot ((1-f) \cdot h - f \cdot b)$, where $a > 0$, or, alternatively,*
 - *if $f \cdot b > (1-f) \cdot h$, then no damages should be awarded, i.e. $d = 0$;*
 - *if $f \cdot b < (1-f) \cdot h$, then the damage award should be set sufficiently high to ensure $\max\{\Pi^V(\tilde{x}^N), \Pi^P, \Pi^{NP}\} = \Pi^{NP}$.*

Remark: The proof of this result, as well as its underlying intuition, are similar to the proof and intuition provided for proposition 3.

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FIGURES

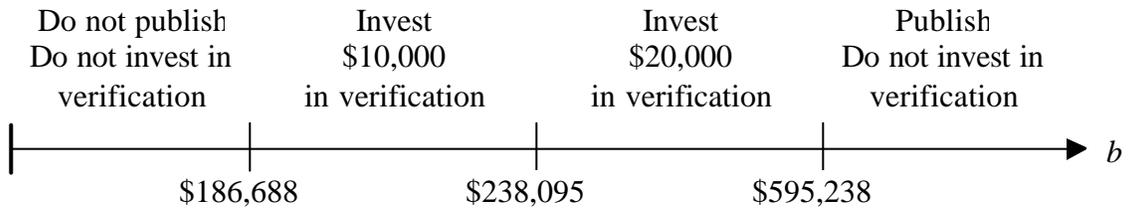


Fig. 1: The socially optimal verification and publication decisions

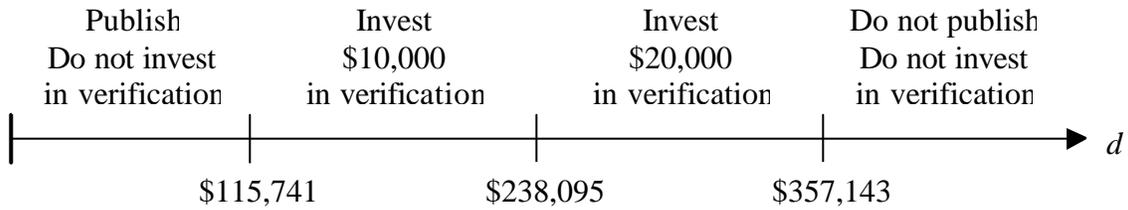


Fig. 2: The newspaper's verification and publication decisions

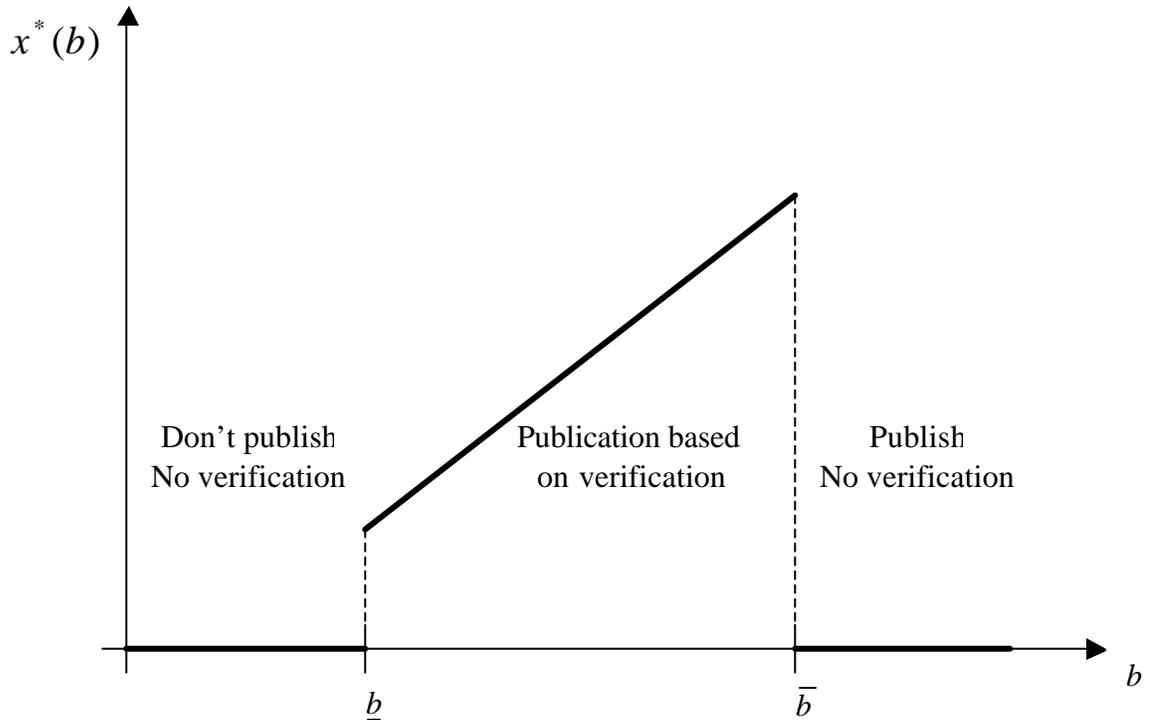


Fig. 3: Optimal verification and publication decisions

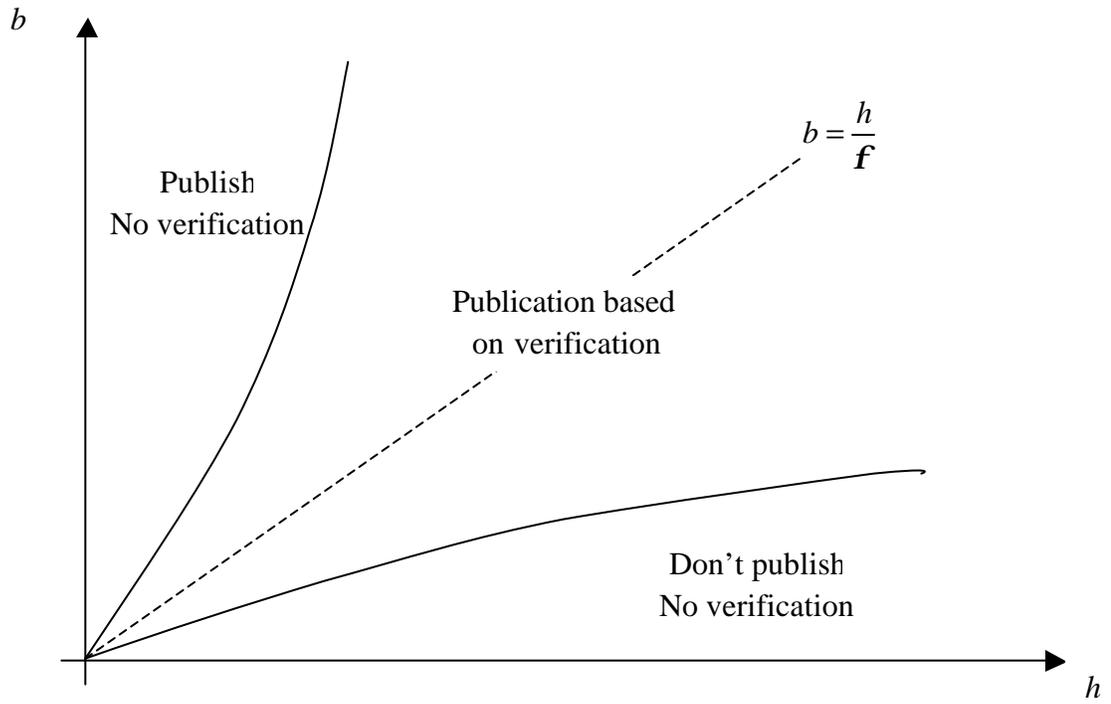


Fig. 4: Optimal verification and publication decisions

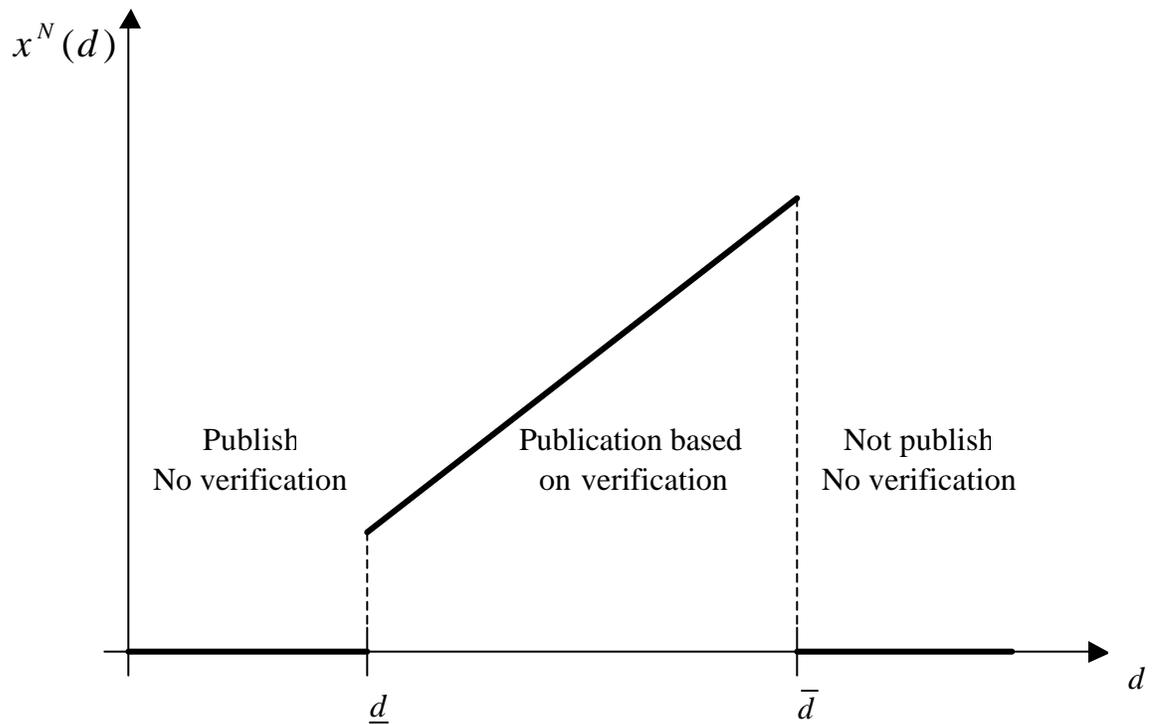


Fig. 5: The newspaper's verification and publication decisions

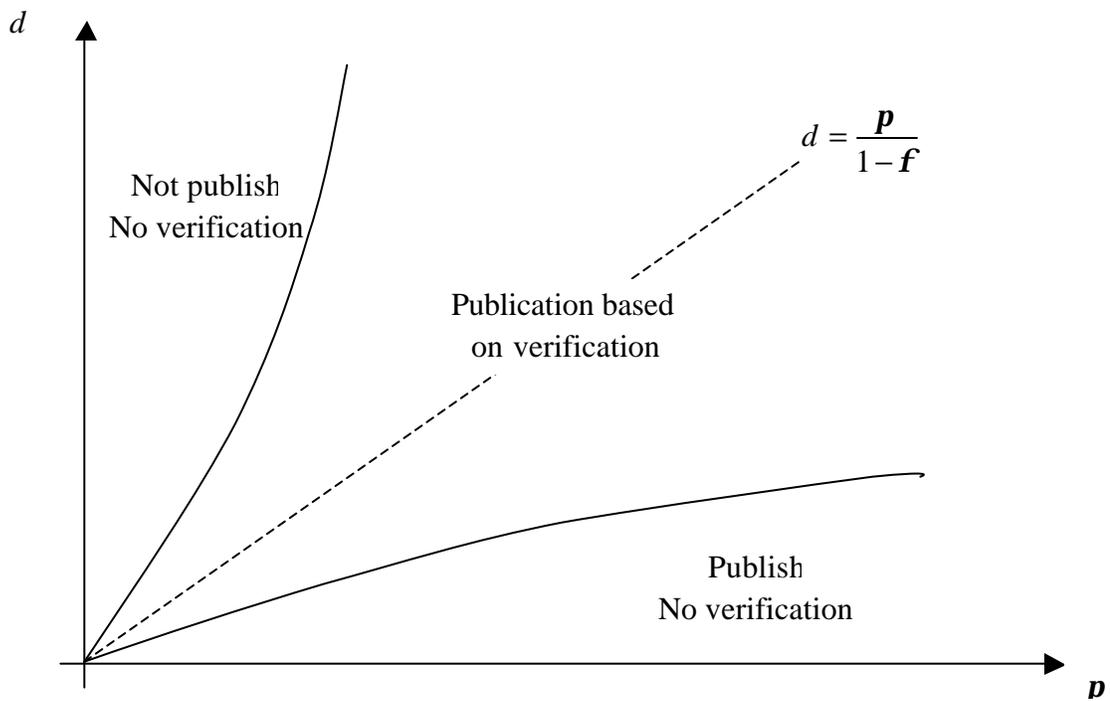


Fig. 6: The newspaper's verification and publication decisions

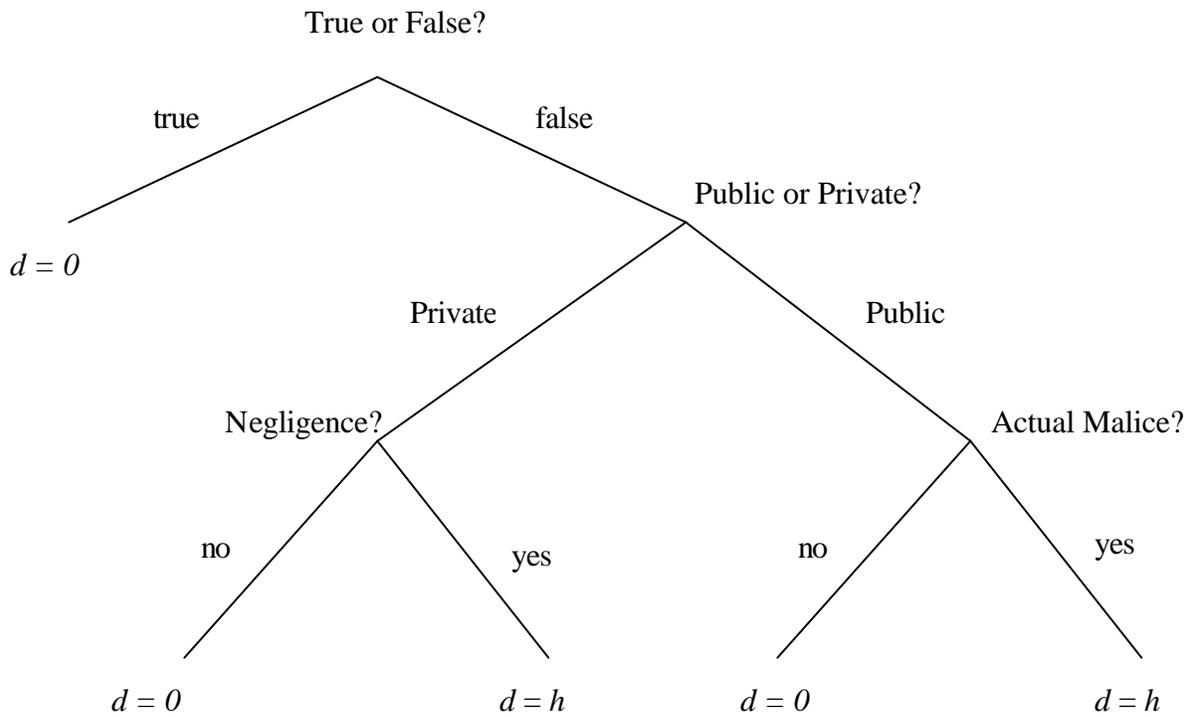


Fig. 7: Current libel doctrine

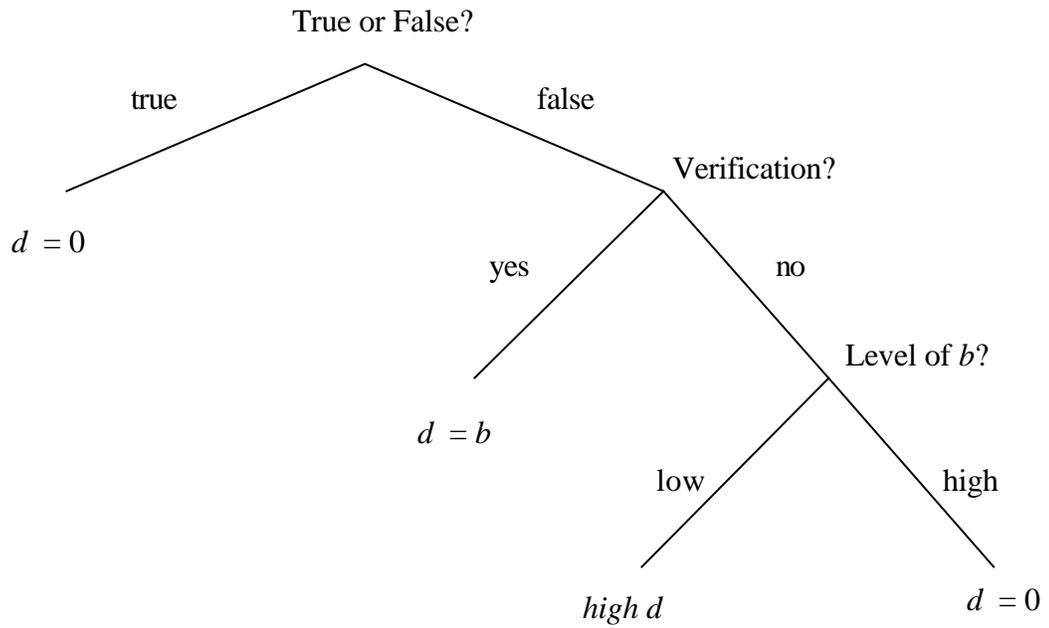


Fig. 8: The proposed liability regime

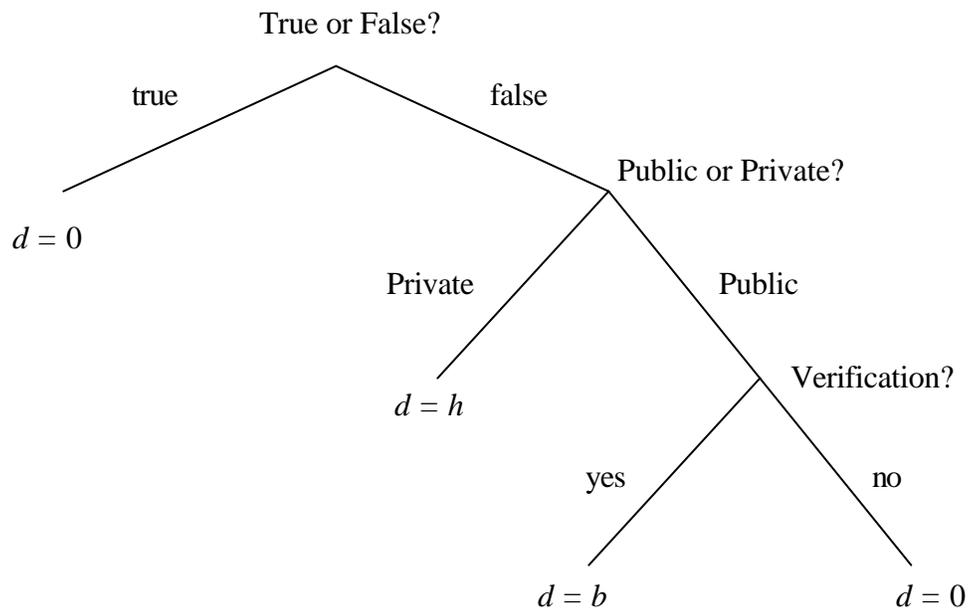


Fig. 9: The proposed liability regime - Another view