

Crowding In: How Formal Sanctions Can Facilitate Informal Sanctions

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January 27, 2014

Abstract

A long line of legal scholarship has examined how formal or legal sanctions can deter misbehavior or facilitate cooperation. A second strand of legal scholarship asks how informal or reputational sanctions can accomplish these same goals. Insufficient attention has been paid to why, in reality, these two kinds of sanctions often co-exist and how they interact with each other. This paper attempts to fill this gap by analyzing how the two types of sanctions can be jointly deployed in a long-term, relational contract setting. The paper advances four claims. First, both legal and reputational sanctions are costly: legal sanctions require spending resources on litigation while reputational sanctions can lead to inefficient failures to trade. An optimal deterrence regime must, therefore, make a trade-off between these two types of costs. Second, in achieving optimal deterrence, the two sanctions function as both substitutes and complements. As substitutes, relying more on one type of sanction requires less of the other to reach any desired level of deterrence. As complements, formal sanctions—by revealing information about past misconduct—can improve the performance of the informal sanctions. Indeed, a desire to generate information can explain why contracting parties might want legal liability to turn on a fault-based standard (such as “best efforts,” “commercially reasonable efforts,” or “good faith”). Third, the paper argues that the most effective deterrence regime will often combine both types of sanctions. By keeping legal sanctions low, the regime keeps the litigation costs in check while taking advantage of the informational benefits of litigation. Reputational sanctions, then, can make up for any shortfall in deterrence. Finally, the paper shows how various empirical findings are consistent with the theoretical predictions.

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Introduction

How do we get contracting parties to do what they promised to do? Legal scholars have focused on two different mechanisms. First, a party who fails to keep its promise may have to pay damages or be subject to an order of specific performance, a formal or legal sanction. Second, the renegeing party might suffer a loss of future business and profits or be subject to other “reputational” punishment, an informal sanction. Legal scholars have mostly examined each mechanism independently. In searching for an efficient damages remedy, for example, scholars viewed that remedy as the only instrument influencing the behavior of the parties, setting reputational or informal consequences to one side. In studying reputational sanctions, legal scholars have frequently focused on instances where the parties opt out of the legal regime altogether.¹

While convenient for isolating the effects, the independence assumption does not fully capture the reality. For most transactions, both formal and informal sanctions are in play. The vendor that cheats his long-time distributor runs the risk of a lawsuit and also the risk that the relationship will not continue. Consumers who buy cars with defective brakes can file lawsuits. At the same time, markets react as consumers learn about the shoddy automobiles and buy from other, competing manufacturers. Our goals are to explore why both formal and informal sanctions often co-exist,² investigate how they might interact with each other, and ask what that

¹ The places where only informal sanctions are used (or where informal sanctions are the primary tools) are surprising and interesting. See Stewart MacCaulay, *Noncontractual-Relations: A Preliminary Study*, 28 *Amer. Soc. Rev.* 1 (1963) (commercial entities relying primarily on reputational sanctions); Robert Ellickson, *A Hypothesis of Wealth Maximizing Norms: Evidence from the Whaling Industry*, 5 *J. Law, Econ. & Org.* 83, 94 (1989) (Whalers in New England); Robert Ellickson, *Order Without Law: How Neighbors Settle Disputes* (1991) (Ranchers in Shasta County); Lisa Bernstein, *Opting Out of the Legal System: Extra Legal Contractual Relations in the Diamond Industry*, 21 *J. Leg. Stud.* 115 (1992) (diamond merchants in New York); Barack D. Richman, *How Communities Create Economic Advantage: Jewish Diamond Merchants in New York*, 31 *Law & Social Inquiry* 383 (2006); and Lisa Bernstein, *Private Commercial Law in the Cotton Industry: Creating Cooperation Through Rules, Norms, and Institutions*, 99 *Mich. L. Rev.* 1724 (2001) (buyers and sellers in the cotton industry); Stuart Green, *Plagiarism, Norms and the Limits of Theft Law*, 54 *Hastings L.J.* 167 (2002) (academic plagiarism); and Dotan Oliar and Chris Sprigman, *There’s No Free Laugh (Anymore): The Emergence of Intellectual Property Norms and the Transformation of Stand-Up Comedy*, 94 *Va. L. Rev.* 1789 (2008) (stand-up comedians). For theoretical and doctrinal analyses of relational contracts, see, e.g., Ian Macneil, *Contracts: Adjustments of Long-term Economic Relations under Classical, Neoclassical, and Relational Contract Law*, 72 *Nw. U. L. Rev.* 854 (1978); Charles Goetz & Robert Scott, *Principles of Relational Contracts*, 67 *Va. L. Rev.* 1089 (1981); Robert Scott, *Conflict and Cooperation in Long-Term Contracts*, 75 *Cal. L. Rev.* 2005 (1987); David Charny, *Nonlegal Sanctions in Commercial Relationships*, 104 *Harv. L. Rev.* 373 (1990); Alan Schwartz, *Relational Contracts in the Courts: An Analysis of Incomplete Agreements and Judicial Strategies*, 21 *J. Leg. Stud.* 271 (1992); Robert Scott, *The Case for Formalism in Relational Contract*, 94 *Nw. U. L. Rev.* 847 (2000); and Robert Cooter & Ariel Porat, *Should Courts Deduct Nonlegal Sanctions from Damages?*, 30 *J. Leg. Stud.* 401 (2001).

² This is not the first study to examine how formal and informal sanctions can co-exist. Recently, Gilson, Sabel, and Scott have examined how two commercial contracting parties can “braid” formal and informal mechanisms to achieve desirable outcomes. Gilson, et. al. *Braiding: The Interaction of Formal and Informal Contracting in Theory, Practice, and Doctrine*, 110 *Colum. L. Rev.* 1377 (2010). See also Iva Bozovic and Gillian Hadfield, *Scaffolding: Using Formal Contracts to Build Informal Relations in Support of Innovation* (2013). Our objective is to formalize this interaction using repeated game theory and to examine other areas where both types of sanctions are in play, such as consumer contracts. This is also the first paper to highlight the implications of the interaction for the judicial interpretation of best efforts and good faith. Economists have also been interested in the interaction between formal

interaction means for contractual interpretation and policy debates involving whether market checks or legal liability should be used to deter misconduct.³

Using a simple repeated game model, the paper advances four claims about the relationship between formal and informal sanctions. First, both legal and reputational sanctions are costly. Legal sanctions require spending resources, including time, money, and opportunity cost on litigation. Reputational sanctions, on the other hand, involve failures or refusal to trade even when trade may be beneficial to the parties.⁴ While the cost of relying on formal dispute resolution mechanisms has been widely recognized in the literature,⁵ legal scholars have been less cognizant that reputational sanctions can also create inefficiencies. As a result, legal scholars often place a thumb on the scale in favor of using reputational mechanisms to solve the deterrence problem.⁶ Our approach more explicitly accounts for the pros and cons of each mechanism and asks what an efficient deterrence regime for contractual breach might entail.

Second, we identify that the formal and informal sanctions operate as both substitutes and complements. In reaching a desired level of deterrence, relying more on legal sanctions requires less of the reputational sanctions, and vice versa: they are substitutes. At the same time, the

and informal sanctions. For some theoretical works in this literature, see Paul Milgrom, Douglass North, and Barry Weingast, *The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagne Fairs*, 2 *Economics and Politics* 1 (1990); George Baker, Robert Gibbons, and Kevin Murphy, *Subjective Performance Measures in Optimal Incentive Contracts*, 109 *Q. J. Econ.* 1125 (1994); Jonathan Levin, *Relational Incentive Contracts*, 93 *Am. Econ. Rev.* 835 (2003); and Bentley C. MacLeod, *Optimal Contracting with Subjective Evaluation*, 93 *Am. Econ. Rev.* 216 (2003).

³ In theory, either formal sanctions or informal sanctions may be sufficient to prevent, or equally effective in preventing, misbehavior. The work of Professor Gary Becker, for example, teaches that the legal system can achieve deterrence through sufficiently high damages. See Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 *J. Pol. Econ.* 169 (1968). See also, Steven Shavell, *The Design of Contracts and Remedies for Breach*, 99 *Q. J. Econ.* 121 (1984). Works by Professor Robert Ellickson, on the other hand, demonstrate that sometimes reputational or informal sanctions alone can induce desirable behavior. See Robert Ellickson, *A Hypothesis of Wealth Maximizing Norms: Evidence from the Whaling Industry*, 5 *J. Law, Econ. & Org.* 83, 94 (1989) (*Whalers in New England*); Robert Ellickson, *Order Without Law: How Neighbors Settle Disputes* (1991) (*Ranchers in Shasta County*).

⁴ We focus on informal sanctions that involve no trade (or boycott) to make the analysis easy to follow. There are, of course, other possible informal sanctions. A firm who fails to meet its commitments today might be forced to drop its price to “win” back its customers. It may also have to offer a more generous warranty (or liquidated damages) or other favorable non-price attributes. Neither of these mechanisms, just like boycott, are perfect. Generous warranties can induce more frequent litigation and engender additional litigation costs. The price cut option has the potential to be an “efficient” punishment scheme, i.e., it may be able to induce the seller to cooperate without generating any inefficiency due either to litigation or no trade. See Joseph Farrell & Eric Maskin, *Renegotiation in Repeated Games*, 1 *Games & Econ. Behav.* 326 (1989). However, creating such an efficient punishment mechanism requires the parties to be quite patient. If they are not, relational sanctions will have to entail some inefficiency (such as litigation, boycott, or lack of cooperation). See *infra* note ___ and the corresponding main text for a more in-depth analysis on this issue.

⁵ Steven Shavell & Mitch Polinsky, *The Uneasy Case for Products Liability*, 123 *Harv. L. Rev.* 1437, 1470 (2010) (“The preceding review of findings about the costs of the tort system implies that, for each dollar that an accident victim receives in a settlement or judgment, it is reasonable to assume that a dollar of legal and administrative expenses is incurred”); and Alan Schwartz & Robert E. Scott, *Contract Theory and the Limits of Contract Law*, 113 *Yale L. J.* 541, 584 (2003) (noting that “parties should be permitted to realize the [litigation] cost savings from contract interpretations on minimal evidentiary bases even if, in any given case, the odds of an accurate interpretation would be higher with a broader base”).

⁶ See Polinsky & Shavell, *supra* note ___, at ____.

imposition of legal sanctions can produce information for the market participants to engage in better tailored reputational sanctions. Legal sanction might identify whether the seller was negligent or operated in bad faith. This information can be used by the counterparties: negligent or bad faith sellers can be punished more severely by other market actors. In this way, legal sanctions can facilitate or complement reputational sanctions.

In facilitating reputational sanctions, the content of the legal obligation matters. To define contractual duties, parties to relational contracts often will be better off using a vague clause like “best efforts.” Due to its vagueness, best efforts clause implicitly grants the court flexibility to look at multiple performance metrics or signals in determining liability. Under such an open-ended standard, a court might consider (1) whether spending on product promotion would have forced a distributor into bankruptcy;⁷ (2) whether a distributor had the capacity to promote the merchandise;⁸ or (3) the reasons why the seller’s (or the buyer’s) effort produced less than expected.

Each metric, of course, will be imperfectly correlated with what actually transpired, i.e., whether the seller acted primarily for the benefit of himself at the expense of the buyer. Multiple noisy signals, however, are more informative than one noisy signal. As a result, resting liability on multiple signals increases the deterrence of the legal sanction.⁹ Since the legal sanction provides more deterrence, the parties can rely less on reputational sanctions. This reduction, we suspect, is particularly important in long-term relationships where the suspension or disruption of trade imposes large switching costs on the parties.¹⁰

Finally, in many cases, contracting parties will use threats of both formal and informal sanctions to control opportunism. Relying solely on either formal or informal sanctions incurs too much cost, either in terms of too frequent litigation or a complete or near-complete termination of a beneficial relationship. By combining the two types of sanctions, contracting parties can often achieve the best outcome, given the constraint that neither sanction is costless.

Let us illustrate these three theoretical points with the help of a more concrete example. Take a vendor, say, a supplier of pool filters. The vendor wants its distributors to feel comfortable that the pool filters will meet expectations: that the filters will be delivered on time and be of sufficient quality (“conforming”) to please the distributors’ customers. Why might the vendor deliver the promised quality? One reason is the contract itself: it promises, backed by a warranty or a liquidated damages term, that the pool filters will meet a certain quality. A second

⁷ See *Bloor v. Falstaff Brewing Corp.*, 601 F.2d 609 (2d Cir. 1979) (noting that the distributor was not required to spend itself into bankruptcy).

⁸ See *Bloor v. Falstaff Brewing Corp.*, 454 F. Supp. 259 (S.D.N.Y. 1978) (noting that the contract required the distributor to merchandise the product to the extent of its capacity).

⁹ This is known as the “informativeness principle” in contract theory literature. Usually, the principle is laid out in terms of likelihood ratios, the ratio of two probabilities conditional on certain events. In providing incentives, the players should utilize all noisy signals that are correlated with seller’s effort. See Bernard Salanie, *The Economics of Contracts* 139 (2d ed. 2005); Bengt Holmstrom, *Moral Hazard and Observability*, 10 *Bell Journal of Economics* 74 (1979).

¹⁰ While we are emphasizing the informational benefits of litigation, information flow will often be bilateral. Contracting parties’ current and past interactions can often provide beneficial information for the courts in determining breach and remedy. Indeed, the Uniform Commercial Code expressly sanctions the use of course of performance and course of dealing evidence to “explain and supplement” the writing. UCC §2-202.

reason is a fear of lost business—a reputational hit. If the vendor fails to deliver on her promise, distributors may not buy from her in the future. One might think of the contract sanction and reputation sanction as different commitment devices for the vendor. With either or both devices in place, the distributors understand that the vendor will suffer a loss if she cheats on quality.

Neither commitment device is perfect, however. To enforce the vendor's promise of a warranty or the liquidated damages provision in the contract, a disappointed distributor might need to initiate a formal proceeding, which can be expensive and time-consuming. In this lawsuit, the accused vendor might claim that the filters conformed to the contractual specifications. Resolving this dispute requires time and resources. On the other hand, the imposition of reputational penalties—a boycott of the vendor—involves the termination or suspension of an otherwise viable economic relationship. The disappointed distributor could have to search for an alternate vendor.¹¹ Ex ante, in choosing between formal and informal sanctions, the parties will trade off litigation cost on one hand with cost of terminating (or suspending) the relationship on the other. By calibrating the liquidated damage award appropriately, the parties are able to make this tradeoff.

Take the case where the vendor offers a robust promise as to quality, backed by a large liquidated damages penalty for breach. With sufficiently large damages, the distributor need not resort to the threats of discontinuing the relationship to get the vendor to act appropriately. Fear of the lawsuit and having to pay large damages will provide the necessary incentive. At the opposite end of the spectrum, the vendor makes a quality promise backed by minimal or no liquidated damages. If the pool filters fail to meet the promised quality, the distributor lacks a legal cause of action, and because legal sanctions are unavailable, the distributor must carry out his threat to end (or suspend) the relationship in order to create trust in the first place. As the parties rely more on the legally enforceable remedy, the less is required of the reputational sanction. In this way, legal sanctions “crowd out” the reputational sanctions.¹²

What about a little of both types of sanctions? One example might be a promise backed by a moderate liquidated damages provision. As compared to the robust legal remedy, the moderate remedy produces less litigation and, as a result, lower litigation costs. It produces less litigation because some distributors, given the prospect of only a modest potential recovery, won't bother filing suit even when the product turns out to be of poor quality. At the same time, as compared to no legal remedy, the moderate remedy requires fewer lost future sales to bond the vendor to keep its promise.

¹¹ There may be two different reasons why a distributor may no longer deal with the vendor. When a distributor finds out that the supplied filters do not meet the qualifications, this may make her realize that the value of the filters is substantially less than what she had originally expected. Alternatively, a distributor may refuse deal with the vendor as a punishment mechanism. The first is an “information” story that lets distributors recognize that the surplus from trade is substantially lower or negative. The second is a “deterrence” story that allows the distributors to engage in a collective action to deter vendor misbehavior. While, in reality, both will often co-exist, we are more interested in the latter, deterrence story.

¹² The phrase “crowding out” is used most often in the law and society literature to represent a phenomenon where a use of formal mechanism undermines informal relationships or makes them “less effective.” See Ellickson and others. Our use of “crowding out” has a slightly different meaning, in that as more formal sanctions are used, because more deterrence is being provided through formal sanctions, informal sanctions become “less necessary.”

With the combination approach, upon the delivery of low quality, the vendor pays (or expects to pay) some damages for breach and also loses some future sales. This approach is likely to be the most efficient option when litigation costs are spread out among the distributors: when some distributors end up having a low cost of litigation while others end up facing a high cost of litigation. In that case, the cap on damages ensures that the distributor with high litigation costs won't find it worthwhile to file suit. This, in turn, prevents the accumulation of the hefty litigation costs. At the same time, by providing a more limited remedy, the vendor still exposes itself to some threat of litigation from the distributor with a low cost of litigation. And, given that formal sanctions and reputational sanction work as substitutes, preserving this litigation threat means that reputational penalty can be less severe.

Legal sanctions can also facilitate reputational sanctions. For a group of distributors to effectively impose reputational sanctions on the vendor, they must somehow share the information on the history of their respective relationship, for instance, whether the vendor broke its promise or delivered a shoddy product to a distributor in the past. As the number of distributors gets large and as they become more geographically separated, the sharing of information becomes more difficult, reducing the effectiveness of reputational sanctions. Using legal sanctions can help the dispersed distributors overcome the informational hurdle. Litigation, in particular, often generates publicly observable information, such as filing or dismissal of a lawsuit or the determination of the vendor's liability. To the extent that such information correlates with the vendor's true behavior, distributors can use this information to coordinate efforts in imposing reputational sanctions. Through information production, legal sanctions thus can "crowd in" reputational sanctions.

The coordinating function becomes more effective when the court's finding generates information that did not previously exist in the market, for instance, through its determination of negligence, lack of best efforts, or bad faith. True, such fault-based inquiries are apt to increase the cost of litigation. This cost must be weighed against two benefits. First, as noted, fault based inquiries instruct the court to base liability on multiple noisy signals of the seller's conduct, increasing the deterrence impact of the legal sanction. Second, with a fault-based standard, the parties fire the reputation penalty less frequently, saving on the cost of the informal sanction. As an example, compare two contracts, one with a best efforts clause and one without. Without the best efforts clause, reputational sanctions arise whenever quality is low. With a best efforts clause, reputational sanctions arise only when (1) quality is low and (2) the court determines that the seller failed to provide best efforts, a less common event.

After laying out the basic theoretical points, as the fourth and the final claim, the paper shows how the predictions of the framework are consistent with empirical evidence and descriptive accounts drawn from a variety of areas. In each area, a combination of reputational and legal sanctions attaches to a failure to perform as expected. Many times, the publicity associated with a pending legal sanction triggers the reputational sanction. In each area, the legal sanction is costly. Recognizing this fact, the policy debates involve a push to limit the legal remedy to control litigation costs. Yet, despite the cost of formal sanctions and ability of markets to punish bad behavior, some, albeit limited, legal sanction remains. Why? The informational benefit of litigation and the ability of legal sanctions to dampen the inefficiencies associated with market punishments provide two reasons to preserve a limited legal remedy.

Finally, our discussion of best efforts and good faith shows why this concept plays such a substantial role in long-term relational contracts.

The paper is organized as follows. Part I presents a numerical example to demonstrate the tradeoffs between legal and reputational sanctions in the context of two long-run parties. Part II extends the example to consider “best efforts” as a clause in the long term agreement. It also provides a discussion of how courts might deploy the concept of good faith in a more economically consistent manner. Part III shifts to consumer contracts, places where one seller is facing a dispersed set of consumers. Part IV shifts from theory to applications. Drawing from existing empirical scholarship, the Part discusses situations where a combination of formal and informal sanctions is used to control misconduct. The last Part concludes.

I. Optimal Relational Contracting

To better understand the tradeoffs between legal and reputational sanctions, we present a numerical example that relies on the tools of repeated game theory.¹³ Our goal is to lay out the main ideas while keeping the example as simple as possible. We first present the basic ingredients of the model, show some benchmark results, and then proceed to the main analysis. The example highlights how legal and reputational sanctions can be used together to create an optimal deterrence regime, and also the conditions under which the deterrence regime may want to rely on one or the other, or both.

A. The Basic Setup

Imagine a buyer and a seller engaged in a long-term, repeated relationship.¹⁴ They can transact in periods 1, 2, 3, and on. In any period, the relationship can terminate with some positive probability (due, for instance, to an unforeseen dissolution or liquidation of one of the parties). In addition, the parties value present dollars more than future dollars. Both of these effects can be captured by assuming the parties discount future earnings by a factor of 0.9. This means, for instance, that \$100 in period 3 is worth $(0.9) \times \$100$ or \$90 in period 2 or worth $(0.9) \times (0.9) \times \100 or \$81 in period 1.

¹³ A few papers in the law literature have more expressly used repeated game theory in analyzing the issues of reputation. See, e.g., Robert Scott, *Conflict and Cooperation in Long-Term Contracts*, 75 Cal. L. Rev. 2005 (1987); Eric Posner, *Law and Social Norms* (2000); and Paul Mahoney and Chris Sanchirico, *Norms, Repeated Games, and the Law*, 91 Cal. L. Rev. 1281 (2003). In a companion paper, we present a more formal, game theoretic model. See Scott Baker & Albert Choi, *Managing Reputation with Litigation: Why Legal Sanctions Can Work Better than Market Sanctions*, Virginia Law and Economics Research Paper No. 2013-02, Washington University in St. Louis Legal Studies Research Paper No. 13-03-01. While dealing with a similar topic, the companion paper deals with other issues, such as transmission of information in non-relational setting (when the seller deals with a new buyer each period), the presence of court error in verifying the realized quality, and the game theoretic issues related to subgame perfection and renegotiation-proofness in punishment.

¹⁴ The buyers and sellers could be any two commercial parties interacting repeatedly, for instance, a vendor and a distributor, a movie studio and talent agency, a building company and a supplier of raw materials. There are (at least) two ways of thinking about the long-term relationship. The parties could be interacting in a spot transaction in each period, with the (implicit) understanding that they will continue their relationship in the future. In the other, they could have signed a long-term requirements contract (that is renewable), which gives the buyer the discretion of ordering zero from the seller.

Each period the buyer approaches the seller and inquires about purchasing a single unit of good (product or service). To keep the analysis simple, assume that the seller, in response, makes the buyer a take-it-or-leave-it offer, which the buyer accepts or rejects.¹⁵ The seller's offer contains three elements: description of the good (q), price (p), and liquidated damages (or warranty) term (d). As described in more detail later, the liquidated damages term is what the seller promises to pay in the event the product turns out to be "low" quality (or when the good does not meet the specifications or fails to function as requested). If the buyer rejects the offer, both parties get a payoff of zero for that period.¹⁶

If the buyer accepts, the buyer pays the price. Next the seller can costly exert effort that affects the quality of the delivered good (or affects the probability that the good will be conforming). She might, for example, decide how much time to spend ensuring that the good produced for the order meets the buyer's specifications. The seller can decide to exert either high or low effort. The effort translates into the delivery of a high or low quality good. The seller's effort is unobservable to the buyer or to any third party. Low effort—"defection" in the language of the prisoner's dilemma—costs the seller \$10. At the same time, low effort doesn't inevitably lead to low quality. The seller can still get lucky and deliver a high quality good even with low effort. To capture this possibility, assume low effort leads to a twenty-five percent (25%) chance of producing high quality. On the other hand, high effort or "cooperation" costs the seller \$40. It is more effective than low effort at generating high quality. Specifically, assume that high effort carries a seventy-five percent (75%) chance of producing high quality.

The buyer values high quality goods more than low quality. Assume that the buyer values high quality at \$100 and low quality at \$0. Given these numbers, it is efficient for the seller to choose high, rather than low, effort. With high effort, the expected surplus from the transaction is \$35 ($= (0.75) \times (\$100) + (0.25) \times (\$0) - \40). By contrast, with low effort, the expected surplus from the transaction is \$15 ($= (0.25) \times (\$100) + (0.75) \times (\$0) - \10).¹⁷ The following table summarizes the parameters of the relationship.

¹⁵ Allowing the seller to make a take-it-or-leave-it offer to the buyer makes the seller the residual claimant of the transaction. This convenient assumption allows us to compare the efficiency of different sanctioning regime by simply looking at the seller's long-run profit. If the buyer and the seller were to split the surplus, although the basic analysis will remain the same, efficiency comparison will become more cumbersome. We will also have to use slightly different sanctioning mechanism (for instance, longer reputational punishment) to provide the requisite incentive.

¹⁶ Outside reservation values are "normalized" to zero for convenience. Zero represents the value of the parties next best alternative.

¹⁷ Even when the seller chooses low effort, the expected surplus is still positive. Alternatively, we could assume that, with low effort, the expected surplus is negative. This will be true, for instance, if the probability of obtaining high quality with low effort is less than 10%. In that case, without a successful deterrence mechanism, the parties will never trade: the market will fall apart. Also, the only viable punishment mechanism (assuming that the seller exerts low effort in punishment state) is no trade.

	Probability of High Quality (Conforming)	Expected Value	Cost of Effort	Net Surplus
High Effort (Cooperate)	75%	\$75	\$40	\$35
Low Effort (Defect)	25%	\$25	\$10	\$15

Table 1: Transactional Parameters

After the seller exerts effort, the good is produced and delivered, and both parties observe the quality realized. Even though it is efficient for the seller cooperate and put in high effort absent any sanctions, such an outcome is not obtainable.¹⁸ The reason stems from the fact that the seller’s effort choice is not observable and cannot be contracted upon. Conditional on any price, because high effort costs the seller more than low effort, she has no incentive to exert high effort. Suppose the buyer pays \$75 for the product, having faith that the seller will put in high effort. If the seller were to put in high effort—at a cost of \$40—she reaps a profit of \$75-\$40 or \$35. Low effort, in contrast, costs only \$10 and leads to a profit of \$75-\$10 or \$65. In a very simple way, these numbers reveal the presence of a moral hazard (or commitment) problem. Since the buyer’s payment is independent of seller’s effort and effort is costly, our seller avoids high effort.¹⁹

The buyer, of course, understands the seller’s incentives and adjusts her expectations in accordance. When the seller exerts low effort, the expected value of the good is \$25 (= (0.25)×(\$100)+(0.75)×(\$0)). That number thus represents the maximum the buyer will be willing to pay for the contract. In equilibrium, given her power to make a take-it-or-leave-it offer to the buyer, the seller will offer slightly less than \$25 for the contract; the buyer will accept the offer and expect that the seller will put in low effort. This expectation will then be confirmed as the seller chooses low effort. The end result is low prices and low seller effort. Due to the problem of moral hazard, even though it is efficient for the seller to put in high effort, without any formal or informal sanctions, the buyer and seller cannot achieve this outcome. So,

¹⁸ This is a classic example of one-sided moral hazard, most often used in principal-agent settings. By assumption, the seller is the only party that chooses unobservable input. We use one-sided moral hazard example to demonstrate the main ideas without too much complication. In many commercial settings, of course, one would expect both parties to engage in behavior (some of which may be unobservable) that affects the value of the relationship. That type of relationship can be represented by two-sided moral hazard, prisoners’ dilemma type models. Our results can be easily extended to such settings.

We also do not allow the seller to be of different “types” so as to shy away from the issues of adverse selection. When different seller types have different costs of effort, some may have an incentive to mimic others and that pooling can lead to inefficiency. When the buyer’s learning is “unbounded,” however, i.e., the buyer has knowledge of outcomes from all past transactions, the seller types will eventually be separated, and the adverse selection issue will disappear, leaving only the per period moral hazard concerns.

¹⁹ Our seller acts like a fully insured individual in the classic discussions of moral hazard. Fully insured individuals shirk. See Steven Shavell, *On Moral Hazard and Insurance*, 4 Q. J. Econ. 541 (1979) (articulating a model of insurance and moral hazard). The critical element here is the unobservability and non-verifiability of the seller’s effort. Timing of the payment is less important. Even if the buyer were to pay the price at the same time as the seller choosing effort, the same result will hold.

they end up realizing a much lower expected surplus from their relationship. The following table presents the parties' strategies and outcomes.

	High Effort (Cooperate)	Low Effort (Defect)
Not Purchase (Reject)	(\$0, \$0)	(\$0, \$0)
Purchase (Accept)	(\$75-p, p-\$40)	(\$25-p, p-\$10)

Table 2: Stage Game Payoffs

The left most column represents the buyer's choices. She can either accept or reject the seller's offer (or approach or not approach the seller about possible trade). The first row represents the seller's possible actions. She can put in high or low effort. If the buyer rejects the offer, both parties get a payoff of \$0, which is represented in the second row. The efficient outcome is for the buyer to purchase and the seller to put in high effort (Purchase, High Effort). Such combination generates respective profits of \$75-p for the buyer and p-\$40 for the seller. However, conditional on the buyer's acceptance of the seller's offer, it is strictly in the seller's interest to choose low, rather than high effort. The reason is that, conditional on buyer's purchasing the product, the payoff from low effort (p-\$10) is always larger than the payoff from high effort (p-\$40). And that's true regardless of what the price is. In game theory terms, low effort is the seller's (weakly) dominant strategy.²⁰ Hence, the buyer and seller end up in the inefficient cell corresponding to (Purchase, Low Effort). The respective profits are \$25-p and p-\$10.

B. When Enforcement is Costless

Now we consider the two primary methods of solving the moral hazard problem: litigation and reputation. The legal sanction takes the form of payment of liquidated damages. The reputational sanction involves a suspension or termination of relationship.²¹ Either will be triggered when the buyer observes an undesirable outcome, such as low quality product or the seller shirking (i.e., putting in low effort). Both will motivate the seller to select high effort. Furthermore, when legal and reputational sanctions are costless to impose, the parties can achieve the first best outcome: high effort and high prices, with no loss of surplus.

First, take the legal sanctions. Suppose that the buyer can bring a lawsuit against the seller to collect liquidated damages (d) when the realized quality is low. As a benchmark, assume that the lawsuit imposes no cost on either party and the court perfectly verifies the realized quality. Without any litigation cost, by promising sufficiently high damages, the parties

²⁰ The parenthetical "weakly" is there because the seller is indifferent between the two levels of effort when the buyer does not purchase from her, i.e., she only weakly prefers low effort conditional on no purchase. In prisoner's dilemma setting, numbers are set up such that "defection" is a strictly dominant strategy for each player.

²¹ Legal sanctions, in the form of damages, can be thought of as a "stick" mechanism against misbehavior, while reputational sanctions, by allowing the seller to preserve the long-term relationship, can be thought of as a "carrot" mechanism. So, the main issue can be recast as a problem of whether the parties should utilize more of the stick or the carrot mechanisms.

can achieve the first best. For example, suppose the seller promises to pay damages (d) of \$100 if she delivers low quality.²² After collecting the price (p) from the buyer, the seller needs to decide whether to put in high or low effort—to cooperate or deviate.

In contrast to our case with no enforcement mechanism, because the seller's effort choice affects the damages she expects to pay, the seller's calculus is different. With the damages of \$100, if the seller were to put in high effort, her expected profit is $p - (0.25) \times (\$100) - \$40 = p - \$65$. The second term, $(0.25) \times (\$100)$, reflects the fact that, even with high effort, there is a 25% chance the seller will deliver low quality. At that moment, the buyer will sue and the seller will have to pay \$100 in damages. If, instead, the seller were to choose low effort, her expected profit is $p - (0.75) \times (\$100) - \$10 = p - \$85$. Compared to high effort, the middle term in the low effort expression has gone up: the probability of having to pay \$100 of damages is now 75% instead of 25%. The last term, by contrast, falls from \$40 to \$10 to reflect the lower cost of effort.

Since $p - \$65$ is larger than $p - \$85$, the \$100 liquidated damages award motivates the seller to exert high effort.²³ With high effort, the seller faces a lower expected damages award, but a higher cost of effort. Given that litigation is costless and the court can perfectly verify the realized quality, the seller can set the damage award as high as needed to ensure the cost-savings from a lower expected award more than offsets her higher cost of effort.²⁴ More important, because litigation is costless, the seller's commitment to pay high damages solves the incentive problem without entailing any loss in transactional surplus whatsoever.²⁵

Next consider the reputational sanctions. Suppose, in a departure from the initial assumptions, the buyer actually observes the seller's effort. Think about the harshest possible reputational sanctions: whenever the buyer observes low effort ("deviation") by the seller, the buyer never purchases from the seller again (using the "grim trigger" punishment strategy).²⁶

²² Throughout the analysis, we assume that the court accurately determines whether the product is low quality or not. Thus, the buyer can't falsely claim a high quality good is low quality and recover under the liquidated damage provision. This assumption takes nuisance or frivolous lawsuits off the table.

²³ Indeed, any damage award larger than \$60 will solve the problem. For the seller to put in high effort, we need $p - (0.25) \times d - \$40 \geq p - (0.75) \times d - \10 . When we solve for d , we get $d \geq \$60$.

²⁴ We are assuming away the anti-penalty doctrine in contract law that limits the amount of liquidated damages that the parties can post. When such limitations exist, the parties' ability in providing necessary deterrence may be limited. We are also assuming away that the parties, the seller, in particular, are judgment-proof. With judgment-proof seller, the damages may not be bigger than the price the buyer pays the seller.

²⁵ This is an example of the court costlessly verifying the realized quality. Using price and damages is tantamount to setting up an incentive pay system. We have implicitly assumed that both parties are risk-neutral and neither are judgment-proof. If one or both of the assumptions do not hold, even with perfect verification by court, because quality realization only imperfectly translates to seller's effort, imposing an incentive system can generate some deadweight loss, either in the form of imposing risk onto a risk-averse party and leaving some surplus to a judgment-proof party.

²⁶ Given that, even with low effort, the expected surplus from the transaction is positive (at \$15), a more efficient reputational punishment is for the seller to choose low effort and offer \$15 to the buyer and for the buyer to accept in each punishment period. Such a punishment strategy can be sustained by shifting the buyer's belief: once the buyer observes low quality, the buyer now believes (during the punishment period) that the seller will put in low effort for any price larger than \$15. In punishment stage, stage-game Nash equilibrium of (Purchase, Low Effort) is obtained. Such a punishment strategy still works in inducing the seller to cooperate in non-punishment state since the seller earns a lower per-period profit in punishment state. Because the seller still earns some surplus in punishment, the punishment period will have to be longer. For this punishment strategy to work, however, the

Compared to the legal sanctions case, the analysis is slightly more involved but still straightforward. If the seller puts in high effort each period, the seller will make a profit of $p-\$40$ in each period. With the discount factor of 0.9, the discounted value of the stream of payoffs equals $(p-\$40)/(0.1)$.²⁷ If the seller deviates and puts in low effort, she obtains the one-time cost-savings associated with shirking. But that savings comes with a price tag. The seller will never be able to sell to the buyer again. The seller's payoff to low effort is thus $p-\$10$.

expected surplus, with low effort, has to be positive. If we alternatively assume that the expected surplus under low effort is negative (for instance, by assuming that the probability of obtaining high quality with low effort is less than 10%), punishment has to resort to no trade, since when the seller chooses low effort in punishment, the expected surplus is negative.

Both types of punishment strategies are inefficient. Any reputational sanctions that entail inefficiency (including suspension or termination of trade) will be subject to the problem of renegotiation. That is, when the buyer is supposed to "impose" punishment (either through suspension/termination or shifting her beliefs about the seller's effort choice), given that there is a positive surplus from trade when the seller puts in high effort, the players have an incentive to "renegotiate" out of the punishment phase. Such renegotiation will, of course, undermine the punishment strategy.

Furthermore, in our scheme, reputational sanctions will also be subject to the problems of subgame perfection. When the punishment, based on lower price or suspension of relationship, is to start, the seller may be able to unilaterally evade punishment by promising high enough damages (generous warranty). When damages are sufficiently high, the buyer should (correctly) believe that the commitment problem has been solved and should be willing to purchase from the seller. To the extent that such high damages still provides some profit to the seller, it will be in the seller's interest to bypass reputational punishment (which gives her zero profit) through damages. Given that higher damages are likely to lead to more litigation (and more deadweight loss), this constitutes yet another type of punishment against the seller.

The renegotiation-proofness issue and the subgame perfection issue can be addressed as follows. To impose an efficient punishment (where the parties trade and the seller puts in high effort in punishment state), the parties should not rely on any legal sanctions, since they produce deadweight loss through the cost of litigation. Also, the players should make sure that, even in punishment stage, the seller will have an incentive to exert high effort (cooperate). The efficient (renegotiation-proof and subgame perfect) punishment strategy will involve: (1) the seller posting a high price during cooperation stage; (2) in punishment stage, the buyer still purchases but at a lower price; (3) while in the punishment stage, when high quality realizes, the players revert back (the seller gets "rehabilitated") to the cooperation phase (with high price) with some positive probability; and (4) the low price in the punishment phase is high enough to guarantee the seller the profit she would have gotten had she posted high enough damages to solve the commitment problem using only legal sanctions. The third factor, positive probability of reversion back to the cooperation phase, is there to ensure the seller will have an incentive to exert high effort even in the punishment phase.

This efficient punishment strategy has two important limitations. First, because the players have to allow the seller to revert back to the cooperation phase from punishment phase, this will impose a limit on how strong the reputational punishment can be. A strong punishment, such as grim-trigger punishment strategy, will simply not be possible since, once in punishment phase, the seller will not have any incentive to exert high effort. Second, punishment is also limited because the seller has to make some positive profit even during punishment. Otherwise, the seller will bypass the punishment stage by offering high damages. These limitations imply that for the efficient punishment strategy to work, the players have to be very patient. See Baker and Choi, *Managing Reputation with Litigation: Why Legal Sanctions Can Work Better than Market Sanctions* (2013), for a more detailed analysis of these issues.

²⁷ The seller discounted stream of payoffs is $(p-\$40) \times (1 + 0.9 + 0.9^2 + 0.9^3 + \dots)$. The infinite sum in the second parenthesizes reduces to $1/0.1$.

Given that the buyer is willing to pay up to \$75 for the good when the seller exerts high effort and the seller makes a take-it-or-leave-it offer to the buyer, the seller will offer $p=\$75$. Now, the seller's long-run, discounted profit from exerting high effort (every period) is $(\$75-\$40)/(0.1)=\$350$. In contrast, if the seller deviates (once), she makes $\$75-\$10=\$65$. The reputational loss (i.e., the loss of all future sales) is clearly larger than the seller's one-time gain from deviation.²⁸ As a result, the threat of this loss provides sufficient incentive for the seller to put in high effort. More importantly, the parties can fully capture the surplus from trade without any loss. Because (1) the buyer observes the seller's effort choice and (2) in equilibrium, the seller chooses high effort, the buyer never carries out the reputational sanctions, regardless of the realized quality. When effort is observable, then, reputational sanctions will also achieve the first best.

C. Enforcement Costs

In reality, litigation is costly and players rarely observe other players' behavior with perfect accuracy. With respect to the latter, let's return to the initial assumption that the buyer does not observe the seller's effort choice and only observes the realized quality. With respect to the former, let's assume that, to bring a lawsuit, the buyer must incur a litigation cost. The litigation cost is uncertain *ex ante* and gets realized after the quality of the good has been determined. Like effort and quality, litigation cost can be either high or low, but with equal probability (50% chance for each). If the cost is high, the buyer must pay \$80 to go to court. If the cost is low, she must pay \$30. Although litigation is costly for the buyer, for the sake of simplicity, we assume that the seller does not incur any litigation cost and, as before, the court does not make any mistake in verifying the realized quality.²⁹

Adding the litigation cost slightly changes the timing of the game in each period. The sequence now runs as follows:

- (1) The seller makes a take-it-or-leave-it offer containing price, product description, and liquidated damages terms (p,q,d) ;

²⁸ Grim-trigger punishment strategy is clearly an over-kill, here. In fact, the buyer needs to suspend the relationship for only about 1 period after observing low effort by the seller to induce the seller to cooperate. The number 1 can be found as follows. Under cooperation, with $p=\$75$, the seller's long-run discount profit is \$350 $(=(\$75-\$40)/(0.1))$. Suppose that, if the seller were to deviate, the buyer suspends trade for T periods. When the seller deviates, the seller's long-run discount profit becomes $(\$75-\$10)+(0.9)^{T+1}\times(\$350)$. When we set this expression equal to \$350 and solve for T , we get about 0.95.

²⁹ The assumptions that the seller doesn't bear any litigation cost and the court does not make any mistake on verifying realized quality are done for simplification. With respect to the former, in addition to reducing the total surplus from trade, litigation cost on the seller will have an effect of producing additional deterrence. This is because the seller is more likely to face litigation and incur litigation cost when she deviates. Litigation cost on the seller, therefore, will make reliance on legal sanctions more attractive. Second, no court error but positive litigation cost is an example of costly but perfect verification. Unlike before, now the parties need to incur verification cost to receive a court judgment. If the court can make an error in its quality determination, it can lead the buyer to file suit (a "frivolous" suit) against the seller even when the realized quality is high, particularly when damages are sufficiently large. Allowing for such possibilities will make reliance on legal sanctions less desirable but will not change the main conclusions of the example. See Choi and Triantis, *Completing Contracts in the Shadow of Costly Verification*, 37 *J. Legal Stud.* 503 (2008) for a more general treatment of verification cost; and Baker and Choi, *Managing Reputation with Litigation: Why Legal Sanctions Can Work Better than Market Sanctions* (2013) for allowing frivolous litigation.

- (2) If the buyer accepts the offer, the buyer pays the price (p) and the seller chooses between exerting high or low effort;
- (3) The seller produces and delivers the good;
- (4) The quality of the good (high/low or conforming/non-conforming) is realized;
- (5) The buyer's litigation cost (high or low) is realized;
- (6) The buyer may bring a lawsuit against the seller, incurring the litigation cost; and
- (7) The court accurately determines the realized quality and, if low, the court grants the buyer the liquidated damages (d) initially promised.

In addition, following the outcome of the game in each period, the buyer can, in future periods, impose reputational sanctions against the seller by suspending or terminating the relationship.

Not surprisingly, once we take away costless litigation and perfect observability, efficiency can no longer be achieved. To provide incentives with formal sanctions, the buyer will have to incur litigation cost, which reduces the surplus from trade. With reputational sanctions, because suspension (or termination) of relationship is conditioned on observables, such as realized quality, rather than the seller's effort, a danger exists that the buyer will impose reputational sanctions even when the seller has put in high effort. If the buyer suspends the relationship after receiving low quality, the parties will be unable to reap any surplus from trade while they are in the punishment stage. In devising the optimal sanctioning mechanism, therefore, the parties will have to tradeoff the cost of litigation against the cost of misfiring reputational sanctions.

1. Legal Sanctions Only

What is the optimal mix of sanctions? To answer this question, let's first consider two polar cases: legal sanctions only and reputational sanctions only. First, take legal sanctions. For the parties to solve the commitment problem with only legal sanctions, damages have to be at least \$80. If the damages are set below \$30, given the possible litigation costs of \$30 or \$80, the buyer will never sue the seller when she observes low quality and the seller will have no incentive to exert high effort.

If the damages are set between \$30 and \$80, the seller will still have insufficient incentive for effort. To see why, suppose that the seller selects high effort. Her expected profit is $p - (0.25) \times (0.5) \times d - \40 . The second term is the expected damage payment, given high effort. With damages set between \$30 and \$80, if the buyer draws a high cost of litigation (\$80) she doesn't sue the seller even when the seller delivers low quality. Thus, given the seller exerts high effort, the probability the buyer both realizes low quality and finds a lawsuit worthwhile is $(0.5) \times (0.25)$.

If the seller deviates to low effort, her expected profit is $p - (0.75) \times (0.5) \times d - \10 . With low effort, damages are paid with probability $(0.5) \times (0.75)$. In words, with low effort, the seller delivers low quality 75% of the time and in half those sales she faces a lawsuit from the buyer. For the seller to have the incentive for high effort, we need $p - (0.25) \times (0.5) \times d - \40 to be larger than $p - (0.75) \times (0.5) \times d - \10 . But that requires damages to be at least \$120, a contradiction since we have confined the damages to between \$30 and \$80.

To solve the incentive problem with only legal sanctions, therefore, the damages have to be larger than \$80. Suppose the seller sets the damages at \$81, large enough to cover the litigation cost of any buyer. Now, the buyer will sue the seller to collect damages whenever quality is low. With 100% chance of litigation in case of low quality, the seller's expected profit, if she exerts high effort, is $p-(0.25)\times d-\$40$. Comparable profit under low effort is $p-(0.75)\times d-\$10$. In order to provide the necessary incentive, we need $p-(0.25)\times d-\$40$ to be (weakly) larger than $p-(0.75)\times d-\$10$, which is equivalent to damages (d) being larger than \$60. At $d=\$81$, this condition is satisfied.

Although using only the legal sanctions (with damages set at \$81) solves the incentive problem, the parties incur a lot of litigation costs in equilibrium. Whenever quality is low, the buyer incurs an expected litigation cost of \$55.³⁰ Given 25% chance of receiving low quality with high effort, this translates to the expected loss of surplus of \$13.75 ($= (0.25)\times(\$55)$). The total surplus from trade, without litigation, was \$35. Frequent litigation brings the per-period surplus down to about \$21.25 and the long-run, discounted surplus down to about \$212.50.³¹ Compared to the first best long-run surplus of \$350, the parties face a steep reduction in gains from trade when they solve the incentive problem using only the legal sanctions.

2. Reputational Sanctions Only

What if the parties were to rely only on reputational sanctions? Imagine that the seller sets the liquidated damages at \$0. Even without any legal sanctions in play, if the buyer imposes reputational sanctions through suspension of trade after receiving low quality, the parties can still solve the incentive problem. The seller would want to avoid this reputational punishment as much as she can. The fact that exerting high effort is less likely to trigger the reputational punishment motivates the seller to provide high effort. At the same time, because high effort can still lead to low quality, reputational sanctions triggered by low quality will result in some loss of surplus.

To make this point more concrete, suppose the buyer stops purchasing from the seller for four (4) periods after receiving low quality.³² After the four period suspension, the buyer resumes the purchase as before. The analysis is a little involved, but it can be shown that this suspension threat is sufficient to induce the seller to exert high effort.³³ Recall that the buyer is

³⁰ Half the time, the litigation cost is \$30; half the time it is \$80, for an expected litigation cost of $\$55=(0.5)\times(\$30)+(0.5)\times(\$80)$.

³¹ The \$21.25 surplus is realized every period. Its discounted value is thus $\$21.25\times(1+.9+.9^2+.9^3\dots)$, which reduces to $\$21.25/0.1$ or \$212.50. The first best surplus in each period is \$35. When realized every period, the long-run discounted first best surplus is $\$35/0.1$ or \$350.

³² Throughout the analysis, we round up or down (as necessary) the numbers, both the dollar figures and the number of punishment period, for ease of exposition. For instance, if the parties were to rely only on informal sanctions, the exact number for the punishment period is 3.848.

³³ Let V be the discounted profit in the event the seller produced high quality last period. The seller's long-run profit from high effort can be written recursively as $V=(P-\$40)+(0.25)\times\delta^5V+(0.75)\times\delta V$. The δ^5 term stands for the fact that the seller suffers a four period gap with no sales following the realization of a low quality good. The seller's payoff from low effort is $(P-\$10)+(0.25)\times\delta V+(0.75)\times\delta^5V$. The seller prefers high effort if the payoff from high effort exceeds the payoff from low effort: $(0.75-0.25)\times\delta\times(1-\delta^4)V\geq\$40-\$10$.

willing to pay up to \$75 for the product when the seller exerts high effort. With her power to make take-it-or-leave-it offers, the seller will offer (slightly below) \$75 to the buyer. With \$40 of effort cost, the seller's profit in each period is (slightly less than) \$35. Conditional on purchase, the seller's per period profit is higher when it relies exclusively on informal sanctions rather than exclusively on formal sanctions. The reason is that, by setting the damages to zero, the seller eliminates the litigation costs.

At the same time—and unlike the case of relying only on legal sanctions—the seller is not guaranteed a purchase from the buyer every period. Instead, even when the seller puts in high effort, she still faces a 25% chance of producing low quality and losing sales for the next four periods. During the suspension period, the seller reaps zero profit. When the buyer employs the four period reputational sanctions upon receiving low quality and when the seller charges \$75 for the product, we can show that the seller's discounted long-run, discounted profit is \$200 ($=\$35/0.175$).³⁴ Compared to the case of using only legal sanctions, the effect of reputational sanctions shows up as a bigger discount rate (0.175 versus 0.1). This is intuitive since, with reputational sanctions, the parties face a larger chance of temporary termination of their relationship. But, even with only four periods of suspension, because the chances of triggering that reputational punishment is sufficiently large (25%), as compared to the first best outcome, the parties face a steep reduction in long-run surplus (\$350 versus \$200).

3. Using Both Legal and Reputational Sanctions

Can the buyer and the seller somehow improve the outcome by using both legal and reputational sanctions? The problem with relying only on legal sanctions is that the parties incur too much litigation cost in equilibrium. Similarly, when reputational sanctions alone are used, the parties too frequently forego potential surplus from trade. Given these two problems, it is not surprising that the optimal approach combines both types of sanctions. The parties can do so by calibrating the liquidated damage award, placing it at a moderate amount, which discourages the high litigation cost buyer from filing suit. The parties can then make up the sanctions shortfall with modest amount of reputational sanctions.

Suppose that the seller sets the damages award at \$79. As noted above, the buyer's litigation costs are \$30 or \$80 with equal probability. A liquidated damage award of \$79, therefore, makes suits unattractive for the buyer with the \$80 litigation cost. But some threat of a lawsuit remains. Specifically, the buyer drawing the litigation cost of \$30 will still file suit upon receipt of low quality. However, as we saw previously, when the seller is sued only half the time when quality is low, with \$79 liquidated damages, the seller has insufficient incentive to exert

From $V=(P-\$40)+(0.25)\times\delta^5V+(0.75)\times\delta V$, when we solve for V , we get $V=(P-\$40)/((1-(0.75)\times\delta)-(0.25)\times\delta^5)$, which is also equal to $V=(P-\$40)/((1-\delta)+(0.25)\times\delta\times(1-\delta^4))$. Given no formal sanctions, there are no litigation costs. That means that, conditional on high effort, the buyer is willing to pay up to \$75. Plug this value into for price gives a discounted payoff of $V=(\$75-\$40)/((1-\delta)+(0.25)\times\delta\times(1-\delta^4))$.

Now, we can check that, under these conditions, the seller indeed wishes to exert high effort. Plugging the value of V into expression $(0.75-0.25)\times\delta\times(1-\delta^5)V\geq\$40-\$10$, we get $(0.75-0.25)\delta(1-\delta^4)\times(\$75-\$40)/((1-\delta)+(0.25)\times\delta\times(1-\delta^4))\geq\$40-\$10$. When $\delta=0.9$, the inequality is strictly satisfied.

³⁴ From the previous footnote, the seller's long-run, discounted profit was given by $V=(\$75-\$40)/((1-\delta)+(0.25)\times\delta\times(1-\delta^4))$. When we solve for V with $\delta=0.9$, we get $V=\$35/((0.1)+(0.25)\times(0.9)\times(1-(0.9)^4))=\$35/0.175$.

high effort from only formal sanctions.³⁵ Simply stated, with the moderately sized liquidated damages, the shirking seller's liability exposure is not large enough to offset the cost-saving associated with shirking.

To provide sufficient incentive to the seller, therefore, the parties have to supplement the formal sanction with reputational sanctions. Suppose they combine the \$79 penalty with a one-period boycott. Such a layered approach discourages the seller from shirking. Although the analysis is more involved, the intuition is easy to see. Because of the modest liquidated damage award, the seller faces some higher chance of legal liability if she exerts low effort. This legal liability isn't enough to completely solve the commitment problem, but it goes some way to achieving the goal. The one period trade suspension is also more likely if the seller puts in low effort. The seller's incentive for high effort then comes from attempting to avoid two costly sanctions: the modest damage award and the one-period boycott.

Unlike with exclusive reliance on reputational sanctions, the boycott need not be four periods to deter seller misconduct. The seller is already being partially deterred by the threat of the legal sanction. The one-period boycott just fills in the deterrence gap. Now, let's think about the seller's long-run, discounted profit with this combination approach. Assuming that the incentive problem is solved (which will be verified shortly), when the seller puts in high effort each period, with 25% chance of producing low quality and 50% chance of being sued conditional on low quality (when litigation cost is \$30), the buyer is willing to pay about \$81.³⁶ With the power to make take-it-or-leave-it offer, the seller will set $p=\$81$ and earn about \$31 each period.³⁷ If the seller is also subject to one period suspension of relationship, the seller's long run, discounted profit becomes about \$253 ($\approx \$31/0.1225$).³⁸

The seller's long run payoff from combining both types of sanctions is higher than using either sanction on its own. Each sale with the modest damage award carries some risk of litigation. And this risk of litigation is factored into the seller's per period profit. The litigation exposure is less with the modest award than with the large award since the modest award induces fewer and less costly lawsuits. For this reason, the firm's per period profit is higher with the modest award than the large damage award. Meanwhile, the inclusion of any litigation risk

³⁵ The seller's payoff from high effort is $p-\$40-(0.25)\times(0.5)\times(\$79)=p-\$49.875$. The first term is the price. The second term is the cost of effort. The third term is the expected damage award. The seller pays this award if two events transpire: (1) the seller delivers a low quality product and (2) the consumer draws a low litigation cost and therefore sues. Given high effort, the first event occurs with probability 0.25. Since the consumer is equally likely to draw high or low litigation costs, the second event arises with probability 0.5. On the other hand, the seller's payoff from low effort is $p-\$10-(0.75)\times(0.5)\times(\$79)=p-\$39.625$, which is strictly higher.

³⁶ The buyer's expected surplus given the seller exerts high effort is \$75. From this, the buyer deducts his expected litigation cost of $(0.25)\times(0.5)\times(\$30)$. At the same time, the buyer adds to his willingness to pay his anticipation of the expected damage pay, $(0.25)\times(0.5)\times(\$79)$. Taking these three together produces the buyer's willingness to pay of \$81.125.

³⁷ The seller charges \$81. To get the seller's per period payoff conditional on a sale, from \$81, we deduct both the effort cost of \$40 and the seller's expected damage payment of $(0.25)\times(0.5)\times(\$79)$. The calculation yields \$31.125.

³⁸ The analysis is comparable to the case where the players were relying exclusively on informal sanctions, except for the fact that the seller's per-period profit is lower and the discount rate is smaller. The seller's long-run, discounted profit is given by $V=\$31/((1-\delta)+(0.25)\times\delta\times(1-\delta))$. When we solve for V with $\delta=0.9$, we get $V=\$31/((0.1)+(0.25)\times(0.9)\times(0.1))=\$31/0.1225\approx\$253.06$.

means that the firm’s per period profit is lower with the modest damage award than when the parties exclusively rely on informal sanctions.

Despite the fact that exclusive reliance on informal sanctions creates a higher per period profit, our numbers reveal that they seller still prefers the combination approach. Puzzling, perhaps, but easy to explain. With exclusive reliance on informal sanctions, every time the seller delivers low quality it suffers four periods of zero profits. With the combination approach, every time the seller delivers low quality it suffers one period of zero profits, a shorter boycott. The benefit of the shorter boycott under the combination approach is captured by discounting the per-period profits by a higher number when the seller exclusively relies on informal sanctions than when it uses the combination approach. The following table compares the outcomes from three different sanctions regimes.

Incentive Mechanism	Long-run Discounted Surplus
The First Best (No Deadweight Loss)	\$350
Legal Sanctions Only (d=\$81)	\$212
Reputational Sanctions Only (d=\$0 and 4 period suspension)	\$200
Legal and Reputational Sanctions (d=\$79 and 1 period suspension)	\$253
Legal and Reputational Sanctions with “Best Efforts” (d=\$177 and 1 period suspension)	\$295

Table 3: Comparison of Different Incentive Mechanisms

D. Advantage of Legal Sanctions: the Infra-Marginal Effect

The fact that the parties would use legal sanctions, and to the maximum extent possible (\$79, slightly below the high litigation cost), supports an important advantage that legal sanctions possess over reputational sanctions. The advantage stems from the presence of an “infra-marginal” effect of increasing damages. Increasing damages creates additional deterrence through two channels: (1) more lawsuits being filed by marginal litigants and (2) granting larger recovery to the existing lawsuits, lawsuits that would have been filed even without the increase in damages.³⁹ An increase in reputational sanctions, by contrast, has the first, marginal effect on deterrence but lacks the second, infra-marginal effect: lengthening the punishment period has no effect on the effectiveness of the existing reputational punishment.

³⁹ This statement is subject to two important caveats. First, when the court’s judgment is subject to error, larger damages can lead to more frivolous litigation, e.g., suing to recover damages even when the buyer knows for certain that the quality is high. Second, we have not modeled how the amount of litigation cost can vary with the size of damages. If litigants spend more resources without improving the accuracy of court judgment, this will reduce the ex ante expected surplus from the trade. Both of these effects, at the margin, will reduce the effectiveness of increasing damages, by working as a counter-weight against the infra-marginal benefits.

To make this point more concretely, imagine we start with some amounts of both legal and reputational sanctions, say, \$30 of damages and 3 periods of reputational punishment. Suppose we want to create additional deterrence and are given two choices: either increase the damages by \$10 or increase the reputational punishment by 1 more period. Let's say that both are equally costly: additional \$10 of damages will engender an equal amount of deadweight loss (through additional litigation) as one extra period of punishment (longer suspension of trade). Although the marginal benefits and costs of these two options are the same, the infra-marginal effects are not. While the increase in reputational punishment has no effect on the efficacy of the existing (3 periods of) reputational punishment, increase in damages by \$10 will actually make the existing legal sanctions stronger, simply because the infra-marginal litigants (those who were already filing lawsuits) will be recovering more. Hence, even when the marginal benefits and costs are the same, the presence of the infra-marginal benefit tips the balance in favor of relying more on legal sanctions.

The infra-marginal advantage gets particularly strong when raising damages does not attract (or attracts little) additional litigation. In our example, raising damages from \$30 to anywhere but up to \$80, produced more deterrence at no additional litigation cost. The infra-marginal litigant (with \$30 litigation cost) makes a bigger recovery and this produced additional deterrence. It does with no additional litigation cost.

A similar result obtains when the spread of the litigation cost gets higher. Suppose the high litigation cost is not \$80 but \$140. Now, the parties can solve the incentive problem by using only legal sanctions. They can promise sufficiently high damages while keeping the high cost litigants from filing suit. If the seller were to set liquidated damages at \$120, even though the seller will face a lawsuit only half the time when quality is low, the damages are high enough to solve the incentive problem. And, \$120 of damages is too small to make a lawsuit worthwhile for the high cost litigant. The bigger the spread in litigation costs, the greater the seller can make the damage award without attracting high cost litigation and the more deterrence can be had by granting a bigger recovery to the low cost litigant.

When everything else is equal, the presence of the infra-marginal effect should induce the parties to favor legal sanctions over reputational sanctions. Everything else is not equal in our example. That is why the parties relied on both legal and reputational sanctions, as opposed to legal sanctions alone. Recall that the benefits from shirking was given by \$30 ($=\$40-\10), the difference in costs. Given that the probability difference in producing high quality is 50% (75% minus 25%), to achieve full deterrence, we need \$60 of aggregate sanctions ($\$60 = \$30/(0.5)$). When the damages were set at \$79, since the seller gets sued only half the time when the realized quality is low, the deterrence benefit is at about \$40 ($= (0.5)\times\79), leaving about \$20 short. If the players were to increase the damages to \$81, now since the seller faces litigation with 100% probability when quality is low, deterrence goes up to \$81. This is an over-kill given that the necessary amount of deterrence is \$60. It is better for the parties to supplement the shortfall with informal sanctions. The legal sanction could not be perfectly tailored: at \$79 it was too weak a deterrent and \$81 it was too strong. Thus, the parties were better off relying on both formal and informal sanctions.

II. Harnessing Additional Sources of Information

The previous numerical example relied on the assumption that determination of breach depended only on the realized quality. This was partly motivated by the assumption that the seller's behavior ("effort") was not observable by a third party, including the court. This Part relaxes the assumption and allows the parties to also use an open-ended standard, such as "best efforts" and "commercially reasonable efforts," that requests the court to examine not just the outcome but also the seller's behavior. The Part also examines the costs and benefits of using such an open-ended standard. In the second half, we extend the analysis further to analyze the mandatory requirement of "good faith." We argue that in the context where both formal and informal sanctions can be used, adoption or imposition of such open-ended standards produces informational benefits that facilitate better tailored reputational sanctions.

A. "Best Efforts" and Other Fault-Based Standards

Up to this point, the analysis made two assumptions. First, the contract specified that the buyer could sue only if the seller delivered low quality. Second, the court could perfectly detect whether the seller breached. This section relaxes the assumption that seller's obligations are defined solely in terms of the quality of the delivered product. What if the seller, perhaps in addition to promising to deliver high quality, also made a promise to use "best efforts" or all "commercially reasonable efforts"? In the context of our numerical example, we can reasonably equate such a promise with the promise of putting in high effort. What if the court can only make a noisy, but probative, determination on whether the seller breached that promise?

Before proceeding to the analysis, note that the best effort clauses and similar fault-based clauses are common to contracts involving buyers and sellers, particularly those anticipating a long term relationship. For example, in exclusive dealing arrangements, the Uniform Commercial Code imputes a duty of best efforts for the buyer and the seller.⁴⁰ In a percentage lease agreement, a landowner leases his property in return for a fraction of the gross receipts the lessee obtains from use of the land. Absent a contractual provision to the contrary, courts imply that the lessee use best efforts to generate gross receipts.⁴¹ In franchise contracts, the franchisor often requires that the franchisee promise to use his best efforts to make the venture succeed.⁴² At the same time, franchise contracts allow the franchisor (and franchisee) to terminate (or not renew) the contract.

While the exact meaning of "best efforts" may be impossible to pin down, one recent court made a valiant attempt. It defined best efforts as

⁴⁰ See U.C.C. 2-306(2).

⁴¹ *Seggebruch v. Stosor*, 33 N.E.2d 159 (Ill. App. 1941).

⁴² See Robert E. Scott & George Triantis, *Anticipating Litigation in Contract Design*, 115 *Yale L. J.* 814, 853 (2006) (noting that franchise and distributorship contracts typically provide that the agent both satisfy specific requirements and generally exercise best efforts); and Albert Choi & George Triantis, *Completing Contracts in the Shadow of Costly Verification*, 37 *J. Leg. Stud.* 503 (2008) (allowing principal to use "best efforts" clause in addition to monetary incentive contract can improve welfare). See also Albert Choi & George Triantis, *Strategic Vagueness in Contract Design: The Case of Corporate Acquisitions*, 119 *Yale L. J.* 848 (2010) (mergers and acquisitions contracts using vague "material adverse change" provisions).

“To be enforceable, a best efforts contract must set some kind of goal or guideline against which best efforts may be measured.” The [prior] court concluded that when sufficient guidelines exist, a party that performs within the guidelines fulfills the contract regardless of the quality of its efforts. Only when a party misses the guidelines would a court measure the quality of its efforts “by the circumstances of the case ... and by comparing the party's performance with that of an average, prudent, comparable operator.”⁴³

The best efforts standard can be easily incorporated into the model. To collect liquidated damages, suppose now the buyer must prove, with sufficient accuracy, that (1) the seller delivered low quality and that (2) the seller's effort fell short of the “best efforts” standard. The first piece of evidence concerns the seller's output, the quality of the product. The second piece of evidence concerns the seller's input, the amount of effort she put forth in manufacturing the product. To be consistent with the original numerical example, we will maintain the assumption that court can perfectly detect whether the seller, in fact, delivered low quality. Judicial inquiries into effort, however, are much more difficult and prone to error. To capture mistakes in the judicial process, suppose that if the seller put in high effort the court will mistakenly determine that she put in low effort with 45% probability. Likewise, if the seller puts in low effort, the court will mistakenly determine she put in high effort with 45% probability.

It is fairly straightforward to see that inclusion of such a fault-based standard will improve the outcome. Notice first that the inclusion of the best efforts clause influences the buyer's willingness to sue after receiving low quality. To prevail under the contract with a best efforts clause, the buyer must prevail on two issues. She must show (1) that the delivered good was of low quality and (2) the seller put in low effort.⁴⁴ Assuming that, in equilibrium, the seller puts in high effort, the buyer's expected payoff from suing upon receipt of a low quality good is $(0.45) \times d$. The 45% probability captures that, before the buyer can recover, the court must mistakenly conclude that the seller puts forth low effort.⁴⁵ In light of this diminished prospect of recovery, to induce a buyer with litigation costs of \$30 to sue requires the seller promise to pay at least about \$67 upon breach. Similarly, to induce the high cost litigant (\$80) to sue, the seller must promise to pay at least about \$178.

Like in our main example, the seller will want to set damages just below what is necessary to attract the high cost litigant—at an amount of, say, \$ 177. Consider the deterrence kick from the formal sanction under the best efforts clause. If the seller puts in high effort, the following three events must occur before she is required to pay damages of \$177.

- (1) The seller delivers low quality (with 25% probability);
- (2) The buyer sues (with 50% probability); and

⁴³ DaimlerChrysler Motors Co., LLC v. Manuel, 362 S.W.3d 160, 171 -173 (Tex.App.–Fort Worth 2012)

⁴⁴ We can also think about adopting only the effort and not the quality standard, i.e., allowing the buyer to prevail whenever courts finds the seller put in low effort regardless of the realized quality. Such a regime, however, will be inferior to relying on both because realized quality provides an informative signal about the seller's effort choice.

⁴⁵ Even though the buyer does not observe the seller's choice of effort, we'll show that, with sufficient deterrence, the seller puts in high effort and the buyer “rationally believes” that the seller has put in high effort. This is how 45% probability is justified.

- (3) The court determines that the seller failed to supply best efforts (with 45% probability).

To compute how often the seller pays the formal penalties if she exerts high effort, we multiply together the probability of each of these events: 5.6% ($= 0.25 \times 0.5 \times 0.45$). The expected damage payment, then, is this probability (5.6%) times the promised damage award of \$177—about \$9.96 ($= 0.056 \times \$177$) in damages.

If the seller instead puts in low effort, the same three events must transpire before she pays the damage award. The difference with low effort is that the seller is both more likely to deliver low quality and the court is more likely find she failed to supply best efforts. The relevant probabilities with low effort are

- (1) The seller delivers low quality (with 75% probability);
- (2) The buyer sues (with 50% probability); and
- (3) The court determines that the seller failed to supply best efforts (with 55% probability).

Multiplying the three probabilities, contingent on low effort, the seller expects to pay damages with 20.6% ($= 0.75 \times 0.5 \times 0.55$) probability. The expected sanction from the formal sanction is thus \$36.46 ($= 0.206 \times \177). The difference between the expected damage payment with low effort and the expected damage payment with high effort defines the deterrence kick from the formal sanction. In this example, the kicker is about \$26.50. Given that the seller gains \$30 from shirking (spending \$10 rather than \$40), the prospect of the higher formal sanction alone is not enough to induce high effort. It falls \$3.50 short.

	Optimal Liquidated Damages (d)	Frequency of Litigation when Low Quality	Deterrence Shortfall from Legal Sanctions
Without “Best Efforts”	\$79	0.5	\$10.25
With “Best Efforts”	\$177	0.5	\$3.50

Table 4: Comparison of Deterrence Shortfalls

Recall that, without best efforts, the deterrence shortfall was \$10.25. Table 4 contains a comparison of the two contracts: one with and one without a best efforts clause. Because the inclusion of the best efforts clause reduces the deterrence shortfall, the parties can reduce the deadweight loss from reputational sanctions. Suppose, to make the relatively small deterrence gap left by the formal sanction, the buyer suspends trade for one period upon a judicial finding of liability.⁴⁶ Like in our original numerical example, the parties decide to combine the formal and

⁴⁶ When the damages are set at \$177.78, the actual number of suspension necessary is 0.8152 periods. Similar to the analysis before, we round up the numbers to make the exposition easier. We can assume that the buyer uses mixed strategy (on suspension) to achieve that fractional punishment. Two remarks are in order. First, generally with the negligence standard, there are three possible states in which the buyer can impose reputational sanctions: (1) low quality but no litigation (due to high litigation cost); (2) low quality and no liability finding by court; and (3) low

the informal sanction. Notably, the informal sanction takes the same form as before: a one period suspension. Yet, the suspension occurs less frequently, making it less costly to the parties. The suspension occurs only if (1) the seller delivers low quality; (2) the buyer sues; and (3) the court determines that the seller failed to provide best efforts.⁴⁷ Despite its reduced frequency, the threat of losing the business is enough to make the seller prefer high effort. But since the threat materializes less frequently, the seller is strictly better off. A simple calculation shows that, in each period, the seller earns a profit of about \$31, which results in the long-run payoff of about \$295 ($\approx \$31/0.105$).⁴⁸ This figure remains less than first best, but better than if the contract did not include best efforts. Note that the better tailored reputational sanctions translate to a lower discount of the per-period profits (0.1225 versus 0.105), producing a higher long-run surplus.

In closing this section, let us make a few comments about generalization. First, we have assumed that the cost of litigating best efforts is the same as litigating over quality only. Given that litigation over best efforts involves two issues (over both quality and seller's behavior) and litigation over quality involves one, the assumption may be hard to justify. Obviously, incorporating additional litigation expenses makes best efforts a less attractive contracting option. The benefit of better formal sanctions and less frequent informal sanctions remain, however. The analysis would then entail trading off these additional benefits against the higher cost of litigation. Especially when the court's determination of seller effort becomes more accurate, using the negligence standard will become more attractive.

To more formally think about the tradeoff from additional litigation cost, suppose we keep the high litigation cost the same at \$80⁴⁹ but increase the low litigation cost. Note, from Table 3, that the difference of long-run surplus with or without the best efforts clause is about \$42 (\$253 versus \$295). Given that under both regimes, the buyer brings litigation against the

quality and liability finding by court. Among the three states, it is fairly straightforward to show that the second state (low quality, litigation, but no liability finding) is the least informative of the seller's deviation. However, it is a priori unclear whether the first or the third state is more informative of the seller's deviation. If, for instance, the chances of litigation is quite unlikely (i.e., the probability of drawing \$30 litigation cost is much lower than 50%), it is better for the buyer to impose reputational sanctions after the first state rather than the third: doing so imposes a more efficient punishment against the seller. In that case, formal and informal sanctions will be observed separately. Second, although the number of punishment period is similar to that used in the previous case (without the best efforts standard), the punishment period will generally be different from the case without the best efforts clause. Given that the reputational punishment is being imposed only when the court finds the seller liable, the number of punishment periods may need to be longer to achieve the necessary deterrence. However, because the reputational punishment is better targeted, the deadweight loss from the punishment is lower, which is the reason why the best efforts standards perform better.

⁴⁷ Although the buyer can still engage in reputational punishment against the seller whenever low quality is delivered (regardless of the litigation outcome), conditioning reputational sanctions on court's judgment is actually better because this produces more bang-for-the-buck. That is, the state represented by both (low quality) and (breach of best efforts) is more informative of the seller's misbehavior than any other state.

⁴⁸ In this example, the buyer is willing to pay $P = \$75 + (0.25) \times (0.5) \times (0.45 \times \$177 - \$30) \approx \81.21 . The seller's per-period profit is $P - \$40 - (0.25) \times (0.5) \times (0.45) \times \177 , or \$31.25 with $P = \$81.21$. When we use \$31, with one period of reputational punishment, the seller's discounted stream of payoffs can be represented as $V = \$31 + (0.9) \times (1 - (0.25 \times 0.5 \times 0.45)) \times V + 0.9^2 \times (0.25 \times 0.5 \times 0.45) \times V$. When we solve for V, we get $V = \$31 / [(0.1) + (0.9) \times (0.1) \times (0.25) \times (0.5) \times (0.45)] = \$31 / 0.105$, which is about \$295.

⁴⁹ Increasing the high litigation cost will allow the parties to further increase the damages, which makes relying on "best efforts" clause more attractive.

seller only half the time when realized quality is low, which occurs with 25% probability when the seller exerts high effort, a \$1 increase in (low) litigation cost will reduce the per-period expected surplus by \$0.125 $(=(0.25) \times (0.5) \times \$1)$. Since \$0.125 reduction in per-period surplus will reduce the long-run surplus by about \$1.25,⁵⁰ so long as the additional litigation cost from having to argue best efforts stays below \$63.60 $(=30+42/1.25)$, it is better for the parties to rely on best efforts clause. If, on the other hand, the clause gets prohibitively expensive, e.g., the litigation cost increases to \$70, it is better for the parties to not use the standard and condition liability and reputational sanctions solely on low quality realization.

Second, the example shows that the parties are better able to tailor the informal sanction by conditioning the suspension of trade on the judicial finding of liability.⁵¹ Yet, in reality, most cases settle. The parties don't wait for the judge to determine what best efforts means. This point shouldn't be overstated, however. Any signal from the judge about the effort will be useful. The parties might suspend trade in response to the denial of the seller's summary judgment motion or to the denial of the seller's motion to dismiss. All that matters is that the judicial signal contains some noisy information about the seller's actual effort. It does not have to be a final judgment. By incorporating best efforts into the contract language, the parties force the judge's hand. The judge must make findings about both effort and quality. The additional signal on effort will always be helpful to the parties in tailoring the reputational sanction. Furthermore, if there is some asymmetry of information between the parties (e.g., the litigation cost is known only to the buyer), the parties will not be able to settle all cases.⁵² Inability to settle can actually be beneficial for both parties in the long run.

Third, in long term agreements, any suspension of trade may be quite costly because the parties may need to find new trading partners. Consider a franchisor forced to find a new franchisee after discontinuing his relationship with one of his original franchisees. The franchisor must locate a new franchisee. He must train the new franchisee on maintaining the brand. Such switching costs could be substantial. Some of these costs are incurred each time the reputation penalty is unleashed. A best efforts clause in the original agreement ensures that these switching costs are incurred less often precisely because the reputation penalty occurs less frequently. This also leads us to predict that a best efforts term (or other fault-based standards) is more likely to be found in a contract where the parties bear large costs from discontinuation of the relationship. Exclusive dealerships and franchisee/franchisor contracts are two examples of such contracts.

⁵⁰ This is because, with best efforts and $d=\$177$, the denominator for the long-run surplus is given by 0.105.

⁵¹ We focus here on best efforts. The same analysis applies to fault-based standards for products liability. Strict liability is akin to making liability turn solely on the delivered quality. Negligence makes liability turn on both quality and some measure of the producer's effort. Like best efforts, negligence can reduce the deadweight loss that stems from faulty reputational sanctions and provide a more effective deterrence. This analysis differs from the classic discussions of the choice between negligence and strict liability, which focuses on concerns about generating the appropriate activity level shifts by the seller or buyer. See generally Richard A. Posner, *Economic Analysis of Law* 177-182 (6th ed. 2003).

⁵² We initially remained agnostic on this, but we can assume that the realized litigation cost is observed only by the buyer. If the seller were to settle all cases, even the buyer with negative expected value of lawsuit (with litigation cost \$80 when damages are equal to \$79 without the best efforts clause) will bring suit and the parties will be unable to settle all cases.

B. Good Faith

Good faith is a mandatory term implied in all contracts. The Restatement (Second) of Contracts articulates that “[e]very contract imposes upon each party a duty of good faith and fair dealing in its performance and its enforcement.”⁵³ The Uniform Commercial Code defines good faith as “honesty in fact and the observance of reasonable commercial standards of fair dealing in the trade”⁵⁴ states that “[e]very contract or duty within [UCC] imposes an obligation of good faith in its performance and enforcement.”⁵⁵ The Code goes further to impose good faith requirement on more specific contexts, for instance, with respect to determining quantity in an output or requirements contract or price in an open-price contract.⁵⁶

While the good faith requirement has been subject to numerous litigation, courts and scholars have struggled with coming up with a workable definition. Legal scholars have advanced three main definitions of good faith. First, Professor Robert Summers argued that good faith performance should be defined in the negative, as an excluder.⁵⁷ Summers conjectured that it would be impossible for a court to identify good faith, or even develop a sensible test for it.⁵⁸ Instead, Summers urged courts to search for actions amounting to bad faith—in his view an easier task. Surveying the case law, Summers provided a non-exhaustive list of bad faith actions. Some of those include: (1) evading the spirit of the transaction, (2) entering into a contract without an intent to perform,⁵⁹ (3) willfully rendering only substantial performance;⁶⁰ (4) taking advantage of the other party’s weakness to get a favorable readjustment or settlement⁶¹ and (5) adopting overreaching or “weasely” constructions of contractual language.⁶² Summers’ approach has been influential and many courts have followed his lead, as did the drafters of the Restatement (Second) of Contracts.⁶³

⁵³ See Restatement (Second) of Contracts § 205.

⁵⁴ UCC §1-201(20). By definition, good faith requirement incorporates the notion of “commercial reasonableness.” Hence, the mandatory requirement of “good faith” has a substantial overlap with parties’ adopting the standard of “commercial reasonableness.”

⁵⁵ UCC §1-304.

⁵⁶ UCC §§2-305 and 2-306.

⁵⁷ Robert S. Summers, “Good Faith” in *General Contract Law and the Sales Provisions of the Uniform Commercial Code*, 54 Va. L. Rev. 195 (1968).

⁵⁸ *Id.* at 196 (noting that good faith “has no general meaning or meanings of its own, but [instead] serves to exclude many heterogeneous forms of bad faith.”)

⁵⁹ *Id.* at 216.

⁶⁰ *Id.*

⁶¹ *Id.* at 237-38.

⁶² *Id.* at 244-246.

⁶³ Alan D. Miller & Ronen Perry, *Good Faith Performance*, 98 Iowa L. Rev. 689, 701 (2013) (noting that the “excluder theory has been tremendous. For starters, it has been adopted and applied in numerous decisions throughout the country”); Allan E. Farnsworth, *The Concept of Good Faith in American Law*, Address at the Centro di Studi e Ricerche di Diritto Comparato e Straniero, available at <http://www.cisg.law.pace.edu/cisg/biblio/farnsworth3.html> (1993) (stating that the definition of exclusion “has not only found favor with a number of courts but is reflected in the comments to the Restatement Second’s section on the duty of good faith performance”).

Professor Steven Burton made the next attempt to define good faith.⁶⁴ Under his definition, a party acts in bad faith “when discretion is used to recapture opportunities forgone upon contracting—when the discretion exercising party refuses to pay the expected cost of performance.”⁶⁵ Burton’s idea is this: Take a contract with some discretion on one side of the contract, like, say, a requirement or output contract.⁶⁶ At the time of the contract, the parties expect the party holding discretion to bear certain costs, including opportunity costs. More specifically, the contract restrains the party with discretion from doing certain things to make performance cheaper. If the party with discretion lowers his costs during the course of performance (by, say, taking an opportunity the parties thought she had given up), she acts in bad faith.

Finally, Judge Easterbrook defined good faith in yet another way. He states that good faith refers to two situations:

First, an effort to wring some advantage from the fact that the party who performs first sinks costs, which the other party may hold hostage by demanding greater compensation in exchange for its own performance....Second, there is an effort to take advantage of one’s contracting partner “in a way that could not have been contemplated at the time of drafting, and which therefore was not resolved explicitly by the parties.”⁶⁷

The theory of default rules suggests that the court can aid contracting parties by providing terms, thereby saving the cost of drafting. Good faith can be seen as another implied term. Even though parties can anticipate the events, the court saves on the parties drafting costs by completing the contract for the parties. The tricky issue is how this completion should be done, what evidence should the court consider.

Despite the inherent difficulty of coming up with a precise definition of “good faith,” in a relational contract setting, the determination of “good faith,” like the determination of “best efforts,” can play a useful informational role. As the numerical example reveals, contracting parties can be made better off if the judge considers any noisy signals correlated with effort. The information improves the performance of the formal sanction and the informal sanction that follows. The court might ask: Does the evidence suggest that the low quality resulted from some action, which may or may not constitute bad faith, or unfortunate events? The focus is not necessarily on party’s intent or what good faith really means. Rather, the judge hunts for clues or signals about the seller’s behavior during performance of the contract that could improve both legal and reputational sanctions.

⁶⁴ Steven Burton, *Breach of Contract and the Common Law Duty to Perform in Good Faith*, 94 Harv. L. Rev. 369 (1989).

⁶⁵ *Id.* at. 373.

⁶⁶ Requirements and output contracts are flexible quantity contracts. A requirements contract measures the quantity by the amount the buyer requires. An output contract measures the quantity by the amount the seller produces. They are governed by 2-306 of the UCC. On the economics of these contracts, see generally Robert E. Scott & Jody S. Kraus, *Contract Law and Theory* 342-43(3d ed. 2002)

⁶⁷ *Industrial Representatives v. CP Clare Corp.*, 73 F.3d 128, 129-130 (7th Cir. 1996).

Take the case of *Miller v. Othello*,⁶⁸ considered in the Burton article. In that case, a seller agreed to sell beans to a buyer who would then plant and harvest the beans. The price was to be determined by a formula, based, in part, on the value of the harvested crop. The buyer conceded that “its harvesting procedures were so inefficient that it left three truckloads of bean vines in the grower’s field.”⁶⁹ Citing the good faith doctrine, the appellate court affirmed the trial court’s decision to award the seller a reasonable value of its crop. Here, the evidence signal is the rotting beans. Leaving the truckload of rotting beans in the field correlates with whether the buyer placed effort into maintaining the harvest. Given high effort by the buyer, the beans would probably not have been left in the field. As a result, the court properly considered this evidence in finding a lack of good faith.

As another example, suppose a buyer in a requirements contract closes down a plant or goes out of business (and thus does not require anything under the contract).⁷⁰ Under UCC §2-306, a requirement contract measures the quantity as the actual requirement “as may occur in good faith.”⁷¹ In applying this statute, our test suggests that the court should focus on what drove the buyer out of business. Did the buyer make a series of bad business decisions? If so, the evidence—out of business—tracks effort and should be part of the good faith analysis. On the other hand, suppose that another dominant producer entered the market, making continued operation unprofitable. Here the same evidence—getting out of business—is uninformative about effort and should be excluded from the good faith analysis.

One could view the obligation of good faith as an implicit charge to the court to look for noisy but informative signals. The parties delegate to the court the choice about which signals (or which extrinsic or other relevant evidence) to consider. Contracting parties might wish to delegate because, at the time of the drafting, they don’t know what signals will be available or their relative strength. That said, any delegation under a standard creates additional litigation costs, as courts feel enabled to look at multiple signals to find breach. Fearing the litigation cost but wishing to preserve the benefit of partial delegation, parties might attempt to demarcate what signals are out of bounds and can’t be used to interpret best efforts. The practice of listing several explicit clauses alongside a best efforts clause accomplishes this feat. It is also a practice common in exclusive dealing and franchise contracts.⁷²

In doing the good faith analysis, the court might ask whether the improvement in the performance of the formal and informal sanctions justifies the additional litigation costs. It might not and this determination will be difficult. That said, the information generated through a good faith inquiry has value outside the determination of legal liability in the specific case at hand. Similar to the determination of “best efforts,” it can also facilitate informal sanctions by market participants. Particularly in a long-term relationship, this facilitating role of good faith determination can be quite valuable. Even if the court is unable to come up with a precise definition of good faith, by generating evidence of underlying behavior that the counterparty or

⁶⁸ 410 P.2d 33 (1966).

⁶⁹ Id. at 34.

⁷⁰ See *Metal One America, Inc. v. Center Mfg., Inc.*, 2005 WL 1657128 (W.D.Mich.2005) (buyer closes down a plant and thus has little demand on the requirements contract).

⁷¹ U.C.C. 2-306.

⁷² See Scott & Triantis, *supra* note ___, at ___; and Choi & Triantis, *supra* note ___, at ___.

other market participants can use, litigation over good faith can enable more efficient reputational sanctions.

III. Consumer Contracts and the Informational Role of Litigation

The numerical example above assumed two players in a long-term relationship, exemplary of the business to business relationship appearing in the relational contracting literature. The analysis easily extends to consumer contracts, where a business interacts with a series of different customers over time. Think of a car manufacturer, a plumber or a producer of lawn-mowers selling products or services to individual buyers who purchase infrequently. When the seller manufactures low quality or defective product, the seller will be subject to both legal and reputational sanctions. Compared to the previous example, however, there are two important differences. First, for the reputational punishment to work, future consumers must somehow learn what has happened in the past. Without that information, consumers will not be able to engage in reputational sanctions. Second, unlike business-to-business dealings, the parties' ability to set their own legal regime, for instance, the remedy or the liability standard may be more limited. This will be especially true when products liability issues are concerned.

A. Overcoming Informational Challenges

In our relational contract setting, delivery of a low quality product (or combined with court's finding of violation of "best efforts" clause) triggered a suspension of trade. There, since the same buyer purchased repeatedly, she knew whether the delivered product was, in fact, low quality and therefore justified halting trade. With consumer contracts, by contrast, delivery of a low quality product to one consumer might not be revealed to another consumer, who can then avoid buying the firm's products going forward. The lack of information transmission from one consumer to another can pose a significant hurdle in generating reputational sanctions. In practice, there are a few different channels that attempt to mitigate this informational problem.⁷³

First is through businesses or practices ("information intermediaries") that collect and disseminate information for market participants. A consumer thinking about hiring a plumber can consult Angie's List.⁷⁴ A patron thinking of going to a new restaurant can click on Yelp.com.⁷⁵ Ebay collects and posts reputational feedback scores about its sellers.⁷⁶ WebMD.com collects information about the quality of doctor practices.⁷⁷ Given the wealth of information in the marketplace, a firm that mistreats a customer has a fair chance of being found out by its future consumers. When information about product failures is transmitted through

⁷³ When none of the channels effectively offer information to consumers, legal sanctions become even more important. When the market poorly transmits information about product quality, we should observe even more reliance on legal sanctions.

⁷⁴ www.angieslist.com.

⁷⁵ www.yelp.com.

⁷⁶ <http://pages.ebay.com/help/feedback/scores-reputation> (detailing the features of Ebay's reputational scoring system).

⁷⁷ www.webmd.com.

such information intermediaries, fear of lost future sales will serve as a deterrent for misbehavior.⁷⁸

Second is the set of more formal channels, and litigation can play an important role here. Like in the relational contracting setting, the same seller misconduct that gives rise to a loss of future business can also lead to a lawsuit. A customer can bring a contract suit against the plumber who installs sub-standard pipe. A customer can sue if the television set fails to perform as promised. Even if future consumers do not directly observe what has happened in the past, outcomes from litigation can be a valuable source of information for them to engage in reputational punishment. In that sense, litigation can play an important, facilitating role for reputational sanctions. Legal sanctions, rather than crowding out, can complement reputational sanctions.

Finally, government entities can also play an important informational role. Agencies, such as Food and Drug Administration (FDA), Federal Trade Commission (FTC), Federal Aviation Administration (FAA), National Highway Traffic Safety Administration (NHTSA), and Consumer Product Safety Commission (CPSC), not only provide information to the consumers about safety of various products and (potential) manufacturer misbehavior but also bring their own lawsuit against manufacturers. One important shortcoming of relying on consumer-driven litigation as source of information is that through different mechanisms, such as non-public arbitration and secret settlements out of court, the sellers can attempt to suppress the production of information so as to avoid any reputational damage.⁷⁹ Government-initiated legal actions, by contrast, may be much more immune from such information suppression. Once consumers learn more about firm misbehavior (or product defect/mal-functions) from such sources, they can more effectively engage in reputational sanctions.

B. Mandatory Damages and Liability Standard

Greater informational challenges are not the only difference between business to business contracts and business to consumer contracts. Another important difference arises out of the parties' freedom in designing their legal system. The discussion thus far has assumed that the seller has the complete freedom to set the terms for damages resulting from poor or shoddy performance of a product. That freedom disappears when product defects cause physical

⁷⁸ Information aggregated through such intermediaries may not be entirely accurate. Some may be biased, while others are just noisy or irrelevant. Some intermediaries may be much better at providing useful, relevant information than others. So long as the aggregated information provides additional information about the entity's behavior, consumers can use that information to impose reputational sanctions. Also, as the aggregated information becomes less accurate, it will make relying on legal sanctions more attractive.

⁷⁹ Seller's ability to control the amount of litigation in consumer contracts also has important consequences in the context of consumer contracts. The seller can offer a robust warranty, a limited warranty, or no warranty whatsoever. The seller can limit consequential damages. Subject to the unconscionability checks, the seller can impose favorable terms for arbitration via contract. In all these ways, the seller controls the amount of its formal liability. And so, the predictions of table 4 provide a way to think about consumer contracts too. When litigation costs are spread in the consumer population, we should observe damage caps, limits on consequential damages, and limited warranties. In these ways, the seller controls – but does not eliminate – legal exposure. Where seller effort can be observable and easily transmitted to other future consumers, the seller should rely almost entirely on informal sanctions. Where even a low-level of litigation is likely to be costly, reliance on informal sanctions is also most desirable.

injury—the classic case of products liability.⁸⁰ The question, then, is whether our theory extends to products liability, where mandatory rules set by either the state legislature or courts are in play.⁸¹ Irrespective of which institutional player decides on the mandatory rule, the choice presents the same tradeoffs identified in our example. The difference is that the policy maker steps into the shoes of our seller. For example, advocates for damage caps argue that they control litigation costs.⁸² Like our seller, in considering damage caps, the policymaker wants to achieve deterrence at the lowest total cost, recognizing that both formal and informal sanction entail costs. Akin to a limited warranty, a damage cap for tort claims controls litigation costs, but forces the seller to rely more on reputation. We will return to consider products liability in more detail below. For now, it is sufficient to note that the tradeoffs revealed in the numerical example are of sufficient generality to include both a seller choice of a warranty provision and a policy-maker choice as to rules for products liability.

IV. Reconciling Theory with Practice

In this part, we take the numerical example developed in part II and compare it with real-world practice. The purpose is not to argue that the model provides the only explanations but to show how the model can be consistent (or be reconciled) with certain observed behavior. We first summarize three predictions that follow fairly naturally from the numerical example. We then focus, in particular, on four sets of stylized empirics: (1) long-term contracts, some of which

⁸⁰ To see the difference between contract and products liability, consider two examples. Suppose first that a refrigerator fails to keep ice cream cold. In that case, the consumer has an action in contract. Absent defenses like fraud or unconscionability, this action will be governed by the terms of the agreement, including any limitations on the consumer's ability to recover. Suppose instead, the refrigerator malfunctions, catches fire and injures the consumer in the blaze. In this case, the consumer action sounds in tort. Any express warranty won't play a role. In addition, under UCC 2-318, the consumer can always sue if the breach of the warranty caused the injury. Finally, the seller in almost all cases cannot limit its liability for consequential damages that result in injury to a person. See U.C.C. 2-719(3) ("Limitation of consequential damages for injury to the person in the case of consumer goods is prima facie unconscionable.").

⁸¹ The egg-shell skull rule, for example, is a judicially created rule stating that seller must pay all damages arising out of the accident, whether foreseeable or not. See *Vaughn v. Nissan Motor Corporation in U.S.A., Inc.*, 77 F.3d 736, 738 (4th Cir. 1996) ("The tortfeasor's duty of care is measured by the ordinary person, but the plaintiff's injuries may not be. In short, if [defendant] breached its objective duty of care, it must take the victim as it finds her."); see also Restatement (Second) Torts 402(A). Judicially created rules specify whether liability attaches from a negligent act by the seller or instead is a strict liability cause of action. Manufacturing defects are governed by a strict liability standard. See *Welge v. Planters Lifesavings Co.*, 17 F.3d 209, 212 (1994) ("The strict-liability element in modern products liability law comes precisely from the fact that a seller subject to that law is liable for defects in his product even if those defects were introduced, without the slightest fault of his own for failing to discover them, at some anterior stage of production."). Design defects are governed by a risk/utility calculation which comes close to mirroring a negligence standard. See Restatement of Products Liability § 2(b); Dan B. Dodds, *The Law of Torts* 980-81(2000) ("When the risk utility test is applied, the courts seem to be requiring negligence or at least some species of fault."). Judges decide what counts as a product misuse and thus what acts by the consumer truncate the seller's liability. See, for example, *Burkett v. Loma Mach. Mfg., Inc.*, 552 So.2d 134 (1989) (finding summary judgment for the manufacturer given substantial alteration of a saw.).

Other times the mandatory rules of tort are promulgated from the legislature. Some state legislatures have specified caps for non-economic damages for tort claims. See F. Patrick Hubbard, *The Nature and Impact of the Tort Reform Movement*, 35 *Hofstra L. Rev.* 437, 496-498 (summarizing state legislative efforts at damage caps). Others have restricted the reach of joint and several liability. See *id.* at 489-491 (summarizing state efforts to replace joint and several liability).

⁸² Our framework does not extend to tort situations involving strangers. The lack of a transaction means that the parties cannot allocate the cost of litigation or the cost of effort via the price term.

rely on fault-based standards; (2) consumer contracts that use both legal and market sanctioning mechanisms; (3) the classic, celebrated accounts of New York diamond merchants and cotton traders; and (4) securities litigation where both private and public enforcements are at play.

A. Predictions

Our first prediction is about the informational linkage. It may be roughly stated as that the filing or disposition of formal proceedings will trigger market or reputational sanctions. Further, the same event—the delivery of poor quality—can generate both litigation and reputation sanctions. We note in passing that the conventional contract theory, which relies on a strict dichotomy between verifiable and non-verifiable states, cannot fully explain why the same event can trigger both formal and informal sanctions.

Second, the analysis suggests a benefit of formal sanctions that informal sanctions lack: the infra-marginal effect. The presence of infra-marginal effect implies that formal sanctions, in many contexts, will be quite useful in designing the optimal deterrence regime. In other words, a complete elimination of legal liability should not be that prevalent. Sure, damage caps will be ubiquitous, useful for policing and controlling litigation expenses. But a modest amount of legal liability is needed both to generate information of misconduct to the marketplace and because legal liability carries with it the infra-marginal deterrence benefit. So, some legal sanctions should be present even when the market can and does effectively sanction misconduct.

Third, our analysis posits that parties in long-term relationship should instruct the courts to examine multiple noisy signals of respective parties' behavior to determine breach. This "instruction" can take the form of vague commands like best efforts, obligations to perform in a reasonable time and references to good faith. In consumer contracts, the prediction suggests that markets should be more reactive to a legal finding rooted in negligence than to a legal finding rooted in strict liability. The reason is now familiar: the negligence finding rests on two probative signals (harm and a judicial determination of fault) rather than one. As a result, breach of an obligation sounding in negligence provides more information to the market about seller's underlying conduct.

B. Long-Term Contracts

This first example deals with the prediction from our analysis as applied to transactions involving long term contracts. We start with some evidence on information linkage. An empirical study of venture capitalists finds that "litigated [venture capitalists] suffer declines in future business relative to carefully selected peers."⁸³ The key empirical move made by the authors was to benchmark litigated VC against a group of VCs, which was similar in almost all respects except that VCs in that group did not face litigation. The finding that litigated VC suffered a decline in future business relative to the benchmark group provides evidence that the same event—a lawsuit—can result in both formal sanctions and reputational harm. A second study considered whether franchisors, that faced litigation, experienced declines in future

⁸³ Vladimir Atanasov, Vladimir Ivanov, & Kate Litvak, Does Reputation Limit Opportunistic Behavior in the VC Industry? Evidence from Litigation against VCs, 67 J. of Fin. 2215, 2215 (2012).

growth.⁸⁴ The authors found that “franchisor litigiousness is associated with lower levels of expansion goals.” Again, the empirics suggest an information linkage between litigation and subsequent dealings.⁸⁵

Turning to the content of law prediction, most exclusive dealing and franchise contracts include a “best efforts” clause. Other similar clauses can be found across many long term agreements. A clause in a lending agreement might, for example, allow the lender to accelerate payment on the loan if it believes, in “good faith,” that the borrower is unlikely to pay. A clause in a franchise agreement might require that the franchisor provide “reasonable notice” before termination or provide the franchisee with a “reasonable time” to recoup its investment in the franchise. Occasionally, even in the absence of an express obligation, courts read in such “reasonableness” obligations into the interpretation of the contract.⁸⁶ The analysis above suggests why these standard-like terms are so common. They allow—indeed encourage—the court to consider multiple noisy but informative signals to determine breach, facilitating more accurate legal and reputational sanctions.⁸⁷

C. Consumer Product and Automobile Safety

Two different formal mechanisms govern the safety of consumer products and automobiles. As a matter of regulation, the Consumer Product Safety Commission (CPSC) is charged with protecting the public from “unreasonable risks of injuries associated with consumer products.” Governing over 15,000 different kinds of products, the CPSC has the power to impose civil fines and demand the recall of unsafe products. The failure to comply with a recall notice results in substantial penalties. Consumer product recalls can either be voluntary or triggered by a lawsuit filed by the CPSC. The National Highway Traffic Safety Administration (NHTSA) similarly regulates the safety of automobile safety. Like the CPSC, the NHTSA has the power to force a manufacturer to recall defective automobiles.

Second, products liability law allows consumers injured by defective products a private cause of action against the manufacturers. Damages can include both compensatory and punitive elements. Punitive damages are not necessarily related to the harm suffered by a victim, and in theory, can be quite large. In practice, however, punitive damages are capped in many states. In addition, any punitive award cannot be so unreasonably large as to amount to a violation of due process.

With respect to consumer product and automobile safety, consider first the information prediction. The evidence suggests that markets react to legal sanctions in the form of recalls and

⁸⁴ Kersi D. Antia , Xu (Vivian) Zheng , and Gary L. Frazier, Conflict Management and Outcomes in Franchise Relationships: The Role of Regulation, 50 J. Marketing Research 577 (2013).

⁸⁵ One might explain the results in both these studies through an adverse selection story. It runs like this: The litigation reveals that the firm is a bad type, one prone to litigation. Future partners learn as much and, as a result, are unwilling to deal with a firm involved in prior litigation. The data is also consistent with the moral hazard model we set forth. In the real world, we suspect, both adverse selection and moral hazard are in play.

⁸⁶ E. Allan Farnsworth, Contracts § 7.17 (4th ed. 2004)

⁸⁷ See Scott & Triantis, supra note ___, at ___.

private lawsuits.⁸⁸ For example, Friedman et al. examined the response of consumers to a 2007 recalls of toys and other children's products.⁸⁹ They found that "the types of toys that were involved in recalls in 2007 experienced above average losses in Christmas season sales."⁹⁰ Rhee and Haunschild similarly found significant changes in market values for companies experiencing extensive recalls.⁹¹

It is also true that in products liability area, both formal and informal sanctions work together. Damage caps are common,⁹² but no state has eliminated products liability altogether. Our theory justifies the middling position many states take with respect to punitive damages and products liability, more generally. Limitations on the reach of formal sanctions control litigation costs. Elimination may be an overkill, however, not only because it implies that more of the deterrence must come from informal sanctions, which are also costly, but also because formal sanctions, as empirical evidence supports, often serves to coordinate the deployment of the informal sanctions.

The trend from strict liability to negligence standard is also consistent with our theory. As originally conceived in the courts, products liability was a strict liability cause of action. Over time, the strict liability component has dwindled. Under the Third Restatement of Torts, strict liability only applies to manufacturing defect cases. Design defects and failure to warn cases are governed by a de facto negligence standard. Given that both formal and informal sanctions are in play with products liability, we view a push toward negligence as a positive development. The reason stems from the informational value of negligence-based litigation.

In fact, the market (i.e., the reputational mechanism) seems to take the liability standard into account. Empirical support for the content of obligation prediction comes from a study of airline crashes conducted by Mark Mitchell and Michael Maloney. They found that when the Federal Aviation Administration finds that an airplane crash was due to a pilot error rather than some events that are beyond a pilot's control, such as bad weather or mechanical failure, the airline company suffers a larger drop in market valuation.⁹³ To the extent that the drop in market valuation roughly correlates with the size of the reputational sanctions, the informational content

⁸⁸ See Ting-Heng Chu & Che-Chun Lin, An Extension of Security Price Reactions Product Recall Announcements, 44 *Quart. J. of Bus. & Econ.* 33 (2005) (examining "269 non-automotive product recall announcements that were published in the Wall Street Journal Index between January 1984 and December 2003" and finding "[c]onsistent with previous research, we find statistically significant negative, abnormal returns on, and one day prior to the announcement date."); other cites here.

⁸⁹ Seth M. Freedman et al., Product Recalls, Imperfect Information, and Spillover Effects: Lessons from the Consumer Response to the 2007 Toy Recalls, NBER working paper No. 15183 (2009).

⁹⁰ *Id.* at 1.

⁹¹ Mooweon Rhee & Pamela R. Haunschild, The Liability of Good Reputation: A Study of Product Recalls in the U.S. Automobile Industry, 17 *Organization Science* 101 (2006). For older evidence of the same effect, see Robert R. Reilly and George Hoffer, Will Retarding the Information Flow on Automobile Recalls Affect Consumer Demand, 21 *Econ. Inq.* 444, 444 (1983) ("It was found that over the 1977-81 period, severe recalls adversely affected the demand for the model recalled, while benefiting substitutes of other manufacturers."). There is also a literature documenting stock price reactions to automobile recalls. See Peltzman studies here.

⁹² As noted supra note ____, Professors Polinsky and Shavell report that "for each dollar that an accident victim receives in a settlement or judgment, it is reasonable to assume that a dollar of legal and administrative expenses is incurred." Shavell & Polinsky, supra note ____, at 470.

⁹³ Mark Mitchell and Michael Maloney, Crisis in the Cockpit? The Role of Market Forces in Promoting Air Travel Safety, 32 *J. L & Econ.* 329 (1989).

of the litigation (or in this case a finding by FAA) seems to affect the size of the reputational punishment.

Finally, even in a non-products-liability setting, manufacturers often limit contract remedy to repairing or replacing a non-conforming product (rather than disclaiming all liability) and disallow other remedy, such as consequential damages. While such limitation has been most often interpreted as either an efficient or inefficient shifting of risk from the manufacturer to the consumer, we can also think of such limitation as an attempt to rely on both legal and reputational sanctions. While repair or replace remedy may be insufficient as a remedy for a non-conforming product, it will limit the contracting parties' reliance on litigation and the parties can rely on reputational sanctions to make up for the shortfall. Such a regime can avoid the expenses associated with establishing and proving consequential damages.⁹⁴

D. Diamond Merchants and Cotton Traders

Professor Bernstein documents that buyers and sellers in the diamond industry in New York have opted out of public enforcement of contracts.⁹⁵ Instead, for formal sanctions, they use a private arbitration system operated through the New York Diamond Dealers club. Details of any arbitration are kept secret. The club's bylaws, however, provide "[a]ll decisions of arbitration panels including floor committee arbitrations which are not complied with within 10 working days, together with the picture of the non-complying member shall be posted in a conspicuous place in the Club rooms." Unlike a state court, the arbitration panel lacks the ability to enforce the judgment on its own. It cannot order, for instance, foreclosure of property or garnish the wages of parties who breach contracts.

Consider first the information prediction as applied to this market. Buyers and sellers form a close-knit community. Despite this fact, buyers and sellers don't rely exclusively on word of mouth for the transmission of information about non-cooperative behavior. Some information comes through the arbitration panel, which serves to rat out those that don't comply with its rulings. The arbitration board also responds to misinformation. As found by Professor Richman, the board "can punish any party responsible for spreading inaccurate information about another reputation."⁹⁶ Here, the imposition of the informal sanctions is triggered by the formal sanction.

Second, both formal and informal sanctions attach to opportunistic conduct. Jilted sellers and frustrated buyers can file a grievance with the arbitration panel. They can also refuse to deal with opportunistic counterparty going forward. Reliance on formal sanctions at all is surprising in this market. After all, the buyers and sellers all know each other; they run in the same social and business circles. Informal sanctions can include preclusion from future social and business transactions. Given the potential power of informal sanctions, why go to the trouble of forming an arbitration panel and hearing grievances? The informational and deterrence benefit from

⁹⁴ Not only does the promisee have to prove consequential damages with reasonable certainty (by presenting sufficient evidence), the promisee also has to prove that the consequential damages were foreseeable at the time of entering into the contract. Both parties can spend substantial resources arguing such issues.

⁹⁵ Bernstein, *supra* note __ at 115. See also Milgrom, North, and Weingast, *supra* note __ at __.

⁹⁶ Cite here.

formal sanctions provides one rationale for why this close knit community still relies partly on formal sanctions.

One final observation is that the arbitration panel has the ability to ratchet up any award to include punitive damages. At first blush, this practice appears puzzling, since the parties may want to limit damages and rely more on informal sanctions when litigation is costly. Notably, the diamond industry draws arbitrators from industry insiders. As experts, they can perhaps better balance the tradeoffs between formal and informal sanctions appropriately if the parties fail to do so themselves. Empowering the arbitration panel, then, to adjust the award up or down can make sense: with this flexibility, the arbitrators can opt for relatively more or relatively less reliance on formal sanctions, perhaps on a case-by-case basis. The arbitrators could tie the balance between the informal and formal sanctions to fit the needs of parties.

Like the diamond industry, the cotton industry relies on a combination of formal and informal sanctions. Generally, buyers and sellers of cotton do not call on the courts for the enforcement of contracts; they rely on arbitration. In cotton transactions, trade rules—not the provisions of the UCC—govern transaction disputes and set the default rules. The Southern Mill Rules apply in merchant to mill transaction and grant “market difference damages plus a one-half cent per pound penalty.” Consequential damages are not available. Rules from the regional trade associations or the Memphis Cotton Exchange apply to most merchant to merchant transactions. These rules limit relief to the market damages, disallowing broader relief based on, say, lost profits. Limiting—but not the wholesale denial of relief—is consistent with infra-marginal prediction.

In this market, the prospect of a limited relief via arbitration means that the informal sanction can be weaker—any boycott can last fewer periods. At the same time, the cap on damages controls litigation costs. Indeed, the trade rules control litigation costs in other ways too. The arbitrators use a “relatively formalistic adjudicative approach that gives little explicit weight to elements of the contracting context.” The rules do not allow arbitrators to inquire course of dealing, course of performance, or trade usage, each inquiry ramps up the potential litigation costs for the parties. Professor Bernstein finds that “in practice...arbitrators only look to custom when there are no trade rules or contract provisions on point.”⁹⁷ In the end, cotton buyers and seller appear to balance an inexpensive formal remedy system with threats of informal sanctions.

E. Securities Litigation

Publicly traded securities, such as stocks and bonds on national exchanges, are subject to regulation, most notably under the Securities Act of 1933, the Securities Exchange Act of 1934, and various regulations promulgated by the Securities and Exchange Commission (SEC). Among other things, these laws are designed to prevent material misrepresentation and to provide more accurate information to the investors. The laws are enforced through private rights of action and through actions, civil or criminal, instituted by the SEC. Damages for violations of

⁹⁷ Cite here.

these laws are thought to serve two purposes: to compensate harmed investors and to deter misconduct by market participants.⁹⁸

Promulgated under Section 10(b) of the Exchange Act of 1934, rule 10(b)(5) is one of the most important sources of fraud prevention. Adopted by the SEC in 1942, this rule penalizes fraudulent activities in connection with the sale or purchase of a security.⁹⁹ Shortly thereafter courts began to imply a private right of action under the rule.¹⁰⁰ According to the Supreme Court in *Herman & McLean v. Huddleson*,¹⁰¹ the “existence of this implied remedy is simply beyond peradventure.” In enforcing such private rights, class actions are often used. The social desirability of these class actions is subject to much debate.¹⁰² In response to some criticisms of the class action process, in 1995 Congress passed the Private Securities Law Reform Act (PSLRA).¹⁰³ The PSLRA provides a number of protections designed to control litigation costs, minimize strike suits, and the agency problems between the lead plaintiff attorney and the class members.¹⁰⁴

The characteristics of the securities market and the policies regulating securities transactions, including the PSLRA, are consistent with the predictions flowing from our theory.¹⁰⁵ First, take the information prediction. Investors are dispersed and unlikely to observe a firm’s misbehavior in terms of either not preventing or committing misrepresentation. Unless there is a formal finding or an action by some entity, such as the SEC, individual investors are unlikely to find out whether a firm has made a material misstatement in its filings or committed a fraud, including insider trading.¹⁰⁶ A government investigation can greatly facilitate private action by producing relevant information on unlawful behavior.

Second, private securities litigation can be quite expensive. In 2012, the average settlement amount for a securities class action was \$36 million, with a median settlement value of \$12 million.¹⁰⁷ The plaintiff attorney’s take of these settlements ranged between 38.8 percent

⁹⁸ Stephen J. Choi & A.C. Pritchard, *Essentials Securities Regulation* 103 (2008).

⁹⁹ 17 CFR 240.10b-5.

¹⁰⁰ *Kardon v. National Gypsum Co.*, 73 F.Supp. 798 (E.D. Pa 1947).

¹⁰¹ 459 U.S. 375, 380 (1983).

¹⁰² Cite large literature here.

¹⁰³ Private Securities Reform Act of 1995 (PSLRA), Pub. L. No. 104-67, 109 Stat. 737 (codified as amended in scattered sections of 15 U.S.C. (2006)).

¹⁰⁴ Stephen J. Choi, Jill E. Fisch & A.C. Pritchard, *Do Institutions Matter? The Impact of the Lead Plaintiff Provision on the Private Securities Litigation*, 83 Wash U. Law Quarterly 869, 871 (2005) (describing the motivations and provisions of the PSLRA); see also Joel Seligman, *The Private Securities Reform Act of 1995*, 38 Ariz. L. Rev. 717, 725 (1996) (same).

¹⁰⁵ As with the data on VCs and franchisors, one can tell an alternative story for this evidence based on adverse selection, which is also consistent with the data. It goes like this: The fraud lawsuit reveals that the firm is a bad type; as an institution it is unable to detect and control fraud. Given this new information, the market discounts the value of the shares. This adverse selection story, however, is inconsistent with the evidence that many firms accused of fraud return to levels of performance similar to matched firms that didn’t experience such lawsuits. See discussion *infra* note __ and accompany text. Our theory, by contrast, is consistent with both findings. In reality, however, we suspect that both theories are potentially in play.

¹⁰⁶ Cite Dyck and Zingales about who blows the whistle on securities fraud.

¹⁰⁷ Renzo Comolli et al., *Recent Trends in Securities Class Action Litigation: 2012 Full-Year Review* (figures 25 & 26).

and 12.6 percent.¹⁰⁸ Although the high percentage of recovery for the attorneys does not perfectly translate to high cost of litigation, one can guess that there is at least a rough correlation between the two. Given such a high litigation cost, one also sees an attempt to limit liability and damages in a number of ways. Investors can recover only the difference between the price paid and the value absent fraud. Plaintiff must prove recklessness, materiality, and a causal relationship between the fraud and the sale. In addition, the PSLRA enhanced the pleading standard, making it more difficult for the plaintiff to succeed at the motion to dismiss stage. Some of these policy choices are designed to weed out nuisance suits as well as more generally controlling litigation costs. Notably, the prospect of some legal liability remains, but the law makes effort to cap damages. Like with products liability, the contours of the law are consistent with a balance of concerns about excessive litigation costs against the infra-marginal deterrence benefit and informational value of formal sanctions.

Empirical evidence for the information prediction comes from Karpoff, et. al.. They find that securities misrepresentation is deterred through both legal and market channels.¹⁰⁹ Investigating 585 firms subject to SEC enforcement actions, they uncovered that

“The penalties imposed on firms through the legal system average only \$23.5 million per firm. The penalties imposed by the market, in contrast, are huge. Our point estimate of the reputational penalty...is over 7.5 times the sum of all penalties imposed through the legal and regulatory system.”¹¹⁰

Other empirical studies support that the relationship between investors and firms are restored after the initial punishment. Evidence comes from Marciukaityte, et. al.¹¹¹ They examine the long run performance of firms accused of fraud and find these long run measures were comparable to a control set of firms. In a related study, Bai, et. al. find that firms who “settle class actions experience no significant decline in [long run] sales.”¹¹² These evidence suggests

¹⁰⁸ Id. at figure

¹⁰⁹ Jonathan M. Karpoff et al., *The Cost to Firms of Cooking the Books*, 43 *J. Fin. & Quantitative Analysis*, 581 (2008).

¹¹⁰ Id. at 581. Many other studies find significant negative abnormal returns following the announcement of a lawsuit or the underlying fraud. See Paul A. Griffin, Joseph A. Grundfest, & Michael A. Perino, *Stock Price Response to News of Securities Fraud Litigation: An Analysis of Sequential and Conditional Information*, 40 *ABACUS* 21 (2004); Stephen P. Ferris & A.C. Prichard, *Stock Price Reactions to Securities Fraud Class Actions Under the Private Securities Reform Act*, working paper 01-008, University of Michigan John M. Olin Center for Law and Economics (2001); James Bohn & Stephen Choi, *Fraud in the New Issues Market: Empirical Evidence on Securities Fraud Class Actions*, 144 *U. Pa. L. Rev.* 903 (1996); and Roberto Romano, *The Shareholder Suit: Litigation without Foundation*, 7 *J. L. Econ. & Org.* 55 (1991). Unlike the Karpoff et al. discussed in the text, these studies do not attempt to disentangle the legal penalty from the reputational penalty. It could be that the abnormal negative returns reflect only the reduction in share value arising out of the payment of damages and the litigation costs arising from the lawsuits, nothing more. That said, these findings are also consistent with the market punishing the firm by more than the amount at stake in the litigation. For more evidence on the reputational effects of corporate misconduct, see Lott paper.

¹¹¹ Dalia Marchukaityte, et. al., *Governance and Performance Changes After Accusations of Corporate Fraud*, *Fin. Analysts J.*, May-June 2006, at 32.

¹¹² Lynn Bai, et. al., *Lying and Getting Caught: An Empirical Study of Effect of Securities Class Action Settlements on Targeted Firms*, 158 *U. Pa. L. Rev.* 1877, 1912 (2010). As a caveat, these firms did experience some liquidity problems and worsening Altman Z-score which measures the financial health of a company. The observations also lead to more testable predictions. For firms where proving fraud is relatively difficult, we should observe relatively

that while the market's punishment can be quite harsh in the short-run, in the long-run, the firms can restore their tarnished reputation and successfully come back to the market.

One final area of law where reputation seems to play an important role is in initial public offerings. Since the firm that is offering to sell its securities, usually stock, to the public may be doing so for the first time in its history, the firm may have a hard time pledging its reputational capital as a bond. Formal sanctions may not work very well either especially if the firm has an intention of committing a securities fraud and has insufficient assets. Where formal and informal sanctions against the primary actor may be insufficient, reputational capital of the gatekeepers, notably the investment banks and law firms, can fill this important deterrence gap. Evidence supports that the investment banks' reputation can greatly aid the IPO process. Prospective investors are better assured of the fundamental value of the company when a more reputable investment bank is representing the public offering. While the investment bank's assets may be insufficient to cover any potential liability, vicarious reputational punishment can have the desirable effect on preventing material misrepresentation in the IPO process.

Conclusion

This paper started with a question: what is the relationship between formal and informal sanctions? In most relational contracts and even in many mass-market consumer contracts, both seem to be in play. As Professor Stewart Macaulay identified long ago, contracting parties don't rely solely on formal contracts to ensure commitment.¹¹³ But they don't seem to rely exclusively on reputation sanctions either. Even when they are in a long-term relationship, they write enforceable contracts and often rely on formal dispute resolution mechanisms. The contracts also often empower one or both parties to formally terminate their relationships. The presence of both formal and informal mechanisms raises intriguing questions, both positive and normative. Our analysis revealed three points, which we reiterate one last time for emphasis here.

First, legal sanctions and reputation sanctions are both costly to deploy. The key task for contracting parties is to reach the desired level of deterrence at the lowest total cost of the sanctions. In so doing, the parties are apt to recognize that more of one type of sanction means less of the other type is required. The optimal mixture will then often entail a little bit of both. Second, legal sanctions can form the informational basis for unleashing reputational sanctions. Without the legal sanction, the market or other trading partners can't learn when to punish. In this way, even when litigation is quite costly it can nonetheless be desirable. Reputation penalties won't work without it.

With respect to the informational role, conditioning liability on proxies for effort—through a best efforts clause, negligence, or the good faith standard—can improve the functioning of both the legal sanction and the reputational sanction. The proxies provide additional noisy signals above what the court receives in “no fault” regimes (regimes where liability turns only on delivery of low quality). Subject to litigation cost concerns, the court should consider signals correlated with effort until the next signal to be examined provides no

more extensive reputational sanctions following a suit. On the other hand, for firms where proving fraud is less difficult, we should observe relatively less severe reputational sanctions following suit.

¹¹³ See, e.g., Stewart MacCaulay, *Noncontractual-Relations: A Preliminary Study*, 28 *Amer. Soc. Rev.* 1 (1963).

more information than what can be found in the prior ones. This recipe can be used to ground judicial investigations into good faith.

Third, it is often efficient to combine both legal and reputational sanctions. The reason stems in part from the infra-marginal benefit of litigation. It also stems from the fact that litigation often generates useful information for the market to coordinate its reputational punishment on. The optimal deterrence regime will often keep the legal sanctions at an insufficient level while allowing the reputational sanctions to fill the gap. The analysis can rationalize why legal sanctions are often capped—but not entirely eliminated in—contract and tort. Caps control litigation costs while preserving some of the infra-marginal and informational benefit of the formal sanction.

In closing, the paper calls out for empirical testing of the hypotheses. The numerical example is consistent with much existing empirical evidence, but none of those papers were developed with this analysis in mind. One might wonder whether reputational sanctions are usually triggered by litigation or alternatively if reputational sanctions arise frequently absent litigation. Second, we set aside issues of adverse selection. What if litigation revealed information about the seller's underlying ability to keep his promises not just his willingness to do so? Would the market or trading partner completely learn about the seller's ability over time? How much litigation would be desirable in such a setting, more or less than in settings involving just moral hazard? We leave questions like these for future work.