Damages for Breach of Duty in Corporate Disclosure

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Abstract

Information provided by an agent affects prices at which equity transactions take place. The agent may breach his duty either by spending too little effort at investigating relevant matters or by manipulating the obtained information unduly. As a consequence of such breach of duty, market participants may suffer from losses. Legal systems provide a rather disparate array of remedies without providing a coherent theory that would support the design of these remedies. The present paper propagates a general principle according to which courts may award expectation damages and it identifies sufficient conditions under which such damages would generate incentives for the agent to investigate with due care and to disclose the information duly.

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1 Introduction

Issuers and their agents provide information to markets that affects the prices at which equity transactions take place. Breach of duty in corporate disclosure results from insufficient care in acquiring information or from disclosing information untruthfully and from withholding relevant information. As a consequence of such breach of duty, market participants may suffer a loss.

Harm from such breach of duty typically corresponds to pure economic losses, for which many tort laws grant recovery only in exceptional cases. In Germany\(^1\), e.g., pure economic losses can be recovered if the injurer’s behavior was intentionally immoral, a standard far beyond mere negligence.\(^2\)

In addition to general rules from tort and contract law, legal systems provide remedies that are specific for transactions on equity markets. On primary markets, the victim is granted restitution damages as a remedy if the faulty information concerns an issue that has caused a fall in prices or even if the faulty information, without affecting the price, has just caused the victim to buy the equity.\(^3\)

On secondary markets, the issuer of equity can be held liable for withholding relevant insider information or for disseminating such information falsely. In such cases, the issuer must pay expectation damages to the victim even in cases of pure economic loss.\(^1\)

If courts have to rule on causality and to specify the appropriate quantum of damages, they face the following conceptual difficulty. The relevant definitions refer to a purely hypothetical situation where the agent had acted with due care which, actually, he has not. In the hypothetical situation, prices could have fallen as well and the buyer’s decision to buy would remain one under uncertainty even if predictions were based on the best information available at that time. Typically, this hypothetical situation remains uncertain even from an ex post perspective and, for that reason, poses a challenge to courts.

Courts in many countries still adhere to the all-or-nothing approach. Ei-

\(^{1}\)For details concerning the German legal system, see Wagner (2008).

\(^{2}\)“Vorsätzliche Sittenwidrigkeit”, § 826 BGB (German Civil Code).

\(^{3}\)In Germany, liability according to § 44 I BörsG (Börsengesetz) may lead to restitution under certain circumstances.

\(^{4}\)In Germany, § 37 b II, WpHG (Wertpapierhandelsgesetz).
ther the victim fully recovers or she is denied any recovery. The approach is known to be at odds with the compensation principle as envisaged by the verbal definition of expectation damages.

To recover the compensation principle, the present paper argues in favor of awarding correct expectation damages where, if information is lacking, averages over the observed event should be taken.\textsuperscript{5} The paper discusses how such expectation damages can be calculated and what are the agent’s incentives not only for acquiring information with sufficient care but also for disclosing it duly to the market if, for deviations, he will be held liable along such lines.

In such an environment, legal duties of information agents can be seen as serving two purposes. Traditionally, they are taken as reference point for ruling on causality and for determining the appropriate quantum of damages. But legal duties may also guide beliefs as markets rely on the agent to meet such duties. For these beliefs to be rational, the agent must have the appropriate incentives. If the agent, anticipating damages claims for violations correctly, has the incentive to meet his duty then the duty is called implementable under the damages regime in place.

Normative properties of the market outcome also turn out to matter. To be sure, the damages regime in place cannot be expected to overcome difficulties from trade taking place before violations are detected, let alone to cure trade distortions resulting from market imperfections. The most we can hope for is an outcome that maximizes social surplus subject to these constraints. The agent’s duty is called constrained efficient if it solves this optimization problem.

The present paper investigates constrained efficient duties that are implementable under the appropriate damages regime. To this end, a traditional model of trade with the following extra features is introduced. Ex ante, the shapes of demand and supply functions are uncertain. An agent, however, is spending effort to collect relevant information in order to disclose it to the market. Markets rely on the agent to search for information with sufficient care and to disclose it duly. As a consequence, the market outcome will

\textsuperscript{5}In Schweizer (2009), I have introduced the notion of correct damages on average over the observed event for malpractice suits. The same notion proves useful for the present setting concerning transactions on equity markets as well.
depend on the information as disclosed by the agent. While the legal background of corporate disclosure serves as institutional guideline, the analysis is applicable far beyond.

The main findings of the paper are as follows. Neither restitution damages nor the all-or-nothing approach to expectation damages allow to implement duties that are constrained efficient. These two damages regimes are shown to be at odds with the compensation principle and, for that reason, fail to generate efficient incentives. If, however, correct expectation damages on average over the observed event were granted then constrained efficient duties could be implemented quite generally.

The present paper departs from and is related to many contributions from the existing literature. Hirshleifer (1971) introduced the distinction between the private and the social value of information. The focus of the present paper will be on information having social value. Kronman (1978) argued that allocative efficiency is promoted by getting information to the market as quickly as possible. Yet, denying a property right in deliberately acquired information will discourage the search for information. The present paper looks at disclosure duties that are (constrained) efficient.

Shavell (1994) explores the involved trade-offs in a seller-buyer relationship. If information is socially valuable then its disclosure is desirable. Moreover, sellers will have the correct incentive to acquire information even when required to disclose it. For buyers to have any incentive to acquire information at all, they must be given a property right in deliberately acquired information. But if they have this right, their incentives to search for information may be excessive. No general statement is possible as to whether requiring buyers to disclose would be efficient or not.

Shavell assumes that agents disclose their information truthfully if they are required to do so. The present paper, in contrast, takes incentives to disseminate information in line with the (constrained) efficient disclosure duty into account.

Schäfer (2004) also deals with a topic that is related to the present paper. He argues that an auditor’s liability has a different function in primary and in secondary capital markets. Auditors observe the true state of the world with higher probability if they exert more effort. Yet, again, if auditors happen to observe the true state of the world, they will disclose it honestly. In contrast
to the present paper, Schäfer does not examine the incentives to do so.

The present paper is organized as follows. Section 2 introduces a simple version of the general setting as well as a numerical specification which serves as illustration throughout the paper. There are two states of the world and the agent may observe one out of two signals. The precision of the signals depends on the agent’s effort. Two general propositions are established dealing with the implementation of constrained efficient duties. Both are based on compensatory properties of the damages regime in place.

Section 3 explores the existence of constrained efficient (non-trivial) duties. Due to trade distortions, checking for constrained efficiency may be quite demanding. A single crossing property is identified which simplifies the task.

Section 4 discusses three damages regimes: restitution damages, the all-or-nothing approach to expectation damages, and expectation damages on average over the observed event. Under restitution damages, constrained efficient duties cannot be implemented, not even if courts would know the hypothetical signal. Under the all-or-nothing approach to expectation damages, constrained efficient duties become implementable if courts know the hypothetical signal though not, if the hypothetical signal remains uncertain. If correct expectation damages are awarded on average over the observed constrained efficient duties can be implemented even if the hypothetical signal remains uncertain.

Section 5 introduces a richer version of the model and establishes that correct expectation damages on average over the observed event allow to implement constrained efficient duties quite generally. Section 6 concludes.

2 A simple model

The true but unknown state of the world is either $S = L$ or $S = H$. Ex ante, state $S = H$ is expected to occur with probability $\mu$ and state $S = L$ with probability $1 - \mu$. In state $S$, the indirect demand and supply functions are $p = F^S(q)$ and $p = G^S(q)$, respectively. Indirect demand is interpreted as marginal utility and indirect supply as marginal costs from which utility and
cost functions are obtained by integration:

\[ V^S(q) = \int_0^q F^S(y) \cdot dy \] and \[ K^S(q) = \int_0^q G^S(y) \cdot dy \]

Social welfare then amounts to \( W^S(q) = V^S(q) - K^S(q) \).

An agent in charge of acquiring and disclosing additional information observes signal \( s \in M = \{l, h\} \). In state \( S = L \) (\( S = H \)) the signal \( s = l \) \((s = h, \) respectively\) is called the correct signal. At effort costs \( c(x) \) the correct signal is observed with probability \( x \) where \( x \in [1/2, 1] \). Precision \( x = 1/2 \) would prevail under tossing a coin. To be informative, the precision must be from the range \( x > 1/2 \). The cost function \( c(x) \) is assumed increasing in \( x \) whereas full precision \( x = 1 \) is infinitely costly. Expressed in Kronman’s (1978) terminology, the agent is deliberately acquiring information.

The signal allows to update beliefs. If the true signal \( s = h \) is observed then

\[ \mu_h(x) = \text{prob} \{S = H : s = h\} = \frac{\mu \cdot x}{\mu \cdot x + (1 - \mu) \cdot (1 - x)} \]

whereas, if signal \( s = l \) is observed then

\[ \mu_l(x) = \text{prob} \{S = H : s = l\} = \frac{\mu \cdot (1 - x)}{\mu \cdot (1 - x) + (1 - \mu) \cdot x}. \]

For any \( x > 1/2 \), \( \mu_l(x) < \mu < \mu_h(x) \) must hold. Moreover, \( \mu_l \) is decreasing whereas \( \mu_h \) is increasing in \( x \), i.e. \( d\mu_l/dx < 0 < d\mu_h/dx \). At signal \( s \in M \), the expected welfare amounts to

\[ w_s(x, q) = \mu_s(x) \cdot W^H(q) + (1 - \mu_s(x)) \cdot W^L(q) \quad (1) \]

if quantity \( q \) is traded.

The agent may but need not disclose truthfully. His disclosure strategy is denoted by the function \( \sigma : M \rightarrow M \) where \( s' = \sigma(s) \) denotes the signal he discloses if he actually has observed signal \( s \). Since there are two possible signals, there exist four different disclosure strategies: first, telling the truth \( \sigma^*(s) \equiv s \); second, \( \sigma(s) \equiv h \); third, \( \sigma(s) \equiv l \); fourth, misrepresenting the truth \( \sigma^m(h) = l \) and \( \sigma^m(l) = h \). Notice, the second and third strategy fail to be informative whereas the first and the fourth strategy are equally informative.

If the agent were known to investigate with precision \( x \) and to use disclosure strategy \( \sigma \), the market would believe state \( S = H \) to occur with
probability \( m_s(x, \sigma) \) whenever signal \( s \) has been disclosed. For such believes to be rational, the following conditions must hold:

\[
m_s(x, \sigma \equiv h) = m_s(x, \sigma \equiv l) = m_s(\frac{1}{2}, \sigma) = \mu
\]

and

\[
m_s(x, \sigma^*) = m_s'(x, \sigma^m) = \mu_s(x)
\]

where \( s' = l \) and \( s' = h \) if \( s = h \) and \( s = l \), respectively. In other words, if the agent’s disclosure strategy fails to be informative or if he is just tossing coins, markets stick to their ex ante beliefs. If, however, the agent’s disclosure strategy is informative markets update their beliefs in line with Bayes’ rule.

Under the damages regime in place, it is the agent’s duty to investigate with precision \( x^o \) and to disclose according to strategy \( \sigma^o \). This duty affects the outcome in two ways. It serves as focal point because markets are assumed to believe that the agent is meeting his duty. It further serves as reference point for calculating damages and for ascertaining causality.

Therefore, if the agent discloses signal \( s \) then the market believes state \( S = H \) to occur with probability \( m_s^o = m_s(x^o, \sigma^o) \) and, if market structure \( n \) is in place (in the numerical example below, \( n \) corresponds to the number of Cournot competitors in the market), then quantity

\[
q^o_s = q^n(m_s(x^o, \sigma^o))
\]

will be traded at price \( p^o_s = p^n(m_s^o) \).

The agent may deviate either by investigating with insufficient effort \( x < x^o \) or by disclosing according to \( \sigma \neq \sigma^o \) (or both). Under such a deviation, the social surplus as expected ex ante amounts to

\[
\gamma(x, \sigma; x^o, \sigma^o) = w(x, q_{\sigma(l)}^o, q_{\sigma(h)}^o) - c(x)
\]

where

\[
w(x, q_l, q_h) = \mu \cdot x \cdot W^H(q_h) + \mu \cdot (1 - x) \cdot W^H(q_l) + (1 - \mu) \cdot x \cdot W^L(q_l) + (1 - \mu) \cdot (1 - x) \cdot W^L(q_h).
\]

denotes the surplus if quantity \( q_s \) is traded whenever the true signal is \( s \). Notice, at the time parties decide on trade, the deviation is still hidden to the market and, hence, the quantity traded would remain to be (2).
The agent’s duty is called *constrained efficient* if it solves
\[
(x^o, \sigma^o) \in \arg\max_{(x, \sigma)} \gamma(x, \sigma; x^o, \sigma^o)
\]
and it is called *non-trivial* if it is the agent’s duty to investigate with precision \(x^o > 1/2\). Notice, for a non-trivial duty to be constrained efficient, the disclosure strategy must be informative.

The trivial duty not to investigate, i.e. \(x^o = 1/2\) is always constrained efficient. In fact, if the market expects the agent not to investigate, the traded quantity \(q = q^n(\mu)\) will be based on the ex ante probability and, hence, the expected social benefit
\[
w(x, q, q) = \mu \cdot W^H(q) + (1 - \mu) \cdot W^L(q)
\]
will not depend on the agent’s activities. Under such circumstances it would be constrained efficient indeed not to spend effort on a more precise signal.

At the other extreme, consider the first best solution. Let
\[
q^*_s(x) \in \arg\max_q w_s(x, q)
\]
denote the quantity which maximizes social surplus given that the agent has investigated with effort \(x\) and has observed the true signal \(s\). The first best effort level then solves
\[
x^* \in \arg\max_x w(x, q^*_s(x), q^*_s(x)) - c(x).
\]

Therefore, given the agent’s duty to investigate at effort level \(x^*\) and to disclose truthfully, the market would enact trade \(q^o_s = q^*_s(x^*)\) whenever the agent has disclosed signal \(s\). It follows that the agent’s strategy \((x^*, \sigma^*)\) maximizes the expected social surplus \(\gamma(x, \sigma; x^*, \sigma^*)\) over all effort levels \(x\) and disclosure strategies \(\sigma\). Therefore, the duty to invest at the first best level \(x^*\) and to disclose truthfully is constrained efficient provided that markets are not distorted (perfect competition).

Taking these two extreme cases into account, the social value of information becomes an ambiguous issue. The notion of constrained efficiency will be further explored in the next section.

The agent’s duty \((x^o, \sigma^o)\) also plays a role for the damages regime in place. Ex post, courts are assumed to detect deviations \((x, \sigma)\) from the
agent’s duty and to quantify damages accordingly. Let \( \psi = \psi(x, \sigma; x^o, \sigma^o) \) denote the expected payoff (including damages awards) of all parties other than the agent and let \( \phi = \phi(x, \sigma; x^o, \sigma^o) \) denote the agent’s payoff (net of damages liability). The agent may or may not have stakes of his own in producers’ or consumers’ surplus. Costs of operating the legal system are neglected such that

\[
\gamma(x, \sigma; x^o, \sigma^o) = \phi(x, \sigma; x^o, \sigma^o) + \psi(x, \sigma; x^o, \sigma^o)
\]

must hold. The exact specification of damages will be discussed in subsequent sections.

For the agent’s duty to be implementable under the damages regime in place, the agent must have the incentive to meet his duty, i.e. his duty must solve

\[
(x^o, \sigma^o) \in \arg \max_{(x, \sigma)} \phi(x, \sigma; x^o, \sigma^o).
\]

Moreover, the beliefs of the market must be rational given that the agent meets his duty, i.e. \( m^o = m^o(x^o, \sigma^o) \) must also hold. By looking at the other parties’ net payoffs, the following two propositions allow to check for implementability.

**Proposition 1** If, under the damages regime in place, the expected payoff of all parties other than the agent is increasing (decreasing) with precision, more precisely if \( \psi_x(x, \sigma^o; x^o, \sigma^o) > 0 \) (\( < 0 \)) holds for all effort levels \( x \geq x^o \) (\( x \leq x^o \), respectively) and if the non-trivial duty \( (x^o, \sigma^o) \) is constrained efficient then \( (x^o, \sigma^o) \) cannot be implemented under such a damages regime.

**Proposition 2** If, under the damages regime in place, the compensation principle is met in the sense that \( \psi(x, \sigma; x^o, \sigma^o) \geq \psi(x^o, \sigma^o; x^o, \sigma^o) \) holds for any deviation \( (x, \sigma) \) and if the duty \( (x^o, \sigma^o) \) is constrained efficient then \( (x^o, \sigma^o) \) can always be implemented under such a damages regime.

**Proof.** To establish the first proposition, suppose \( \psi_x(x) = \psi_x(x, \sigma^o; x^o, \sigma^o) > 0 \) holds for all effort levels \( x \geq x^o \). For effort levels in the range \( x^o < x \), it follows that \( \psi(x^o) < \psi(x) \) must hold. If the duty were constrained efficient, \( \gamma(x^o) \geq \gamma(x) \) would have to hold from which it would follow that \( \phi(x) < \phi(x^o) \) must hold. Therefore, the agent’s optimal effort cannot be from the range \( x^o < x \).
If the duty is non-trivial it can neither be optimal for the agent to meet his
duty. In fact, if the duty is non-trivial it follows that \( \gamma_x(x^o) = 0 \) and, hence,
that \( \phi_x(x^o) = 0 - \psi_x(x^o) < 0 \) must hold. The agent would have the incentive
to investigate with precision strictly below due effort \( x^o \) indeed. Therefore a
constrained efficient duty cannot be implemented under the damages regime
in place if the duty is non-trivial. This establishes the first claim of Propo-
sition 1. The second claim can be established by a symmetric argument.

To prove the second proposition, suppose the agent’s duty is constrained
efficient. It follows that \( \gamma(x, \sigma; x^o, \sigma^o) \leq \gamma(x^o, \sigma^o; x^o, \sigma^o) \) must hold for
any deviation \( (x, \sigma) \neq (x^o, \sigma^o) \). Since the compensation principle is met,
\( \psi(x, \sigma; x^o, \sigma^o) \geq \psi(x^o, \sigma^o; x^o, \sigma^o) \) and, hence,

\[
\phi(x, \sigma; x^o, \sigma^o) = \gamma(x, \sigma; x^o, \sigma^o) - \psi(x, \sigma; x^o, \sigma^o) \leq \\
\leq \gamma(x^o, \sigma^o; x^o, \sigma^o) - \psi(x^o, \sigma^o; x^o, \sigma^o) = \phi(x^o, \sigma^o; x^o, \sigma^o)
\]

must hold for any deviation \( (x, \sigma) \). Therefore the agent has indeed the in-
centive to meet his duty if it is constrained efficient and if the compensation
principle is met. The second proposition is established as well. ■

For illustration, the following numerical specification of the above model
will be revisited throughout the paper. Ex ante, both states are equally
likely, i.e. \( \mu = 1/2 \). The indirect demand function \( F^S(q) = A^S - q \) is
linear and only its intercept \( 0 < A^L < A^H \) though not its slope is uncertain.
Marginal costs are constant and known such that they can be normalized
to zero, i.e. \( G^L(q) = G^H(q) \equiv 0 \). Social welfare in state \( S \) amounts to
\( W^S(q) = V^S(q) = A^S \cdot q - q^2/2 \).

If signal \( s = h \) occurs then the updated probability of state \( S = H \)
amounts to \( \mu_h = x \) whereas at signal \( s = l \) the updated probability of state
\( S = H \) amounts to \( \mu_l = 1 - x \).

Moreover, suppose market exchange is governed by Cournot quantity
competition among \( n \) suppliers. Since production costs are assumed to vanish,
quantity and price amount to

\[
q^n(m) = \frac{n}{n + 1} \cdot a(m) \quad \text{and} \quad p^n(m) = \frac{1}{n + 1} \cdot a(m)
\]

where \( a(m) = m \cdot A^H + (1 - m) \cdot A^L \) denotes the expected intercept if
markets believe state \( S = H \) to occur with probability \( m \). Notice, if \( n = 1 \),
the solution corresponds to the outcome under monopoly whereas, if \( n \to \infty \),
the solution approaches perfect competition. Constrained efficient duties in
general and for the numerical example in particular will be explored in the
next section.

3 Constrained efficient duties

By definition, the duty \((x^o, \sigma^o)\) is constrained efficient if it maximizes the
expected social surplus \(\gamma(x, \sigma) = \gamma(x; x^o, \sigma^o)\) as defined in the previous
section. The present section explores the existence of non-trivial duties that
are constrained efficient. Recall, for the duty \((x^o, \sigma^o)\) to be non-trivial, the
due effort level must be from the range \(1/2 < x^o\). Moreover, to ensure con-
strained efficiency, the information strategy \(\sigma^o\) must be informative which, in
the present setting, means without loss of generality that the agent discloses
truthfully. For this reason, in the present section, the agent’s disclosure duty
is assumed to be \(\sigma^*(s) \equiv s\).

Recall, markets believe the agent to meet such duty. Therefore, if the
agent discloses signal \(s\) the quantity \(q^o_s = q^o(m_s(x^o, \sigma^*))\) will be traded under
market structure \(n\). Moreover, if he actually meets his duty the expected
social surplus amounts to \(\gamma(x^o, \sigma^*)\) and, hence, for the agent’s duty to be
efficient, the following two conditions must be met (for the definition of \(w\),
see (3)):

\[
\gamma(x^o, \sigma^*) = w(x^o, q^o_l, q^o_h) - c(x^o) \geq \max_x w(x, q^o_l, q^o_h) - c(x) \quad (4)
\]

and

\[
\gamma(x^o, \sigma^*) \geq \max_x w(x, q^o_l, q^o_h) - c(x) \quad (5)
\]

These two conditions require that no effort level and no informative disclosure
strategy allow to increase the social surplus beyond \(\gamma(x^o, \sigma^*)\).

Obviously, disclosure strategies that fail to be informative are cheapest
at tossing a coin. Therefore, for the agent’s duty to be constrained efficient

\[
\gamma(x^o, \sigma^*) \geq w\left(\frac{1}{2}, q^o_l, q^o_h\right) - c\left(\frac{1}{2}\right) \quad (6)
\]

and

\[
\gamma(x^o, \sigma^*) \geq w\left(\frac{1}{2}, q^o_l, q^o_h\right) - c\left(\frac{1}{2}\right) \quad (7)
\]

must also be met. The agent’s duty \((x^o, \sigma^*)\) is constrained efficient if and
only if (4) – (7) are satisfied.
If a market structure is in place that distorts trade checking the constrained efficiency of the agent’s duty becomes quite intricate. To simplify, let us assume that the single crossing property

\[
\frac{dW^H(q)}{dq} > \frac{dW^L(q)}{dq}
\]

is met for all quantities \(q\). Then the following proposition can be established.

**Proposition 3** Suppose the single crossing property is met and \(q^o_l \leq q^o_h\) holds. Then the agent’s (non-trivial) duty is constrained efficient if and only if conditions (4), (6) and (7) are met. In other words, (5) need not be checked.

**Proof.** Since

\[
\frac{\partial w_s(x,q)}{\partial q \partial x} = \left[ \frac{dW^H(q)}{dq} - \frac{dW^L(q)}{dq} \right] \cdot \frac{d\mu_s}{dx}
\]

it follows from the single crossing property that

\[
\frac{\partial^2 w_h}{\partial x \partial q} > 0 > \frac{\partial^2 w_l}{\partial x \partial q}
\]

must hold (for the definition of \(w_s\), see (1)). Moreover, since \(q^o_l \leq q^o_h\), it follows that

\[
\frac{\partial w_h(x,q^o_h)}{\partial x} \geq \frac{\partial w_h(x,q^o_l)}{\partial x} \quad \text{and} \quad \frac{\partial w_l(x,q^o_h)}{\partial x} \geq \frac{\partial w_l(x,q^o_l)}{\partial x}
\]

must also hold.

If \(w_h(1/2,q_h) = w(1/2,q_h,q_h) \geq w_h(1/2,q_l) = w(1/2,q_l,q_l)\) then \(w_h(x,q_h) \geq w_h(x,q_l)\) must hold for all \(x\). Similarly, if \(w_l(1/2,q_l) = w(1/2,q_l,q_l) \leq w_l(1/2,q_h) = w(1/2,q_h,q_h)\) then \(w_l(x,q_l) \geq w_l(x,q_h)\) must hold for all \(x\). In other words, the disclosure strategy \(\sigma^m\) can never be constrained efficient and, for that reason, (5) need not be checked. 

For illustration, let me look at the numerical example again and suppose effort costs \(c(x)\) are a differentiable and convex function of the effort level \(x\). Then the first order condition

\[
\frac{\partial w(x^o,q^o_l,q^o_h)}{\partial x} = \frac{n}{n + 1} \cdot (2x^o - 1) \cdot \frac{(A^H - A^L)^2}{2} = \frac{dc(x^o)}{dx}
\]

is necessary and sufficient for condition (4) to be met. Notice, the term on the left is linearly increasing in \(x^o\) whereas \(dc(x^o)/dx\) is increasing as well.
and, hence, the above equation may allow for several solutions. Not all of them, however, need to be constrained efficient.

To check for the remaining conditions, notice that
\[ w \left( \frac{1}{2}, q^o_h, q^o_i \right) - w \left( \frac{1}{2}, q^o_i, q^o_h \right) = \frac{q^o_h - q^o_i}{2(n + 1)} \cdot (A^H + A^L) > 0 \]
holds such that condition (7) is the remaining one to be checked. It is fulfilled if (and only if)
\[ \frac{n}{4(n + 1)^2} \cdot (2x^o - 1) \cdot (A^H - A^L) \cdot t \geq c(x^o) - c \left( \frac{1}{2} \right) \]  
(9)
is met where \( t = (2nx^o + 2x^o - n) \cdot (A^H - A^L) - 2A^H \).

It might be useful to investigate the comparative static properties of the term \( t \) in (9). At fixed \( n \) and \( A^H - A^L \), let \( A^H \) increase such that the term becomes negative and, hence, inequality (9) will be violated. In this case, no non-trivial duty can be constrained efficient. Or at fixed \( A^H \) and \( A^L \), let \( n \) increase to the point where the term \( t \) becomes positive. It then depends on the shape of the cost function whether or not a constrained efficient duty exists that is non-trivial.

To sum up: if the market structure involves \( n \) Cournot competitors then a non-trivial constrained efficient duty exists if and only if the two equations (8) and (9) allow for a solution \( x^o > 1/2 \). A non-trivial duty that is constrained efficient may but need not exist if trade suffers from monopolistic or oligopolistic distortions.

4 Damages regimes

In the present section, various damages regimes will be explored. To fix ideas, imagine that the information agent is entitled to 100 percent of the producers’ surplus and that buyers can be identified as the parties other than the agent. As a consequence, buyers only will claim damages if at all.

Trade distortions due to the market structure in place and informational constraints cannot be expected to be cured by any damages regime. The most we should hope for is that constrained efficient duties become implementable.

Markets rely on the agent to investigate at level \( x^o \). Moreover, in the present section, the agent is assumed not to manipulate the signal but rather
is exogenously bound to disclosure strategy $\sigma^*$, i.e. telling the truth. Therefore, if market structure $n$ is in place and if signal $s$ is disclosed then quantity $q^* = q^n(m_s(x^n, \sigma^*))$ will be traded at price $p^*_n = p^n(m_s(x^n, \sigma^*))$.

If, ex post, it turns out that the agent has been shirking by investigating insufficiently buyers may be entitled to damages. In order to decide on causality and the quantum of damages, the hypothetical signal $s^0$ that would have occurred if the agent had met his duty matters.

In the first subsection, it is shown that restitution damages generically fail to support constrained efficient duties, even if courts could observe the hypothetical signal for sure.

In the second subsection, it is shown that, under expectation damages, constrained efficient duties can be implemented if the hypothetical signal could be observed. If, however, the hypothetical signal remains uncertain and if courts stick to an all-or-nothing approach, non-trivial constrained efficient duties fail to be implementable.

The third subsection argues in favor of awarding correct damages on average over the observed event. This method ensures that the compensation principle is met and, hence, that constrained efficient duties can be implemented under such a regime of expectation damages.

Throughout this section, for simplicity, informational gains due to shirking are ruled out by assumption. More precisely, if the agent has been shirking by spending insufficient effort $x < x^o$ but, nonetheless, has observed the correct signal then the hypothetical signal is assumed to be correct as well. Under this assumption, the ex ante probability of receiving the wrong signal under shirking though not under due effort while the true state is $S = H$ amounts to $\mu \cdot (x^o - x)$ whereas the probability of the corresponding event while the true state is $S = L$ amounts to $(1 - \mu) \cdot (x^o - x)$. In the final section of the paper, the agent’s incentives will be investigated without imposing the assumption of no informational gains due to shirking.

### 4.1 Restitution damages

Let $\psi^r(x) = \psi^r(x, \sigma^*; x^o, \sigma^*)$ and $\phi^r(x) = \phi^r(x, \sigma^*; x^o, \sigma^*)$ denote the buyers’ and the agent’s expected net payoff if a regime of restitution damages is in place and if the agent has actually investigated with precision $x$. 
Suppose, ex post, courts find out that the agent has been shirking. To calculate the buyers’ expected net payoff under the regime of restitution damages, several events must be distinguished.

First, suppose the true state is $S = H$ and, in spite of the agent’s shirking the correct signal $s = h$ has been observed. This event occurs with probability $\mu \cdot x$. It follows from the assumption of no informational gains due to shirking that the true signal $s^o = h$ would a fortiori have been obtained under due precision. In this first event, the buyer’s payoff amounts to $V^H(q^o_h) - p^H_h \cdot q^o_h$ as restitution would be denied for lack of causality. Indeed, the signal was actually correct and the same signal would have been obtained under due effort.

Suppose, second, the true state still is $S = H$ but the wrong signal $s = l$ was actually obtained while the hypothetical signal would have been correct, i.e. $s^o = h$. This event occurs with probability $\mu \cdot (x^o - x)$. Since the usual test of causality is met, the buyer may then opt for restituting part or all of her purchases. In fact, she will keep the quantity $q_{HI}$ that solves

$$q_{HI} \in \arg \max_{q \leq q^o_l} V^H(q) - p^H_l \cdot q$$

ending up with net payoff $V^H(q_{HI}) - p^H_l \cdot q_{HL}$.

Notice, in the numerical example, buyers would not invoke restitution in this second event, i.e. $q_{HI} = q^o_l$ because $dV^H(q^o_l)/dq = A^H - q^o_l > p^H_l$ is easily seen to hold.

Suppose, third, the true state is still $S = H$ but the wrong signal was actually obtained and would also have been obtained under due effort, i.e. $s = s^o = l$. This event occurs with probability $\mu \cdot (1 - x^o)$. In this event, since the agent’s shirking did not cause the wrong signal, restitution is denied and the buyers’ net payoff remains to be $V^H(q^o_l) - p^H_l \cdot q^o_l$.

Consider, fourth, the event $S = L$ and $s = l$ which occurs with probability $(1 - \mu) \cdot x$. By the assumption of no informational gains due to shirking, the hypothetical signal $s^o$ must also be correct and the buyers’ net payoff remains to be $V^L(q^o_l) - p^H_l \cdot q^o_l$.

Consider, fifth, the event $S = L$ and $s = h$ but $s^o = l$. This event occurs with probability $(1 - \mu) \cdot (x^o - x)$. Since the agent’s shirking has caused the wrong signal, the buyer is given the option to restitute part or all of her purchases.
purchases. In fact, she will only keep the quantity $q_{Lh}$ which solves

$$q_{Lh} \in \arg \max_{q \leq q_{ho}^o} V^L(q) - p_{ho}^o \cdot q$$

leaving her with net payoff $V^L(q_{Lh}) - p_{ho}^o \cdot q_{Lh}$.

In the numerical example, since $dV^L(q_{ho}^o)/dq = A^L - q_{ho}^o < p_{ho}^o$ holds, buyers will at least partly restitute, keeping only the quantity $q_{Lh} = \max\left[ A^L - p_{ho}^o, 0 \right]$ in this fifth event.

Consider, finally, the event $S = L$ but $s = s^o = h$ which occurs with probability $(1 - \mu) \cdot (1 - x^o)$. For lack of causality, restitution would be denied leaving the buyers with net payoff $V^L(q_{ho}^o) - p_{ho}^o \cdot q_{ho}^o$.

By aggregating over the above six events, the buyer’s expected payoff $\psi^r(x)$ can now easily be calculated, its (constant) derivative being

$$\psi^r_x(x) = \mu \cdot \left[ V^H(q_{ho}^o) - p_{ho}^o \cdot q_{ho}^o - \left( V^H(q_{ho}^o) - p_{ho}^o \cdot q_{ho}^o \right) \right] +$$

$$(1 - \mu) \cdot \left[ V^L(q_{ho}^o) - p_{ho}^o \cdot q_{ho}^o - \left( V^L(q_{ho}^o) - p_{ho}^o \cdot q_{ho}^o \right) \right].$$

According to Proposition 1, it is the sign of this derivative that matters for implementability.

Calculating the derivative for arbitrary market structures turns out to be cumbersome even within the numerical example. Therefore, let me focus on the case of perfect competition where $q_{ho}^o = x^o \cdot A^H + (1 - x^o) \cdot A^L$, $q_{ho}^o = (1 - x^o) \cdot A^H + x^o \cdot A^L$ and $p_{ho}^o = p_{ho}^o = 0$ will hold. In this case, it follows that

$$\psi^r_x(x) = \frac{1}{2} \cdot \left[ V^H(q_{ho}^o) - V^H(q_{ho}^o) + V^L(q_{ho}^o) - V^L(A^L) \right]$$

$$= \frac{4x^o - 2 - (x^o)^2}{4} \cdot \left( A^H - A^L \right)^2$$

which is positive if $x^o$ is from the range $2 - \sqrt{2} < x^o < 1$ whereas it is negative if $x^o$ is from the range $1/2 < x^o < 2 - \sqrt{2}$. Except for the non-generic case where, by mere coincidence, $x^o = 2 - \sqrt{2}$ no (non-trivial) constrained efficient duty can be implemented under restitution damages, not even if the hypothetical signal $s^o$ were known for sure.

Typically, however, the hypothetical signal $s^o$ remains uncertain such that causality must be dealt with in an indirect way. A threshold $\tau$ may serve as the appropriate indicator. If the updated probability exceeds the threshold, i.e. if $\frac{\hat{x}^o - \hat{x}}{1 - x} > \tau$ then the agent’s shirking is judged to be causal for the wrong signal but not if the updated probability is below the threshold. This
condition of causality is equivalent to \( x < x_\tau := (x^o - \tau)/(1 - \tau) \). Notice, for a positive threshold \( \tau > 0 \), there exist effort levels in the range \( x_\tau < x < x^o \). For such levels and, in fact, for any level \( x_\tau < x \), restitution damages will be denied. In this range, the buyers’ payoff is as in the absence of a damages regime.

In the range where damages are denied, for plausible specifications of the model, the buyers’ expected payoff will be increasing, i.e.

\[
\psi^r(x) > 0
\]

will hold in the range \( x_\tau < x \) and, according to Proposition 1, a non-trivial constrained efficient duty cannot be implemented under restitution damages, no matter whether the hypothetical signal remains uncertain or not.

In fact, let us look at the numerical example. In the range \( x_\tau < x \), for lack of causality, the buyers’ will not be awarded any damages, leaving them with expected payoff \( \psi^r(x) \) amounting to

\[
\begin{align*}
\frac{1}{2} \cdot x \cdot \left[ V^H(q^o_H) - p^o_H \cdot q^o_H \right] + \frac{1}{2} \cdot (1 - x) \cdot \left[ V^H(q^o_H) - p^o_H \cdot q^o_H \right] + \\
\frac{1}{2} \cdot x \cdot \left[ V^L(q^o_L) - p^o_L \cdot q^o_L \right] + \frac{1}{2} \cdot (1 - x) \cdot \left[ V^L(q^o_L) - p^o_L \cdot q^o_L \right]
\end{align*}
\]

with (constant) positive derivative

\[
\psi^r_x(x) = \frac{n}{2(n + 1)} \cdot (2x^o - 1) \cdot \left( A^H - A^L \right)^2 > 0.
\]

It then follows from Proposition 1 that no (non-trivial) constrained efficient duty can be implemented under restitution damages, not even in the simple setting of the numerical specification.

### 4.2 Expectation damages: all-or-nothing

Under a regime of expectation damages the buyers may claim such sum of money that puts them in the same position as if the agent had met his duty of investigating with due care. Let \( \psi^e(x) = \psi^e(x, \sigma^*; x^o, \sigma^*) \) and \( \phi^e(x) = \phi^e(x, \sigma^*; x^o, \sigma^*) \) denote the buyers’ and the agent’s expected net payoff if a regime of expectation damages is in place. To calculate the buyers’ expected net payoff, several events must be distinguished.

First, suppose the true state is \( S = H \) and, in spite of the agent’s shirking the correct signal \( s = h \) has been observed. This event occurs with probability
\( \mu \cdot x \). It follows from the assumption of no informational gains due to shirking that the true signal \( s^o = h \) would a fortiori have been obtained under due effort. Since the buyers are in the same position as if the agent had met his duty, damages claims are denied. The buyers’ payoff remains to be \( V^H(q^o_h) - p^o_h \cdot q^o_h \) in this first event.

Suppose, second, the true state still is \( S = H \) but the wrong signal \( s = l \) was actually obtained while the hypothetical signal would have been correct, i.e. \( s^o = h \). This event occurs with probability \( \mu \cdot (x^o - x) \). The buyer may claim expectation damages amounting to

\[
D^H = \max \left[ V^H(q^o_h) - p^o_h \cdot q^o_h - \left( V^H(q^o_l) - p^o_l \cdot q^o_l \right), 0 \right].
\]

In fact, if \( D^H \) is positive then the buyer will be put in exactly the same position as if the agent had met his duty whereas, if \( D^H \) vanishes, the wrong signal has not caused any loss to the buyers. They rather have enjoyed a windfall gain which they may keep for free. In this event, buyers end up with a net payoff not below \( V^H(q_h) - p^o_h \cdot q^o_h \).

Suppose, third, the true state is still \( S = H \) but the wrong signal was actually obtained and would also have been obtained under due effort, i.e. \( s = s^o = l \). This event occurs with probability \( \mu \cdot (1 - x^o) \). In this event, the agent’s shirking did not cause the wrong signal and, hence, the buyers’ cannot claim damages. Their net payoff remains to be \( V^H(q_l) - p^o_l \cdot q^o_l \) in this event.

Consider, fourth, the event \( S = L \) and \( s = l \) which occurs with probability \( (1 - \mu) \cdot x \). By the assumption of no informational gains due to shirking, the hypothetical signal \( s^o \) must also be correct and the buyers’ net payoff remains to be \( V^L(q^o_l) - p^o_l \cdot q^o_l \).

Consider, fifth, the event \( S = L \) and \( s = h \) but \( s^o = l \). This event occurs with probability \( (1 - \mu) \cdot (x^o - x) \). Since the agent’s shirking has caused the wrong signal, the buyers are entitled to expectation damages amounting to

\[
D^L = \max \left[ V^L(q^o_l) - p^o_l \cdot q^o_l - \left( V^L(q^o_h) - p^o_h \cdot q^o_h \right), 0 \right]
\]

leaving them with a net payoff not below \( V^L(q_h) - p^o_h \cdot q^o_h \).

Consider, finally, the event \( S = L \) but \( s = s^o = h \) which occurs with probability \( (1 - \mu) \cdot (1 - x^o) \). For lack of causality, damages would not be awarded, leaving the buyers with net payoff \( V^L(q^o_h) - p^o_h \cdot q^o_h \).
By aggregating over the above six events, the buyer’s expected payoff \( \psi^e(x) \) under shirking is easily seen not to be lower than if the agent had met his duty, i.e. \( \psi^e(x) \geq \psi^e(x^o) \) must hold for any effort level \( x \). In other words, the compensation principle is met and, according to Proposition 2, any constrained efficient duty can be implemented under the all-or-nothing approach to expectation damages, at least if courts would know the hypothetical signal \( s^o \) for sure.

For later reference, let me summarize the above quantum of expectation damages within the setting of the numerical example. If the true state happens to be \( S = L \) but the market has been mislead by the wrong signal then buyers actually suffer a loss amounting to

\[
D_L = \frac{q_h^n - q_l^n}{2(n+1)} \cdot [(n + 2) \cdot A^H - n \cdot A^L] > 0.
\]

If, however, the true state is \( S = H \) it depends on the distortions under the market structure in place whether buyers actually suffer from any loss or not. In fact, since \( D^H \) amounts to

\[
D^H = \max \left[ \frac{q_h^n - q_l^n}{2(n+1)} \cdot \left( n \cdot A^H - (n + 2) \cdot A^L \right), 0 \right]
\]

a positive quantum of damages may or may not be awarded. For low values of \( n \), the above term may vanish in which case buyers rather enjoy a gain and, hence, cannot claim damages. Yet, as \( n \to \infty \), i.e. as perfect competition is approached, \( D^H \) will become positive.

So far, it was assumed that courts know the hypothetical signal. But if the hypothetical signal remains uncertain causality must be dealt with in an indirect way. A threshold may serve again as indicator. For the same reason as in the previous subsection, non-trivial duties that are constrained efficient will no longer be implementable under the all-or-nothing approach to expectation damages.

### 4.3 Expectation damages: correct on average

If the hypothetical signal remains uncertain, as a thought experiment, courts may still distinguish subevents according to whether the hypothetical signal would also be incorrect or not. In the first subevent, no damages are due whereas in the second event, the agent should be held liable for the full loss.
Since the two subevents cannot be distinguished, correct damages on average over the observed event offer a promising solution as I now want to show. In particular, the compensation principle would be met and constrained efficient duties could be implemented as follows from Proposition 2.

To calculate the buyers’ expected net payoff under this regime of expectation damages, several events must be distinguished again. First, suppose the true state is $S = H$ and, in spite of the agent’s shirking the correct signal $s = h$ has been observed. This event occurs with probability $\mu \cdot x$. It follows from the assumption of no informational gains due to shirking that the true signal $s^o = h$ would a fortiori have been obtained under due precision. The buyers’ payoff remains to be $V_H(q^o_h) - p^o_h \cdot q^o_h$ in this event.

Suppose, second, the true state still is $S = H$ but the wrong signal $s = l$ was actually obtained. This event occurs with probability $\mu \cdot (1 - x)$ and, as a thought experiment, must be divided into two subevents. Either the hypothetical signal is correct, i.e. $s^o = h$ or the hypothetical signal is equally wrong, i.e. $s^o = l$. In the first subevent, the correct quantum of expectation damages would be $D^H$ whereas in the second subevent, no damages are due (as in the previous section).

The two subevents cannot be distinguished. Based on the observed event, however, the probability of the first subevent turns out to be $(x^o - x)/(1 - x)$ if the assumption of no informational gains from shirking is maintained such that the correct expectation damages on average over the observed event amount to

$$d^H = \frac{x^o - x}{1 - x} \cdot D^H.$$  

Suppose, third, the event $S = L$ and $s = l$ is observed. This event occurs with probability $(1 - \mu) \cdot x$. By the assumption of no informational gains due to shirking, the hypothetical signal $s^o$ must also be correct and the buyers’ net payoff remains to be $V_L(q^o_l) - p^o_l \cdot q^o_l$.

Suppose, finally, the event $S = L$ and $s = h$ is observed. This event occurs with probability $(1 - \mu) \cdot (1 - x)$. As a thought experiment, two subevents must be distinguished again. The correct quantum of expectation damages on average over the observed event amounts to

$$d^L = \frac{x^o - x}{1 - x} \cdot D^L$$  

for the same reason as in the second event above.
By aggregating over the four events, the buyer’s expected payoff \( \psi^e(x) \) under shirking is easily seen not to be lower than if the agent had met his duty, i.e. \( \psi^e(x) \geq \psi^e(x^o) \) must hold for any effort level \( x \). In other words, the compensation principle is met if the correct quantum of expectation though, for lack of information, on average over the observed event were awarded. It then follows from Proposition 2 that constrained efficient duties can be implemented under such a regime of expectation damages, even if the hypothetical signal remains uncertain.

5 The general setting

In the setting of the simple model studied so far, the only damages regime generally supporting constrained efficient duties of the agent was identified as awarding correct expectation damages where, if information is lacking, averages should be taken over the observed event. In the present section, a general model is introduced allowing to generalize these findings.

Uncertainty is captured by a general random move of nature \( \omega \in \Omega \). The distribution of nature’s random move is exogenously given, independent from the trade decision. For simplicity, let me assume that \( \Omega \) is a finite set and that, from the ex ante perspective, move \( \omega \) occurs with probability \( \mu(\omega) \) such that \( \sum_{\omega \in \Omega} \mu(\omega) = 1 \) must hold.

Agent \( a \) is in charge of searching for information relevant for a trade decision \( q \) from an arbitrary set \( Q \) of alternatives. The trade decision affects a (finite) set \( I \) of parties. Let \( J = \{a\} \cup I \) denote the set of all parties, including the agent. If the move of nature is \( \omega \) then the payoff (utility) of party \( j \in J \) under trade decision \( q \) amounts to \( V_j(\omega, q) \). The agent’s function \( V_a \) captures his own stake in trade.

The agent decides on effort level \( x \) from a set \( X \) of possible alternatives and bears effort costs \( c(x) \). At effort level \( x \) and move of nature \( \omega \), he observes signal \( s = S(x, \omega) \) from a set \( M \) of possible signals. At the time of trade, his effort is hidden action and the signal is his private information.

At effort \( x \in X \) and disclosure strategy \( \sigma : M \to M \), the probability of signal \( s \) being revealed to the market amounts to

\[
\pi_s(x, \sigma) = \text{prob } \Omega_s(x, \sigma)
\]
where \( \Omega_s(x, \sigma) = \{ \omega \in \Omega : \sigma(S(x, \omega)) = s \} \) denotes the event of \( s \) being disclosed.

If the market (market structure \( n \)) believes move \( \omega \) to occur with probability \( m(\omega) \) then the trade decision \( q^n(m(\cdot)) \in Q \) will be taken at transfer payments \( t^n(m(\cdot)) \). Transfer payments are understood as a vector with as many components as there are parties in \( J \). The \( j \)-th component refers to the payment received by party \( j \). Transfer payments are balanced, i.e. \( \sum_{j \in J} t^n_j(m(\cdot)) = 0 \) is assumed to hold.

The legal duty \((x^o, \sigma^o)\) guides market believes in the sense that parties believe the agent to meet this duty. For these beliefs to be rational, they must be in line with Bayes’ rule. If the agent reveals signal \( s \) then the market believes the move of nature \( \omega \) to be from the event \( \Omega_s(x^o, \sigma^o) \) and assigns conditional probability \( m^o_s(\omega) = \mu(\omega) \pi^o_s(x^o, \sigma^o) \) if \( \omega \) is from this event, and \( m^o_s(\omega) = 0 \) else. As a consequence, if the agent discloses signal \( s \) then the quantity \( q^o_s = q^n (m^o_s(\cdot)) \) will be traded at transfer payments \( t^o_s = t^n (m^o_s(\cdot)) \).

The legal duty \((x^o, \sigma^o)\) also serves as a reference point for calculating expectation damages. To begin with, suppose that courts, ex post, can observe the move of nature. Moreover, due to their investigative prowess, courts are assumed to know the true effort \( x \) as well as the actual disclosure strategy \( \sigma \) of the agent. Then they will award expectation damages to party \( i \in I \) amounting to

\[
D_i(\omega, x, \sigma; x^o, \sigma^o) = \max \left[ V_i(\omega, q^o_{\sigma^o} + t^o_{\sigma^o, i} - (V_i(\omega, q^o_s) - t^o_{s, i}), 0) \right]
\]

where \( s = \sigma(S(x, \omega)) \) and \( s^o = \sigma^o(S(x^o, \omega)) \) denote the signal actually disclosed and the hypothetical signal, respectively, that would have been disclosed if the agent had met his duty. The corresponding expected surplus amounts to

\[
\gamma(x, \sigma; x^o, \sigma^o) = \sum_{j \in J} E \left[ V_j \left( \omega, q^o_{\sigma^o(S(x, \omega))} \right) \right] - c(x)
\]

whereas the aggregate expected payoff of parties \( I \) amounts to

\[
\psi(x, \sigma; x^o, \sigma^o) = \sum_{i \in I} E \left[ V_i \left( \omega, q^o_{\sigma(S(x, \omega))} \right) + D_i(\omega, x, \sigma; x^o, \sigma^o) \right]
\]
and is easily seen to satisfy the compensation principle \( \psi(x, \sigma; x^o, \sigma^o) \geq \psi(x^o, \sigma^o; x^o, \sigma^o) \) for any deviation \((x, \sigma)\) from the agent’s duty \((x^o, \sigma^o)\).

This duty is implementable under expectation damages if the agent has the incentive to meet his duty, i.e. if

\[ (x^o, \sigma^o) \in \text{argmax}_{(x, \sigma)} \gamma(x, \sigma; x^o, \sigma^o) - \psi(x, \sigma; x^o, \sigma^o) \]

holds. Moreover, the agent’s duty is constrained efficient if it maximizes the expected surplus, i.e. if \((x^o, \sigma^o) \in \text{arg max}_{(x, \sigma)} \gamma(x, \sigma; x^o, \sigma^o)\). The following proposition can be established by the same line of argument as in Proposition 2.

**Proposition 4** Under expectation damages, the compensation principle is met. Therefore, if the agent’s duty is constrained efficient then it can be implemented under expectation damages.

So far, I have assumed that, ex post, courts know the hypothetical signal. If they do not, they should still award correct damages along the above line though, for lack of observability, on average over the observed event. Due to Bayes’ rule, the compensation principle remains to be satisfied and, hence, constrained efficient duties can still be implemented under expectation damages, even if courts do not know the hypothetical signal for sure.

As in the simple model, the first best solution can always be implemented if correct expectation damages on average over the observed are awarded. If, however, the trade decision is distorted providing incentives proves more demanding. By disclosing information dishonestly, the trade decision may be affected in a way which reduces the distortion from market imperfections. As a consequence, the agent’s duty may fail to be constrained efficient which, in turn, may affect his incentives to investigate duly and to report honestly.

### 6 Concluding remarks

If a damages scheme meets the compensation principle and if the agent’s duty to investigate duly and to disclose the obtained information truthfully is efficient then the agent has the incentive to fulfil such duty. Restitution damages do not satisfy the compensation principle and, in fact, distort the agent’s effort incentives.
As for expectation damages, a verbal definition is in use that seems in line with the compensation principle. Yet, as soon as uncertain causation is involved, the widespread adherence to the all-or-nothing principle proves at odds with the compensation principle and, in fact, distorts incentives, at least if the hypothetical situation remains uncertain.

To specify expectation damages in line with the compensation principle, the interaction of the agent’s activities with nature should be visualized in what game theory calls normal form. This requires a random move of nature drawn independently from the agent’s decisions. The actual situation can then be compared with the hypothetical one where – at the same move of nature – the agent had met his duty.

In real cases, such a move of nature can hardly ever be observed. Yet, as a thought experiment, courts could partition the observed event into subevents for which the correct quantum of expectation damages is known. Moreover, based on the observed event, conditional probabilities could be assigned to these subevents which, in turn, makes it possible to calculate correct expectation damages on average over the observed event. While departing from the all-or-nothing principle, the proposed approach would be fully in line with the compensation principle. Moreover, if such expectation damages were granted and if the agent’s duties are constrained efficient he would have the incentive to meet them.

7 References


