

# DISCUSSION PAPER SERIES

No. 9836

**STANDARDIZED ENFORCEMENT:  
ACCESS TO JUSTICE VS.  
CONTRACTUAL INNOVATION**

Nicola Gennaioli, Enrico C Perotti and  
Giacomo AM Ponzetto

***INDUSTRIAL ORGANIZATION and  
PUBLIC POLICY***



**Centre for Economic Policy Research**

**[www.cepr.org](http://www.cepr.org)**

Available online at:

**[www.cepr.org/pubs/dps/DP9836.php](http://www.cepr.org/pubs/dps/DP9836.php)**

# STANDARDIZED ENFORCEMENT: ACCESS TO JUSTICE VS. CONTRACTUAL INNOVATION

Nicola Gennaioli, Università Bocconi and IGER  
Enrico C Perotti, University of Amsterdam and CEPR  
Giacomo AM Ponzetto, CREI, Universitat Pompeu Fabra, Barcelona GSE  
and CEPR

Discussion Paper No. 9836  
February 2014

Centre for Economic Policy Research  
77 Bastwick Street, London EC1V 3PZ, UK  
Tel: (44 20) 7183 8801, Fax: (44 20) 7183 8820  
Email: [cepr@cepr.org](mailto:cepr@cepr.org), Website: [www.cepr.org](http://www.cepr.org)

This Discussion Paper is issued under the auspices of the Centre's research programme in **INDUSTRIAL ORGANIZATION and PUBLIC POLICY**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as an educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Nicola Gennaioli, Enrico C Perotti and Giacomo AM Ponzetto

CEPR Discussion Paper No. 9836

February 2014

## ABSTRACT

### Standardized Enforcement: Access to Justice vs. Contractual Innovation\*

We model the effect of contract standardization on the development of markets and the law. In a setting in which biased judges can distort contract enforcement, we find that the introduction of a standard contract reduces enforcement distortions relative to reliance on precedents, exerting two effects: i) it statically expands the volume of trade, but ii) it crowds out the use of open-ended contracts, hindering legal evolution. We shed light on the large-scale commercial codification undertaken in the nineteenth century in many countries (even common-law ones) during a period of booming commerce and long-distance trade.

JEL Classification: D86, K12, K40 and K41

Keywords: contracts, imperfect enforcement, legal evolution, precedents and standardization

Nicola Gennaioli  
Department of Finance  
Bocconi University  
Via Roentgen 1  
20136 Milano  
ITALY

Enrico C Perotti  
Department of Economics  
Universiteit van Amsterdam  
Roeterstraat 11  
1018 WB Amsterdam  
THE NETHERLANDS

Email: [nicola.gennaioli@unibocconi.it](mailto:nicola.gennaioli@unibocconi.it)

Email: [e.c.perotti@uva.nl](mailto:e.c.perotti@uva.nl)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=158604](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=158604)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=105520](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=105520)

Giacomo AM Ponzetto  
CREI - Universitat Pompeu Fabra  
C/ Ramon Trias Fargas, 25-27  
08005 Barcelona  
SPAIN

Email: [gponzetto@crei.cat](mailto:gponzetto@crei.cat)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=171448](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=171448)

\*We are grateful to John Armour, Giuseppe Dari Mattiacci, Michael Fishman, Ronald Gilson, Raj Iyer, Canice Prendergast, Josh Scwhartzstein, Andrei Shleifer, Dimitri Vayanos, Luigi Zingales, seminar participants at Chicago Booth, Columbia Law School, Northwestern, Oxford, and three anonymous referees for useful comments. Chantal Mak, Stefano Mosso and Jacopo Ponticelli provided able research assistance. We are indebted to Katharina Pistor for extensive discussions. Gennaioli acknowledges financial support from the European Research Council and the Barcelona GSE. Ponzetto acknowledges financial support from the Spanish Ministry of Science and Innovation (grants ECO-2011-25624 and Juan de la Cierva JCI-2010-08414), the Spanish Ministry of Economy and Competitiveness through the Severo Ochoa Programme for Centres of Excellence in R&D (SEV-2011-0075), the Barcelona GSE Research Network and the Generalitat de Catalunya (2009 SGR 1157).

Submitted 17 January 2014

# 1 Introduction

Recent work documents that common law is positively associated with the development of financial, labor and other markets (La Porta, Lopez-de-Silanes, and Shleifer 2008). A widespread albeit controversial interpretation is that common law promotes economic efficiency (Hayek 1960; Posner [1973] 2010) thanks to the efficiency-oriented nature of its judges and to the adaptability of precedents, which enable the use of innovative and flexible contracts. In reality, however, common law has not evolved merely thanks to spontaneous precedent creation by efficiency-maximizing judges. Codification and the standardization of contracts have also played a major role. More broadly, the last century or so has witnessed extensive legal standardization of commercial contracts, in common- and civil-law regimes alike (Calabresi 1982). What are the causes and the effects of such standardization?

We address this question by building a model in which standardization is a way to alleviate the enforcement problems created by imperfect courts. The model allows us to study both the static and dynamic effects of standardization on contracting and legal evolution.

We study a transaction between the buyer and the seller of a widget, in which quality-contingent pay is needed to induce productive effort. The verifiability of quality is imperfect, and depends on how judges interpret the evidence presented by parties in courts. We make two assumptions concerning court verification. First, in line with legal realism (Frank 1930; Posner 2005) and previous work (Gennaioli and Shleifer 2007; Gennaioli 2013), we assume that in verifying complex facts some judges are subject to biases. These biases may systematically favor one party over the other, reflecting class stratification or widely held beliefs. If populist judges believe that large companies unfairly take advantage of unsophisticated consumers, there is a systematic pro-buyer bias. If the transaction is international and the buyer comes from a different jurisdiction, local judges may have a systematic pro-seller bias. In this case, judicial bias creates a stable inequality of parties in court. But judicial biases may also be idiosyncratic, reflecting for instance judicial attitudes towards specific litigants. These idiosyncrasies create volatility but not systematic inequality in decisions. In both cases, though, bias distorts judicial state verification, creating enforcement frictions.

Second, we assume that parties can limit judicial discretion by contracting on legal prece-

dents, but only to some extent. The ambiguity of contractual references to precedent provides judges with some ability to select the elements of a case they consider legally material. This leeway enables judges to choose which exact precedent applies to the case at hand (Llewellyn, 1930; Stone 1946, 1964), or to alter the application of a given precedent to the current contract, as documented by Niblett, Posner, and Shleifer (2010).<sup>1</sup> In this setting, we view standardization as the creation by the state or a trade association of a simple contract that removes any ambiguity over the application of precedents. Standardization removes ambiguity because the standard-setter can train judges on how to enforce the standard, something that atomistic parties cannot achieve on their own.<sup>2</sup>

Based on these assumptions, we study optimal contracts by adopting a mechanism-design approach. Consider a *laissez-faire* regime, in which no standard is available. The optimal contract must not only provide the seller with incentives to exert effort, but also litigants and judges with incentives to report their information truthfully at the enforcement stage. Crucially, we find that, despite judicial bias, the optimal contract is “open-ended”: it conditions the seller’s payment not only on precedents, but also on novel pieces of evidence that have not been used in court yet. By doing so, parties make payments as contingent as possible on material information. This reliance on novel evidence is critical for legal evolution.

On the other hand, judicial biases are costly: they reduce the set of verifiable events, making enforcement less precise. This imprecision increases the cost of incentivizing the seller, destroying gains from trade. These costs are particularly strong at an early stage, when few precedents have been accumulated. As more open-ended contracts are litigated, precedents expand, improving verifiability. This enrichment of precedent allows parties to write better contracts, increasing the volume and efficiency of trade.

---

<sup>1</sup>A canonical strategy is “spurious distinguishing” whereby judges exploit spurious material aspects of the case, or purely abstract legal categories, to argue that the parties’ contract refers to a precedent different from the one the parties originally intended (Fernandez and Ponzetto 2012). Many legal distinctions are at best dubiously grounded in objective efficiency considerations. E.g., manufacturers’ strict liability to the consumer was gradually introduced through a series of rulings that created exceptions for specific products such as soap, hair dye, dog food, and fish food. Cf. *Kruper v. Procter & Gamble Co.*, 113 N.E.2d 605 (Ohio App. 1953); *Graham v. Bottenfield’s, Inc.*, 176 Kan. 68, 269 P.2d 413 (1954); *McAfee v. Cargill, Inc.*, 121 F. Supp. 5 (S.D. Cal. 1954); *Midwest Game Co. v. M.F.A. Milling Co.*, 320 S.W.2d 547 (Mo. 1959).

<sup>2</sup>In reality, even standard contracts are subject to some judicial subversion (Niblett 2013a), but for simplicity we rule this possibility out here. The only thing we need is that standard contracts constrain judicial interpretation of precedent more than nonstandard contracts.

Suppose now that an enforcement body introduces a standard contract and allows parties to use it. The optimal standard perfectly conditions the seller's payment on precedents but is not open-ended, because the enforcement body lacks the parties' transaction-specific information. Standardization, then, has two static effects: it boosts the volume of trade among parties who would not contract under *laissez faire*, but it crowds out the use of open-ended contracts by some parties who would contract under *laissez faire*.

Owing to these effects, standardization presents a dynamic trade-off. On the one hand, it immediately improves welfare by reducing enforcement problems, boosting the volume and efficiency of trade. On the other hand, it stifles legal evolution, as judges are asked to evaluate the same features of every case and precedents no longer evolve. After some time, welfare under *laissez faire* may become higher than under standardization thanks to speedier legal evolution in the former regime. A key implication is that standardization should optimally occur after substantial legal evolution has taken place, and after private parties start to demand a standard contract. Atomistic and shortsighted parties do not internalize the future public benefit of precedent updating. Thus, if a standard were available they would use it too early, slowing down legal change too much. As the law matures, standardization becomes optimal, particularly if judicial biases are strong.

These results can help explain the historical emergence of contract codification in common-but also civil-law regimes. As we discuss in Section 6, the late nineteenth century witnessed a surge in contract standardization across different legal systems. This was precisely a time when booming colonial trade and industrialization created vast trading opportunities, but the different geographical, cultural, and social backgrounds of trading partners created room for substantial enforcement risk. In the last century, the U.S. has also experienced expedited standardization. Calabresi (1982) views this process as a response to the need to make litigation cheaper and more predictable, but he also warns, in line with our model, that excessive standardization may stifle private initiative and innovation.

Our contribution lies in modelling legal change and the introduction of standard contracts in an optimal contracting framework, and in describing the static and dynamic trade-offs between the evolution of case law and the costs of judicial discretion.<sup>3</sup> Our approach to

---

<sup>3</sup>Other papers studying the static effects of judicial error when the latter is due to judicial bias or

standardization is distinct from the legal literature on boilerplate and standard contracts. Ahdieh (2006) views standardization as a way to foster coordination. Kahan and Klausner (1997) view it as a way to exploit network effects and save on transaction costs. These approaches adopt the conventional IO perspective according to which standardization acts as a coordination device, particularly in sectors characterized by large network externalities (e.g., Varian, Farrell, and Shapiro 2004). In our model there is no benefit from coordination, and standardization acts as a constraint on the discretion of law enforcers.

We also contribute to the work on legal evolution. Relative to early papers (Priest 1977; Rubin 1977), recent models of judge-made law focus on judicial behavior (Gennaioli and Shleifer 2007; Ponzetto and Fernandez 2008; Anderlini, Felli, and Riboni 2013; Niblett 2013b). In our approach, precedents are past judicial decisions that narrow down adjudication, and enable more complete contracting. Our view is closest to Gennaioli and Shleifer's (2007) model of distinguishing and to Hadfield's (2011) portrayal of precedents as a form of judicial training. These papers consider torts rather than optimal contracts, with the exception of Anderlini, Felli, and Riboni (2013), who however do not study the legal remedy represented by contracts with limited judicial discretion.

The paper is organized as follows. Section 2 presents the basic contracting setup. Section 3 introduces enforcement risk and solves for the optimal contract under *laissez faire*. Section 4 studies the optimal standard contract and contract choice under standardization. Section 5 studies legal evolution in *laissez-faire* and standardized regimes. Section 6 discusses real-world standardization episodes in light of our model. Section 7 concludes, while the Appendix contains all proofs and mathematical derivations not presented in the text.

## 2 The Model

### 2.1 Setup

Time is discrete, with an infinite horizon. At the beginning of each period  $t = 0, 1, \dots$  a penniless entrepreneur (the seller) and a wealthy customer (the buyer) meet and choose corruption are Glaeser, Scheinkman and Shleifer (2003), Glaeser and Shleifer (2003), and Bond (2004).



whether to form a partnership involving the supply of a relationship-specific widget. In each period  $t$ , production occurs in two stages. First, the seller exerts effort  $a \in [0, 1]$  at a nonpecuniary cost  $C(a)$ . Second, with probability  $a$  the widget is realized to be “good,” taking value  $v > 0$ ; with probability  $1 - a$ , the widget is “bad,” taking value zero. We keep time subscripts implicit until Section 3. The widget is an experience good, such as a medical or professional service, whose value is learned by the buyer only after consuming it.

We impose the following restrictions on the seller’s cost function:

$$C(a) > 0, C'(a) > 0, C''(a) > 0, \text{ and } C'''(a) \geq 0 \text{ for all } a \in (0, 1), \quad (1)$$

with limit conditions  $C(0) = 0$ ,  $\lim_{a \rightarrow 0} C'(a) = 0$ , and  $\lim_{a \rightarrow 1} C'(a) > v$ .

If at time  $t$  the partnership is formed, the seller’s first-best effort level is:

$$a_{FB} = \arg \max_a \{av - C(a)\} = C'^{-1}(v) \in (0, 1), \quad (2)$$

which corresponds to joint surplus

$$\Pi_{FB} = \max_a \{av - C(a)\} = vC'^{-1}(v) - C\left(C'^{-1}(v)\right) > 0. \quad (3)$$

If the partnership is not formed, the seller obtains 0, while the buyer obtains utility  $\underline{u}_B \geq 0$ . Forming the partnership is first-best efficient if and only if  $\Pi_{FB} \geq \underline{u}_B$ .

## 2.2 Contracting

In period  $t$ , the seller and the buyer first meet. If they decide to form a partnership, the seller makes a take-it-or-leave-it contract offer to the buyer (so the seller has full bargaining power). Then the seller exerts effort, which determines the likelihood of producing a valuable widget. The widget is produced, the buyer consumes it, and the contract is enforced.

Under full observability, the first best is implemented by a contract requiring the buyer to pay the seller a price  $p = a_{FB}v - \underline{u}_B$  if he exerted effort  $a_{FB}$ , and zero otherwise. Unfortunately, effort is unobservable (and non-contractible), so this solution does not work.

If the quality of the widget is perfectly observable after consumption, the parties can

specify a quality contingent price  $p_q$ , where  $q \in \{0, v\}$  denotes the widget's quality. At the optimal contract, the buyer's participation constraint is binding. Otherwise, the seller could raise  $p_q$  for all  $q$  and still ensure participation without affecting effort provision. As a result, the seller chooses  $p_v \geq 0$  and  $p_0 \geq 0$  to maximize joint surplus  $av - C(a) - \underline{u}_B$  subject to the buyer's binding participation constraint  $a(v - p_v) - (1 - a)p_0 = \underline{u}_B$ , and to the seller's incentive-compatibility constraint  $p_v - p_0 = C'(a)$ . The problem can be rewritten as:

$$\max_{a \in [0,1]} \{av - C(a) - \underline{u}_B\} \quad (4)$$

subject to

$$av - \underline{u}_B \geq \min_{p_v, p_0 \geq 0} \{ap_v + (1 - a)p_0\} \text{ s.t. } p_v - p_0 = C'(a). \quad (5)$$

In (5), the optimal price  $p_q$  minimizes the cost of inducing any effort  $a$ . This minimum cost defines the set of effort levels that can be implemented given the buyer's participation constraint. The seller chooses the surplus-maximizing effort  $a$  from this set.

**Proposition 1** *When quality  $q$  is contractible, the optimal contract sets a positive price only when quality is high ( $p_0 = 0$  and  $p_v = C'(a_{SB}) > 0$ ).*

*The first best is attainable if and only if the buyer's outside option is nil ( $\underline{u}_B = 0$ ). The partnership is formed if and only if the buyer's outside option is sufficiently low:*

$$\underline{u}_B \leq \max_{a \in [0,1]} \{a[v - C'(a)]\}. \quad (6)$$

*Second-best effort and joint surplus decrease with the buyer's outside option ( $\partial a_{SB} / \partial \underline{u}_B < 0$  and  $\partial \Pi_{SB} / \partial \underline{u}_B < 0$  for all  $\underline{u}_B \in (0, \max_{a \in [0,1]} \{a[v - C'(a)]\})$ ).*

When the buyer's outside option is positive, the first best cannot be achieved because of the seller's wealth constraint. Ideally, the seller would like to pay  $\underline{u}_B$  to the buyer and "purchase the firm" from him, which would elicit first-best effort. However, this arrangement is infeasible because the seller is penniless. Second-best effort and joint surplus are below the first best and decrease with the buyer's outside option. We assume that Equation (6) always holds, so the partnership is feasible when quality is fully contractible.

The optimal contract specifies zero payment to the seller in case of low quality, namely when  $p_0 = 0$ . This feature minimizes wasteful payments, thereby reducing the cost of incentive provision. A similar property will be at work when, owing to imperfect enforcement, parties can only contract on an imperfect signal of quality.

### 3 Litigation and Imperfect Verifiability

Quality is verified in court, depending on the evidence presented by parties and verified by judges. We now describe the structure of the evidence, as well as the preferences of judges.<sup>4</sup> In the remainder, we refer to the partnership occurring at time  $t$  as “partnership  $t$ .”

#### 3.1 The Structure of Evidence

Evidence about partnership  $t$  is drawn from an informative set  $I \equiv [0, 1]$  of material pieces of evidence and an uninformative set  $U_t \equiv \{u_t^v, u_t^0\}$  of immaterial pieces of evidence.

The informative set  $I$  contains fundamental determinants of the quality of the seller’s job (e.g., the functionality of the widget or its timely delivery) that are common to all partnerships. It consists of a continuum of pieces of evidence, each of which is uniquely characterized by an index  $i \in [0, 1]$  and takes value  $e_t(i) \in \{-1, 1\}$  depending on widget quality  $q_t$ . If widget quality at  $t$  is high, all pieces of evidence take value 1, formally  $e_t(i) = 1$  for all  $i$ . If widget quality is low, piece of evidence  $i$  takes value

$$e_t(i) = \begin{cases} 1 & \text{for } i < \xi_t \\ -1 & \text{for } i \geq \xi_t \end{cases}, \quad (7)$$

where  $\xi_t$  is an i.i.d random variable with cumulative distribution function  $F_\xi(\cdot)$  and continuous density  $f_\xi(\cdot) > 0$  on the interval  $[0, 1]$ .  $\xi_t$  proxies for the difficulty of a case: when  $\xi_t$  is higher, fewer signals are revealing of low quality.

Negative material evidence  $e_t(i) = -1$  is consistent with low quality only. Positive material evidence  $e_t(i) = 1$  signals high quality because it is more likely to occur when

---

<sup>4</sup>In the appendix, we present a further microfoundation of our model of evidence collection. For simplicity, here we provide a streamlined description of the features that underpin our model of contract enforcement.

$q_t = v$ . Crucially, a piece of material evidence carrying a higher index  $i$  is more informative. In the limit,  $e_t(1)$  almost surely takes values 1 if quality is high and  $-1$  if quality is low. Generally speaking, a piece of evidence  $e_t(i)$  is a sufficient statistic for  $q_t$  given a lower indexed piece of evidence  $e_t(j)$  for all  $j \leq i$ .

The uninformative set  $U_t$  consists of partnership-specific factors that are not objectively relevant for performance, but may look like performance proxies to an external observer, such as a judge. Formally, the uninformative set contains two immaterial pieces of evidence  $\{u_t^v, u_t^0\}$ : one is positive ( $u_t^v = 1$ ) and the other is negative ( $u_t^0 = -1$ ), regardless of widget quality. Examples of uninformative pieces of evidence may include inappropriate measurements of quality (e.g., estimates of functionality relying on inappropriate methods) or idiosyncrasies in the seller's production method (e.g., having an irregular work schedule).

### 3.2 Partisan Evidence Collection

For the purpose of evidence collection,  $I$  is partitioned into two subsets: a set  $P_t \subset I$  of precedents, and a set  $I \setminus P_t$  of novel pieces of evidence.

$P_t$  is a countable set containing of all informative pieces of evidence  $i$  that have been used in past cases (and cited in the judicial opinions justifying their outcome). The pieces of evidence  $e_t(i)$  for all  $i \in P_t$  are publicly observable and parties can freely contract on their realizations. Let  $i_t \equiv \max i \in P_t$  denote the most informative precedent available at  $t$ . Then, the piece of evidence  $e_t(i_t)$  is a sufficient statistic for all precedents. As a result, if parties contract upon precedents, it is sufficient for them to contract on the realization of  $e_t(i_t)$  alone. The variable  $i_t$  conveniently summarizes the state of precedents at time  $t$ .

Search for novel evidence in  $I \setminus P_t$  is instead both imperfect and undirected. During litigation, each litigant can search for one new piece of evidence. Search is then imperfect because the litigant may come up empty-handed: a party's search in  $I \setminus P_t$  is successful only with probability  $\iota \in (0, 1)$ , and unsuccessful otherwise. Search is undirected because parties cannot target more informative evidence (i.e., higher indices  $i$ ): if search is successful, the litigant randomly samples a piece of evidence in  $I \setminus P_t$ , which may either take value 1 or  $-1$ , and whose informativeness  $i$  is unknown when parties meet in court.<sup>5</sup> After sampling

---

<sup>5</sup>The search for information in  $I$  is unaffected by precedents because the set  $P_t$  is countable. Thus, it has

novel evidence, the litigant can choose to present it in court or hide it. Informative evidence is “hard”: it can be hidden but it cannot be falsified.

This setup outlines a critical distinction between precedents and novel pieces of evidence. Novel evidence is subject to significant ambiguity because it does not have a track record of past use. As a result, neither judges nor the parties recognize and contract upon the informativeness of novel evidence  $i \in I \setminus P_t$ . Precedents, by contrast, incorporate information that is generated by higher courts, legal scholars, or that transpires from partnerships over time. As a result, they allow for more precise contracting on specific signals of performance.<sup>6</sup>

Consider finally uninformative evidence in  $U_t$ . Similarly to precedents, litigants know ex ante which pieces of evidence  $\{u_t^v, u_t^0\}$  are misleading, and they can perform directed search on  $U_t$ . The difference with precedents is that  $P_t$  is publicly observable while  $U_t$  represents relationship-specific information that the parties alone can privately observe. Outside observers (including judges, as we discuss below) cannot distinguish if a piece of evidence is drawn from  $U_t$  or from  $I \setminus P_t$ . Hence, misleading dimensions provide an opportunity for cheap talk. However, the parties can - and optimally will - rule out these opportunities for cheap talk by contracting that  $u_t^v$  and  $u_t^0$  are unacceptable as evidence of quality for their partnership. E.g., the contract may allow the seller to flexibly adjust his work schedule, or it may rule out certain misleading ways of measuring performance.

These assumptions tractably account for the notion that parties are aware of some idiosyncratic features of their transaction and can contract on them in advance, thus revealing some private partnership-specific information to judges. At the cost of greater complexity, the model could allow for transaction-specific material evidence.

---

measure zero while its complement set  $I \setminus P_t$  that the litigants search from always has full measure.

<sup>6</sup>Specifically, the informativeness  $i$  of a novel piece of evidence  $e_t(i)$  that decides partnership  $t$ 's dispute is not immediately known to the litigants nor to the judge issuing the ruling. However, it subsequently becomes known, and thus contractible, at  $t + 1$ .

There are two alternative foundations for the assumption that  $i$  becomes contractible at  $t + 1$ . The strongest assumption holds that at  $t + 1$  judges learn the informativeness of signals in  $P_t$ . This occurs because precedents constitute the bedrock of judicial training. Such gradual judicial learning captures a key insight of legal realism. The judge deciding a case cannot identify exactly and single-handedly its true ratio decidendi. Later courts will determine the precise extent  $i$  of the rule that a precedent had the power to establish (Cardozo 1921; Allen 1927; Radin 1933; Cohen 1935; Frank 1949; Montrose 1957; Llewellyn 1960; Dias 1985; Posner 1990; Garner 2009). A weaker assumption for the contractibility of  $i$  at  $t + 1$  is that only parties learn the informativeness of precedents (owing to their personal experience, or communication with other industry participants) and they contractually reveal it to judges.

### 3.3 Judicial Preferences

Since the contract is litigated ex post, after investment is sunk and production has taken place, the impact of contract enforcement is purely distributional. It is therefore natural for ex-post judicial decisions to be shaped by a judge's idiosyncratic distributional preferences. There are three types of judges. A fraction  $\beta$  have a pro-buyer bias, and wish to minimize payment to the seller. A fraction  $\sigma$  have a pro-seller bias, and wish to maximize payment to the seller. The remaining  $1 - \beta - \sigma$  judges are unbiased: they wish to enforce the contract faithfully. If judicial bias stems from personal idiosyncrasies, pro-seller and pro-buyer biases will roughly balance out in the population of judges and  $\beta \approx \sigma$ . If  $\sigma \gg \beta$ , judicial bias is systematically pro-seller, if  $\beta \gg \sigma$  judicial bias is systematically pro buyer. The difference between  $\beta$  and  $\sigma$  can capture the inequality of parties. When  $|\beta - \sigma|$  is large, one party expects a systematically more favorable treatment than the other in court. Our model allows us to consider idiosyncratic and systematic bias alike.

### 3.4 Judicial Information

Judges observe the evidence presented by the litigants in court. Like the litigants themselves, the judges: a) observe the novel pieces of evidence presented by litigants but not their true informativeness  $i$ ; and b) can hide pieces of evidence presented by litigants but not falsify them. Unlike the litigants, however, judges cannot identify the misleading pieces of evidence  $u_t^v$  and  $u_t^0$  if the parties had not specified them ex ante in their contract. This inability to tell apart spurious from material pieces of evidence (unless instructed how to do so by the parties' contract) reflects judges' limited expertise. Naturally, parties have superior ex-ante knowledge of transaction-specific features.

Judges—like litigants—can recognize precedents  $i \in P_t$ . By stare decisis, these precedents are binding, but critically their grip is imperfect. With probability  $\alpha \in [0, 1]$  a judge can discard the evidence entailed by the precedents that parties contracted upon. The judge can then interpret the relevant provisions of the contract however he sees fit. With probability  $1 - \alpha$ , the judge must correctly verify the evidence corresponding to the precedents parties contracted upon. As we discussed in the introduction, judicial flexibility in enforce-

ing precedents reflects the ambiguity of the parties' contract. When the ex-ante contract is perfectly drafted, it precludes any misinterpretation of its references to precedent, so that  $\alpha = 0$ . When the contract is very poorly drafted, it is easy for judges to misinterpret it, and  $\alpha = 1$ . The higher  $\alpha$ , the more ambiguous contractual language is.

## 4 Contracting under Laissez Faire

By “laissez faire” we denote the legal arrangement in which the members of each partnership  $t$  write a contract tailored to their specific needs. It is immediate that the optimal contract rules out the use of misleading evidence  $U_t$  so as to enable parties to use hard, novel informative evidence drawn from  $I \setminus P_t$ .

A contract in our setting consists of a price schedule  $p(\dots) \geq 0$  specifying a payment from the buyer to the seller contingent on the information presented by the litigants and verified by the judges. The contract cannot also specify a state-contingent trading rule because the widget is an experience good (such as a service). As a result, information is not generated or the good is not even produced until consumption by the buyer takes place.

We rule out the possibility for the contract to specify punishments for the parties as a whole, such as those stemming from fines paid to third parties, nonpecuniary criminal penalties, or incentive payments to judges. The rationale is that these punishments would not be robust to renegotiation.

The contract is written at the beginning of the partnership, before any information on the value of the widget or the preferences of judges is revealed. The figure below summarizes the sequence of events within a generic period  $t$ .

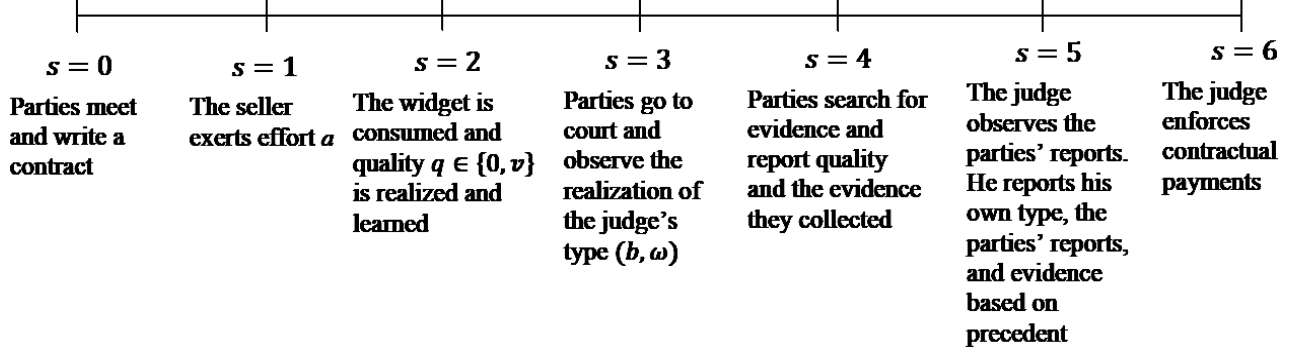


Figure 1: Timing

By the revelation principle, any contract  $p(\dots) \geq 0$  can be represented by a direct revelation mechanism that induces both litigants and the judge to report truthfully all their information. Figure 1 illustrates the information possessed by different agents. After the buyer has consumed the widget, quality  $q_t \in \{0, v\}$  is observed by both litigants  $L \in \{B, S\}$  but remains unobservable to the judge. When the contract rules out misleading evidence  $\{u_t^v, u_t^0\}$ , each litigant privately observes a novel piece of informative evidence  $e_t(i_t^L) \in \{-1, 0, 1\}$ , where  $i_t^L$  denotes the unknown dimension of evidence sampled by litigant  $L$ , and  $e_t(i_t^L) = 0$  denotes an unsuccessful search. Both the litigants and the judge observe the precedent-based evidence  $e_t(i_t) \in \{-1, 1\}$ , the judge's ability to disregard contractual references to precedent  $\omega_t \in \{0, 1\}$ , and the judge's preferences  $b_t \in \{b_B, u, b_S\}$ , where  $b_L$  denotes a bias in favor of litigant  $L$  while  $b_t = u$  denotes an unbiased judge.

In a direct mechanism, each litigant reports to the judge quality  $q_L$  and the realization  $e_L$  of his private signal. The judge verifies the litigants' reports, the realization of precedent  $e_P$ , and his own type  $(b, \omega)$ , and thus enforces the payment of a price  $p(q_B, q_S; e_P, e_B, e_S; b, \omega)$ .

The optimal direct revelation mechanism is the contract that maximizes the seller's expected payoff

$$\max_{p(\dots)} \left\{ \begin{array}{l} a \mathbb{E} [p(v, v; 1, e_B, e_S; b, \omega) | q_t = v] \\ + (1 - a) \mathbb{E} [p(0, 0; e_P, e_B, e_S; b, \omega) | q_t = 0] - C(a) \end{array} \right\} \quad (8)$$



subject to the buyer's participation constraint,

$$a \{v - \mathbb{E}[p(v, v; 1, e_B, e_S; b, \omega) | q_t = v]\} - (1 - a) \mathbb{E}[p(0, 0; e_P, e_B, e_S; b, \omega) | q_t = 0] \geq \underline{u}_B; \quad (9)$$

the seller's incentive compatibility constraint,

$$C'(a) = \mathbb{E}[p(v, v; 1, e_B, e_S; b, \omega) | q_t = v] - \mathbb{E}[p(0, 0; e_P, e_B, e_S; b, \omega) | q_t = 0]; \quad (10)$$

and the seller's wealth constraint,

$$p(q_B, q_S; e_P, e_B, e_S; b, \omega) \geq 0. \quad (11)$$

The seller's maximization problem is also subject to truth-telling constraints. Denote by  $\Omega_t^B \equiv \{q_t = q, e_t(i_t) = e_P, e_t(i_t^B) = e_B, b_t = b, \omega_t = \omega\}$  the buyer's information set when he reports  $(q_B, e_B)$ , and by  $\Omega_t^S \equiv \{q_t = q, e_t(i_t) = e_P, e_t(i_t^S) = e_S, b_t = b, \omega_t = \omega\}$  the corresponding set for the seller. Then, the buyer's truth-telling constraints are

$$\mathbb{E}[p(q, q; e_P, e_B, e_S; b, \omega) | \Omega_t^B] \leq \mathbb{E}[p(q'_B, q; e_P, e'_B, e_S; b, \omega) | \Omega_t^B] \quad (12)$$

for any feasible report  $q'_B \in \{0, v\}$ ,  $e'_B \in \{0, e_B\}$ . The seller's truth-telling constraints are

$$\mathbb{E}[p(q, q; e_P, e_B, e_S; b, \omega) | \Omega_t^S] \geq \mathbb{E}[p(q, q'_S; e_P, e_B, e'_S; b, \omega) | \Omega_t^S] \quad (13)$$

for any feasible report  $e'_S \in \{0, e_S\}$ ,  $q'_S \in \{0, v\}$ .

The truth-telling constraints for biased judges who are bound to respect precedent are

$$p(q_B, q_S; e_P, e_B, e_S; b_B, 0) \leq p(q'_B, q'_S; e_P, e'_B, e'_S; b', 0) \leq p(q_B, q_S; e_P, e_B, e_S; b_S, 0) \quad (14)$$

for any feasible ruling  $q'_B, q'_S \in \{0, v\}$ ,  $e'_B \in \{0, e_B\}$ ,  $e'_S \in \{0, e_S\}$  and  $b' \in \{b_B, 0, b_S\}$ . The

truth-telling constraints for pro-buyer judges who have the ability to disregard precedent are

$$\begin{aligned} p(q_B, q_S; -1, e_B, e_S; b_B, 1) &= p(q_B, q_S; 1, e_B, e_S; b_B, 1) \\ &= \min_{e_P \in \{-1, 1\}} p(q_B, q_S; e_P, e_B, e_S; b_B, 0); \end{aligned} \quad (15)$$

while those for pro-seller judges who have the ability to disregard precedent are

$$\begin{aligned} p(q_B, q_S; -1, e_B, e_S; b_S, 1) &= p(q_B, q_S; 1, e_B, e_S; b_S, 1) \\ &= \max_{e_P \in \{-1, 1\}} p(q_B, q_S; e_P, e_B, e_S; b_S, 0). \end{aligned} \quad (16)$$

Let us discuss the equations above, starting with the seller's objective in (8). When the quality of the widget is high ( $q_t = v$ ), an event that occurs with probability  $a$  equal to the seller's effort, the litigants truthfully report it ( $q_B = q_S = v$ ) and the evidence based on precedent is positive ( $e_P = 1$ ) because no negative signals can be realized in this state. Thus, the expected payment to the seller is  $\mathbb{E}[p(v, v; 1, e_B, e_S; b, \omega) | q_t = v]$ , where the expectation is taken across realizations of the litigants' evidence collection ( $e_B, e_S \in \{0, 1\}$ ) and the judge's type ( $b, \omega$ ). When instead the quality of the widget is low ( $q_t = 0$ ), with complementary probability  $1 - a$ , the expected payment is  $\mathbb{E}[p(0, 0; e_P, e_B, e_S; b, \omega) | q_t = 0]$ . In this case, the expectation is taken across realizations of all evidence, including evidence based upon precedent ( $e_P \in \{-1, 1\}$  and  $e_B, e_S \in \{-1, 0, 1\}$ ) as well as the judge's type ( $b, \omega$ ).

The same expected payments affect the buyer's participation constraint in equation (9) and the seller's incentive compatibility constraint in equation (10), because effort and participation are chosen before any material information is revealed to the parties.

Relative to the analysis of Proposition 1, this problem includes truth-telling constraints that reflect the agents' ability to report information selectively. Constraint (12) means that the buyer cannot lower his expected payment either by misreporting quality (which is cheap talk) or by hiding his private piece of evidence. His expectation takes into account, through  $\Omega_t^B$ , knowledge of actual quality ( $q_t = q$ ), of evidence based on precedent ( $e_t(i_t) = e_P$ ), of his private search for additional evidence ( $e_t(i_t^B) = e_B$ ) and of the judge's type ( $b_t = b, \omega_t = \omega$ ). The buyer, however, does not know the outcome of the seller's parallel search for private

evidence, but anticipates it rationally when making his report. Analogously, constraint (13) means that the seller cannot raise his expected payment by making an untruthful report conditional on his information  $\Omega_t^S$ .

The remaining truth-telling constraints concern judges, and do not involve expectations because judges move last, when all information has been truthfully revealed by the litigants. The first constraint in (14) means that pro-buyer judges cannot lower payment through untruthful cheap talk, neither about the litigants' own cheap talk  $q_B, q_S$ , nor about their preferences  $b$ ; nor can they lower payment by hiding evidence  $e_B, e_S$  that the parties presented in court. The second constraint in (14) means that, analogously, pro-seller judges cannot raise payment through such selective verification of the evidence presented by the litigants.

Finally, constraints (15) and (16) deal with judges' ability to disregard precedent. Constraint (15) means that a pro-buyer judge with the ability to ignore precedent can interpret the contract as if the precedent-based evidence had the realization that minimizes payment. Constraint (16) means that a pro-seller judges symmetrically uses this interpretive leeway to maximize payment. These last two constraints must hold with equality. Otherwise, biased judges without the ability to ignore precedent could improve their payoffs by misreporting their ability without actually needing to disregard precedents.

As in the analysis of Proposition 1, the contracting problem can be written as a two-step problem. In the first step, the seller minimizes the cost of implementing effort subject to incentive-compatibility, non-negativity, and truth-telling (equations (10) to (16)). In the second step, the seller chooses optimal effort. As we show in the Appendix, this is a linear programming problem whose solution minimizes the ratio

$$\frac{\mathbb{E}[p(\dots) | q_t = 0]}{\mathbb{E}[p(\dots) | q_t = v]}. \quad (17)$$

As in Proposition 1, the optimal contract should minimize wasteful payments when quality is low and maximize incentive payments when quality is high. However, since now quality is not directly contractible and reports of quality are cheap talk, payments cannot be perfectly targeted to occur when  $q_t = v$  and not when  $q_t = 0$ . As a result, the second-best contract minimizes the cost of effort provision by loading payment onto verifiable signal realizations

that are most indicative of high quality.

**Proposition 2** *If the share of pro-buyer judges is sufficiently low that*

$$\beta \leq 1 - \mathbb{E}\xi, \quad (18)$$

*then the optimal laissez-faire contract for partnership  $t$  stipulates that uninformative evidence  $\{u_t^v, u_t^0\}$  is inadmissible, and that the buyer must pay the seller a price  $p_{LF} > 0$  if and only if the court verifies no evidence of low quality (either novel or based upon precedent) and it verifies novel evidence of high quality.*

*The price  $p_{LF} > 0$  is thus enforced in the following cases.*

1. *The judge is unbiased ( $b_t = u$ ), evidence based on precedent is positive ( $e_t(i_t) = 1$ ), the buyer does not present negative evidence ( $e_t(i_t^B) \in \{0, 1\}$ ), and the seller presents positive evidence ( $e_t(i_t^S) = 1$ ).*
2. *The judge is pro-seller ( $b_t = b_S$ ), the seller presents positive evidence ( $e_t(i_t^S) = 1$ ), and evidence based on precedent is positive ( $e_t(i_t) = 1$ ) or can be disregarded ( $\omega_t = 1$ ).*

*In any other circumstances the enforced payment is nil.*

As in Proposition 1, under imperfect enforcement the optimal mechanism relies on paying a positive incentive payment  $p_{LF}$  only when specific pieces of evidence of high quality are verified. The optimal contract cannot rely on direct revelation of quality ( $q_B, q_S$ ). Such revelation is cheap talk, and the litigants' interests are perfectly opposed because outcomes in which both litigants are punished are impossible.

Under the optimal contract, parties are precluded from presenting uninformative evidence  $\{u_t^v, u_t^0\}$ , so they must search for novel informative evidence. Each litigant presents in court favorable evidence only: the buyer hides positive novel evidence ( $e_t(i_t^B) = 1$ ), the seller hides negative evidence ( $e_t(i_t^S) = -1$ ). Biased judges selectively verify the evidence presented by the litigants. Under condition (18), the bonus is enforced by unbiased and pro-seller judges when evidence based on precedent is positive and additionally the seller presents a novel signal indicative of high quality. Pro-buyer judges never enforce  $p_{LF}$  because they discard

positive novel evidence presented by the seller, but the ensuing loss is small because under Condition (18) pro-buyer judges are few.<sup>7</sup> We henceforth assume that condition (18) holds, so the optimal contract is the one of Proposition 2.<sup>8</sup>

Enforcement frictions generate a loss of information. Conditioning on the hard information that litigants can provide, the state most indicative of high quality is when three positive pieces of evidence are collected ( $e_t(i_t) = e_t(i_t^B) = e_t(i_t^S) = 1$ ). Payments, however, cannot be made contingent on this realization because the buyer can hide positive signals that he has collected instead of reporting them to the judge. As a result, the second-best contract can do no better than requiring the seller alone to present positive novel evidence. It would also be optimal not to enforce  $p_{LF}$  when any signal realization is negative, because such evidence reveals with certainty that quality is low. However, this provision is rendered unenforceable by pro-seller judges, who neglect any negative evidence presented by the buyer. Similarly, a pro-seller judge with the ability to disregard precedent must be allowed to enforce payment irrespective of the evidence embodied into precedents.<sup>9</sup>

We call the optimal contract above the “laissez-faire contract.” A notable feature is that this is open-ended, in the sense that it is contingent on the realization of novel informative evidence that cannot be perfectly described *ex ante*.<sup>10</sup> The problem with leaving the contract open-ended is that novel evidence can be misinterpreted (literally, hidden) by lawyers and biased judges. However, conditioning payment on such evidence is valuable on average, because it increases the informativeness of the event based on which the price is enforced. As long as parties choose to contract, the latter effect always dominates. Intuitively, parties try to protect themselves from bias by changing the optimal bonus  $p_{LF}$ , but they demand

---

<sup>7</sup>As we show in the Appendix, when  $\beta$  is large the optimal contract does not condition payment on novel evidence collected by the seller, but relies exclusively on precedents and on evidence of low quality presented by the buyer. By discarding some information, this contract reduces the precision of state verification when the judge is unbiased or pro-seller. The benefit is to improve state verification by pro-buyer judges, who are sometimes forced to rule in favor of the seller. Specifically, pro-buyer judges must enforce payment when they respect contractual references to precedent, and neither precedent nor the buyer’s evidence demonstrate low quality ( $\omega_t = 0$ ,  $e_t(i_t) = 1$ , and  $e_t(i_t^B) \neq -1$ ).

<sup>8</sup>Condition (18) is only sufficient. The Appendix derives the weaker necessary and sufficient condition for the optimal contract to be the one of Proposition 2:  $\alpha\sigma = 0$  or  $\beta \leq (1 - \mathbb{E}\xi) / (1 - \alpha\mathbb{E}\xi)$ .

<sup>9</sup>On the other hand, the contract described by Proposition 2 is unaffected by the seller’s ability to hide negative evidence that he has privately collected, because he is paid only if he has presented novel positive evidence, which he cannot fake.

<sup>10</sup>The optimal laissez-faire contract would remain open-ended even if  $\alpha\sigma > 0$  and  $\beta > (1 - \mathbb{E}\xi) / (1 - \alpha\mathbb{E}\xi)$  (which would violate condition 18) because it would still rely on novel evidence presented by the buyer.

its enforcement to be contingent on novel evidence.

The optimality of open-ended contracts under distorted enforcement has important implications for legal evolution, but it does not imply that contract design allows parties to avoid the cost of judicial bias. Social welfare under the laissez-faire contract is fully characterized by the ratio of equation (17). Owing to the binary nature of the optimal contract, this ratio is equivalent to the likelihood ratio  $\Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) \geq 0$  of low relative to high quality when  $p_{LF}$  is enforced. This is an inverse measure of the quality of information that can be verified under laissez faire. If such information becomes less diagnostic (i.e., as  $\Lambda_{LF}$  gets larger), it becomes harder for contracts to reward high quality and provide incentives to the seller. As a consequence, equilibrium effort and welfare decline.

The Appendix proves that partnership  $t$  is formed under laissez faire if and only if the likelihood ratio  $\Lambda_{LF}$  is below a critical threshold  $\bar{\Lambda}(\underline{u}_B)$ . Then, verifiable evidence is sufficiently informative for the contract to provide both incentives to the seller and a sufficiently high expected payoff for the buyer.  $\bar{\Lambda}$  is monotone decreasing in  $\underline{u}_B$  because, as in Proposition 1, a more stringent participation constraint makes the partnership harder to sustain.<sup>11</sup>

The condition for partnership formation can identically be written as a threshold on the informativeness of precedent.

**Proposition 3** *Partnership  $t$  is formed under laissez faire if and only if precedent is sufficiently informative:  $i_t \geq i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B)$ .*

*The likelihood of partnership formation, second-best effort if the partnership is formed, and welfare are higher when the buyer's outside option is lower ( $\partial i_{LF \sim \emptyset} / \partial \underline{u}_B \geq 0 \geq \partial a_{LF} / \partial \underline{u}_B$ ), when informative evidence is easier to collect ( $\partial i_{LF \sim \emptyset} / \partial \iota \leq 0 \leq \partial a_{LF} / \partial \iota$ ), and when precedents are more informative ( $\partial a_{LF} / \partial i_t \geq 0$ ) or more binding ( $\partial i_{LF \sim \emptyset} / \partial \alpha \geq 0 \geq \partial a_{LF} / \partial \alpha$ ). They are lower when there are more biased judges ( $\partial i_{LF \sim \emptyset} / \partial \beta \geq 0 \geq \partial a_{LF} / \partial \beta$ ) and  $\partial i_{LF \sim \emptyset} / \partial \sigma \geq 0 \geq \partial a_{LF} / \partial \sigma$ .*

*Laissez faire replicates the outcomes of Proposition 1 for contractible quality if and only if precedent is perfectly diagnostic of quality and there are no pro-seller judges with the ability*

<sup>11</sup>As we prove in the Appendix, the formal definition is  $\bar{\Lambda}(\underline{u}_B)$  such that  $\max_{a \in [0,1]} \{av - [\bar{\Lambda}/(1-\bar{\Lambda}) + a]C'(a)\} = \underline{u}_B$ , reflecting that the minimum cost of inducing any effort  $e$  is increasing in the likelihood ratio  $\Lambda$ .

to ignore it ( $i_t = 1$  and  $\alpha\sigma = 0$ ). The first best is attainable under laissez faire if and only if both conditions hold and moreover the buyer's outside option is nil ( $\underline{u}_B = 0$ ).

Figure 2 represents graphically Proposition 3 by depicting the regions of the parameter space where the partnership dissolves ( $NC$ ) and where it forms ( $LF$ ) under laissez faire. On the vertical axis,  $\vartheta$  denotes a combination of parameters that increases with each determinant of enforcement frictions (i.e.,  $\beta$ ,  $\sigma$ ,  $\alpha$ , or  $1 - \iota$ ). An increase in the buyer's outside option  $\underline{u}_B$  induces a downward shift in the locus  $i = i_{LF \sim \varnothing}(\vartheta)$ .

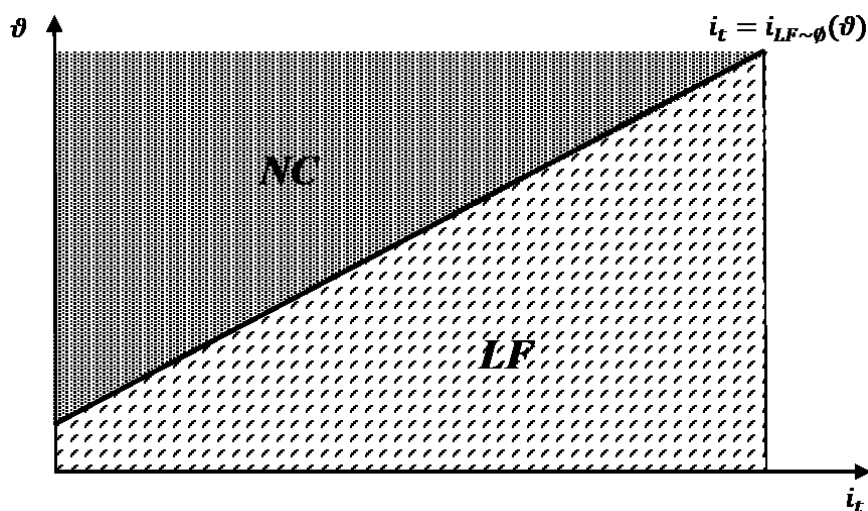


Figure 2: Contracting under Laissez Faire

When precedents are insufficiently informative relative to enforcement frictions ( $i_t < i_{LF \sim \varnothing}$ ), the quality of verifiable information is so poor that it becomes prohibitively costly to harness effort, and the parties prefer not to contract (we are in region  $NC$ ). This outcome is the more likely the higher the buyer's outside option. If instead precedent is sufficiently informative, partnership  $t$  is formed.

The legal system shapes equilibrium effort and welfare. When litigants are more likely to collect novel evidence, the quality of information increases, so that effort and welfare move closer to the first best. On the other hand, for given evidence collection, judicial bias reduces effort and welfare by causing a loss of information (embodied in precedents, novel signals, or both). This cost arises regardless of whether bias is idiosyncratic or systematic. When

bias is idiosyncratic, negative and positive evidence are similarly neglected. When bias is systematic, either negative or positive evidence is more likely to be neglected depending on whether biases are predominantly pro-seller or pro-buyer. In both cases, judicial bias destroys information, reducing effort and welfare.<sup>12</sup>

Legal precedents facilitate contracting in two ways. First, they generate evidence that litigants are powerless to hide and that judges can only sometimes neglect. Precedent is in fact binding, at least to some extent. Second, precedents generate less ambiguous evidence of quality because their informativeness  $i_t$  is known. Accordingly, then, effort and social welfare increase when precedent is more strictly binding and more informative.

The observable-quality outcome of Proposition 1 is attainable only in the limit as precedent becomes perfectly informative ( $i_t \rightarrow 1$ ) and perfectly binding ( $\alpha \rightarrow 0$ ). A substitute of the latter condition is the absence of pro-seller judges,  $\sigma = 0$  (pro-buyer judges simply hide the seller's positive evidence, rather than disregarding precedent, to avoid enforcing the bonus). Under these conditions, and these conditions alone, the optimal contract is informative enough to make quality  $q_t$  directly contractible. Even then, as in Proposition 1, the first best is unattainable when the buyer has a positive outside option ( $\underline{u}_B > 0$ ).

## 5 Standardization

Standardization can be undertaken by the public legal system via commercial codification, e.g., by specifying default investor rights (La Porta et al. 1998), or by a private trade association (Bernstein 2001). Typically, standardization codifies existing legal and trading practices to streamline their enforcement and make it more predictable. By doing so, reliable off-the-shelf contracts are created. Parties then choose whether to use these contracts or to opt out of them by writing nonstandard terms.

To reflect these ideas, we model standardization at time  $t$  as the creation of a contract

---

<sup>12</sup>This does not mean that all biases are equally costly in our model. We can prove that pro-seller bias is more costly than pro-buyer bias. This asymmetry arises because pro-buyer judges introduce white noise in the adjudication process (holding for the buyer regardless of the true state), while pro-seller judges introduce a systematic distortion. When quality is low, they undesirably make payment more likely. When quality is high, they cannot desirably increase the probability of payment because they cannot fake novel informative evidence that has not been collected by the seller.



form that removes any ambiguity in the binding role of precedent  $i_t$  for the purpose of the current transaction. Formally, the standard contract is guaranteed to apply as originally intended by the standard-setter, featuring  $\alpha = 0$ . The removal of ambiguity arises because the government can extensively train judges on how to enforce the standard. Private contracts cannot attain this goal (and thus continue to be subject to the risk of spurious distinguishing of precedent) precisely because atomistic parties cannot train law courts. The standard prevailing at any time  $t$  systematizes the current state of precedent  $i_t$ . Thus, when we consider legal evolution, the standard contract changes as precedents change.

The shortcoming of standardization is that public authorities are less informed about the specifics of each partnerships than the parties themselves. Obtaining such information for all partnerships is prohibitively costly for standard-setting bodies. Formally, the standard contract cannot identify ex ante the misleading evidence  $\{u_t^v, u_t^0\}$ .

## 5.1 The Optimal Standard Contract

In drafting the optimal standard contract, the standard-setter solves the mechanism design problem of Section 4 with two changes: i) now  $\alpha = 0$ , and ii) if any novel evidence is allowed, litigants can direct their search toward misleading evidence  $\{u_t^v, u_t^0\}$ .

The former change eliminates some truth-telling constraints for judges. Specifically, constraints (15) and (16) no longer bind since all judges are fully bound by precedent ( $\omega_t = 0$ ) when enforcing the standard contract. The latter change adds some truth-telling constraints for the litigants. Specifically, constraints (12) and (13) become

$$\mathbb{E} [p(q, q; e_P, e_B, e_S; b, \omega) | \Omega_t^B] \leq \mathbb{E} [p(q'_B, q; e_P, e'_B, e_S; b, \omega) | \Omega_t^B] \quad (19)$$

for any feasible report  $q'_B \in \{0, v\}$  and  $e'_B \in \{-1, 0, 1\}$ , and

$$\mathbb{E} [p(q, q; e_P, e_B, e_S; b, \omega) | \Omega_t^S] \geq \mathbb{E} [p(q, q'_S; e_P, e_B, e'_S; b, \omega) | \Omega_t^S] \quad (20)$$

for any feasible report  $q'_S \in \{0, v\}$  and  $e'_S \in \{-1, 0, 1\}$ . The litigants' reports of novel evidence, which is hard information when  $U_t$  is ruled out by the contract, are transformed

into cheap talk under a standard contract.

The optimal standard contract is the following.

**Lemma 1** *At time  $t$ , the optimal standard contract stipulates that the buyer should pay the seller a price  $p_{SC} > 0$  if and only if the standard evidence based on precedents indicates high quality ( $e_t(i_t) = 1$ ).*

The key feature of this contract is that it relies only on information based upon precedents, which can be standardized, while it disallows the consideration of any novel signal. The advantage of this contract is that judges and lawyers cannot exploit any ambiguity in interpreting it or in selecting evidence. The disadvantage is that the standard contract is not as flexible as the optimal laissez-faire contract. While the latter also exploits novel material evidence, the standard contract does not. This rigidity is necessary in light of the legislature's lack of knowledge about misleading evidence. If novel evidence were allowed, parties would direct their search toward favorable misleading evidence, which unbiased judges cannot recognize. This process would then never generate more information, but merely provide biased judges with an excuse to distort contract enforcement.

Under the standard contract described by Lemma 1, the realization that triggers payment has likelihood ratio

$$\Lambda_{SC}(i_t) = 1 - F_\xi(i_t), \quad (21)$$

which is independent of judicial biases and decreasing in the quality of the evidence that can be standardized on the basis of precedent at time  $t$  ( $\Lambda'_{SC}(i_t) = -f_\xi(i_t) < 0$ ). Intuitively, the quality of the standard contract improves with the informativeness of precedent. In the limit, if standardized precedents become perfectly informative it allows for full contractibility of the value of the widget ( $\lim_{i_t \rightarrow 1} \Lambda_{SC}(i_t) = 0$ ).

## 5.2 Contract Choice and Welfare

Under standardization, parties choose between the standard contract and the more flexible laissez-faire contract presented above.<sup>13</sup> Both contracts exploit the same set of precedents

---

<sup>13</sup>The optimal laissez-faire contract does not change when the standard contract is introduced. The presence of innovative terms based on novel informative evidence and on partnership-specific misleading

$P_t$ , and parties opt for the standard contract if it features a lower likelihood ratio than the laissez faire one ( $\Lambda_{SC}(i_t) < \Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha)$ ).

**Proposition 4** *The parties prefer the standard contract to the laissez-faire contract if and only if standardized evidence is sufficiently precise, namely if and only if  $i_t > i_{SC\sim LF}(\iota, \beta, \sigma, \alpha) \in [0, 1]$ . The standard contract is more likely to be preferred when laissez-faire contracts are more ambiguous ( $\partial i_{SC\sim LF}/\partial \alpha \leq 0$ ), judicial bias is more prevalent ( $\partial i_{SC\sim LF}/\partial \beta \leq 0$  and  $\partial i_{SC\sim LF}/\partial \sigma \leq 0$ ), and novel informative evidence is harder to collect ( $\partial i_{SC\sim LF}/\partial \iota \geq 0$ ).*

The benefit of the standard contract is to protect parties against judicial bias. Its cost is to preclude the use of novel informative evidence. As a result, parties use the standard when judicial bias is too prevalent ( $\partial i_{SC\sim LF}/\partial \beta \leq 0$  and  $\partial i_{SC\sim LF}/\partial \sigma \leq 0$ ), when precedents are too weak a constraint on judicial discretion in the absence of standardization ( $\partial i_{SC\sim LF}/\partial \alpha \leq 0$ ), and when litigants are unlikely to collect novel informative evidence ( $\partial i_{SC\sim LF}/\partial \iota \geq 0$ ).

The laissez-faire contract would always be preferred if there were no biased judges ( $i_{SC\sim LF}(\iota, 0, 0, \alpha) = 1$ ), or if references to precedents in laissez-faire contracts were perfectly unambiguous ( $i_{SC\sim LF}(\iota, \beta, \sigma, 0) = 1$ ). This result is intuitive because the benefit of standardization is precisely to avoid the enforcement frictions that result from biased judges ignoring contractual references to precedent.<sup>14</sup> Instead, standardization cannot solve the problem of selective reporting of novel informative evidence, either by litigants or by biased judges. It addresses this problem very coarsely, namely by throwing away all such new evidence, including the one that could usefully be exploited under laissez faire in spite of the litigants' partisanship and of judicial biases.

The appeal of the standard contract increases as the standardized precedent becomes more informative. As  $i_t$  becomes higher, both standard and nonstandard contracts improve.

---

evidence leaves the contract open to ambiguities concerning contractual references to precedent. As a result, the precedent continues to be binding for the laissez-faire contract only with probability  $\alpha$ .

<sup>14</sup>More generally, the laissez-faire contract would always be preferred if there were no pro-seller judges ( $i_{SC\sim LF}(\iota, \beta, 0, \alpha) = 1$ ). Imperfect enforcement of the laissez-faire contract by pro-buyer judges is costless if there are no pro-seller judges and parties are risk neutral. A pro-buyer judge arbitrarily refuses payment with identical probability whether quality is high or low. With risk-neutral parties and without pro-seller judges, this white noise can be perfectly compensated by raising the payment enforced by unbiased judges. Thus, the key goal of standardization is to prevent pro-seller judges from enforcing payment when evidence based on precedent proves that quality is low.

However, the improvement is starker for the standard contract, because better precedents reduce the usefulness of including novel pieces of evidence in the contract.

For a standard to be used, it must be preferred not only to the open-ended contract, but also to dissolving the partnership. This latter condition also requires precedent to be sufficiently informative, namely  $i_t \geq i_{SC \sim \emptyset}(\underline{u}_B) \equiv F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B))$ . Subject to this feasibility condition, the result below indicates that giving parties the option of using the standard contract can improve welfare in two ways.

**Proposition 5** *The parameter space consisting of the buyer's reservation value ( $\underline{u}_B$ ), enforcement frictions ( $\beta, \sigma, \alpha$  and  $1 - \iota$ ), and the informativeness of precedent ( $i_t$ ) can be partitioned into four regions of non-zero measure.*

1. *If the buyer's reservation value and enforcement frictions are sufficiently high while the informativeness of precedent is so low that  $i_t < \min\{i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B), i_{SC \sim \emptyset}(\underline{u}_B)\}$ , then partnership  $t$  cannot be formed under either laissez faire or standardization.*
2. *If the buyer's reservation value and enforcement frictions are sufficiently low while the informativeness of precedent has an intermediate value such that  $i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) \leq i_t \leq i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$ , then partnership  $t$  is formed through a laissez-faire contract under both laissez faire and standardization.*
3. *If the buyer's reservation value and enforcement frictions have intermediate values while the informativeness of precedents is sufficiently high that  $i_t \geq \max\{i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B), i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)\}$ , then partnership  $t$  is formed under laissez faire, but under standardization it uses the standard contract.*
4. *If the informativeness of precedent is intermediate but enforcement frictions are so high that  $i_{SC \sim \emptyset}(\underline{u}_B) \leq i_t < i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B)$ , then partnership  $t$  cannot be formed under laissez faire, but it can be formed under standardization.*

By protecting parties against judicial bias, standardization has two effects. First, when enforcement frictions are pervasive (and the buyer's reservation value relatively high), some partnerships fail to contract at all under laissez faire. Provided precedent is informative

enough, a standard contract allows these parties to contract, expanding the volume of trade. This is case 4 above. Second, when there are intermediate enforcement frictions (and an intermediate reservation value), and the quality of standardized evidence is sufficiently high, standardization crowds out some open-ended contracts. Some partnerships that under laissez faire formed but still suffered from significant judicial bias can now soften enforcement distortions by adopting the standard contract.

In sum, contract standardization expands the volume of trade and crowds out the use of open ended contracts. Figure 3 below illustrates the effect of standardization on the laissez-faire outcome of Figure 2.

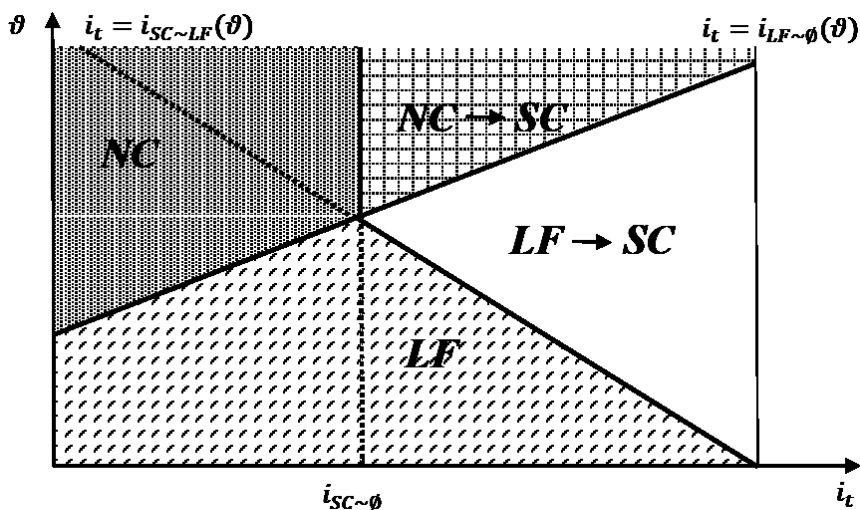


Figure 3: Effects of Standardization

The standard contract is used only if precedent is informative enough (i.e.  $i_t > i_{SC \sim \emptyset}$ ). If standardized precedents are too uninformative the standard remains unused, and its introduction leaves welfare unaffected.

Above the upward sloping locus  $i_t = i_{LF \sim \emptyset}(\vartheta)$ , judicial biases are so strong, precedents so weakly binding and informative evidence so difficult to find that parties do not contract under laissez faire. Here the introduction of a valuable standard contract crowds in parties that would not otherwise contract. Standardization is valuable only if the standardized precedents

are sufficiently informative, i.e., if  $i_t > i_{SC \sim \emptyset}$ . This is the  $NC \rightarrow SC$  region.<sup>15</sup>

Below the upward sloping locus  $i_t = i_{LF \sim \emptyset}(\vartheta)$ , enforcement frictions are sufficiently weak that even under laissez faire parties contract with each other. Here, the introduction of a valuable standard crowds out the use of open-ended contracts provided enforcement frictions are moderate. The standard contract prevails if it is based on more informative precedents, making additional non-standard evidence less valuable, and if the enforcement frictions are strong enough, namely to the right of the downward sloping locus  $i_t = i_{SC \sim LF}(\vartheta)$ . This is the  $LF \rightarrow SC$  region.<sup>16</sup>

In both regions, standardization statically improves welfare. As we show next, standardization is not necessarily welfare-improving when legal evolution is considered.

## 6 Legal Evolution

The stock of precedents evolves as parties litigate their contracts. For simplicity, we assume that litigation is costless, so that parties always go to court to verify the quality of the widget.<sup>17</sup> Every time judges decide a case, they must provide a detailed opinion that justifies their decision. The opinion lays out the deciding facts of the case and explains the judge's legal reasoning. This process of judicial justification underpins the evolution of the stock of precedents  $P_t$  and, therefore, of the set of feasible contracts.

Precedents can evolve only when the judge decides based on the realization of a novel piece of evidence presented by a litigant. Under the open-ended contract from Proposition 2, a judge may write four different decisions.

---

<sup>15</sup>As in Figure 2, when the buyer's outside option is higher contracting under laissez faire is less likely and the entire locus shifts down. Analogously, a higher reservation value also makes standardization less likely to succeed, shifting  $i_{SC \sim \emptyset}$  to the right. Figure 3 is drawn for  $\bar{\Lambda}(\underline{u}_B) \in (\mathbb{E}\xi^2, \mathbb{E}\xi)$ . If  $\underline{u}_B$  were higher, the locus would shift so far down that contracting under laissez faire would be impossible when  $i_t = 0$  no matter how small the enforcement frictions. If  $\underline{u}_B$  were lower, the locus would shift so far up that contracting under laissez faire would always be possible.

<sup>16</sup>Changes in the buyer's reservation value have no effect on the locus  $i_t = i_{SC \sim LF}(\vartheta)$ , although an increase in  $\underline{u}_B$  shrinks the region by shifting down the locus  $i_t = i_{LF \sim \emptyset}(\vartheta)$ .

<sup>17</sup>This is a conventional assumption in many studies of legal evolution. If litigation were costly, the parties would find it in their mutual interest to settle out of court. In this perspective, a common justification for why parties go to court is that they hold different priors about the probability of winning the case. We abstract from modelling this feature because it would greatly complicate the analysis. Furthermore, none of our results on legal evolution would depend on the specific states leading or not leading to litigation. Reluctance to litigate would simply slow down legal evolution.

1. The seller wins by presenting positive evidence ( $e_t(i_t^S) = 1$ ), while no negative evidence was verified. This decision establishes a new precedent ( $P_{t+1} = P_t \cup \{i_t^S\}$ ).
2. The buyer wins because precedent is negative ( $e_t(i_t) = -1$ ). This decision is based on existing precedent and thus never establishes a new one ( $P_{t+1} = P_t$ ).
3. The buyer wins by presenting negative evidence ( $e_t(i_t^B) = -1$ ). This decision establishes a new precedent ( $P_{t+1} = P_t \cup \{i_t^B\}$ ).
4. The buyer wins because the seller failed to present positive evidence. This decision is based on absence of evidence and never establishes a new precedent ( $P_{t+1} = P_t$ ).

Changes in the set of precedents do not necessarily improve its informativeness. Precedent improves when, as in case 3, the buyer wins by presenting novel negative evidence against a positive current precedent. In this case we know that  $i_{t+1} = i_t^B > i_t$ . If instead, as in case 1, the seller wins by presenting novel positive evidence on top of a positive current precedent, informativeness improves if and only if the seller happens to draw a new piece of evidence that is more informative than precedents ( $i_t^S > i_t$ ).

In light of these observations, we can study the evolution of precedents and contracts occurring under a laissez-faire regime.<sup>18</sup> We begin with the case of a representative partnership with parameters  $\iota$ ,  $\beta$ ,  $\sigma$ ,  $\alpha$ , and  $\underline{u}_B$ . In this case, contracting and legal evolution can start if and only if it is profitable to form the partnership when there is no history of contract enforcement. This corresponds to focusing on the bottom section of Figure 2, where contracting occurs even at  $i_0 = 0$ . Formally, the following result holds.

---

<sup>18</sup>In some cases, a ruling in the buyer's favor could be justified in several ways. In the limit, suppose that both precedent and the buyer produced negative evidence ( $e_t(i_t) = e_t(i_t^B) = -1$ ) while the seller failed to produce positive evidence ( $e_t(i_t^S) \neq 1$ ): then each of the three decisions in the buyer's favor is possible. We assume that judges choose which decision to render on the basis of two principles. First, in accordance with stare decisis, if evidence based on precedent suffices to settle the case, it is summarily decided without considering novel evidence. Second, due to the need to justify their decision, judges always prefer citing novel evidence than grounding their ruling on the insufficiency of available evidence. As a consequence, judges consider the four decisions in the order given above. They proceed down the line only if they cannot (or do not want nor have to) stop at a lower-numbered decision. This assumption does not qualitatively affect our results, but merely influences the speed of legal evolution. Precedents would evolve more rapidly if judges preferred decision 3 to decision 2, or more slowly if they preferred decision 4 to decision 3.

**Proposition 6** *Suppose the buyer's outside option  $\underline{u}_B$  is sufficiently low, the parties' ability to search for novel evidence  $\iota$  sufficiently high, and judicial biases  $\beta$  and  $\sigma$  sufficiently rare that partnership  $t$  is formed under laissez faire for every  $i_t \geq 0$ . Formally,*

$$\frac{\mathbb{E}\xi - \bar{\Lambda}(\underline{u}_B)}{\mathbb{E}\xi - \mathbb{E}\xi^2} \leq \iota \left(1 - \frac{\sigma}{1 - \beta}\right) \Leftrightarrow i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) = 0. \quad (22)$$

*Then the evolution of precedent under laissez faire is described by a time-homogeneous Markov chain. Given any body of precedents  $i_t$ , any weakly higher informativeness  $j \geq i_t$  is accessible, but any strictly lower informativeness  $j < i_t$  is inaccessible. The Markov chain is absorbing: its unique absorbing state is perfectly informative precedent  $i = 1$ , while all imperfectly informative states  $i \in [0, 1)$  are transient.*

Condition (22) restricts the analysis to the bottom region of Figure 2. In this case, partnership formation under laissez faire is assured, irrespective of the quality of existing precedents. Then the spontaneous evolution of contract law can take place. It can move only towards greater informativeness, because in our model knowledge is never unlearned and precedents do not depreciate. As a consequence, the quality of precedent is described by a monotone increasing and ratcheting process. If informativeness  $i_t$  has been attained at time  $t$ , then less informative states  $j < i_t$  are unattainable in the future.

Conversely, any higher level of informativeness can be reached from the initial state  $i_t$ . In fact it can be reached directly through a single ruling. For any threshold  $j \in [i_t, 1)$ , the appendix derives the expression for the strictly positive probability with which the judicial decision for partnership  $t$  establishes a new precedent whose informativeness is greater than  $j$ :  $\Pr(i_{t+1} > j | i_t) > 0$ . The informativeness of precedents is then unchanged with complementary probability  $1 - \lim_{j \rightarrow i_t} \Pr(i_{t+1} > j | i_t) > 0$ .

This process implies that any imperfect informativeness  $i_t < 1$  is a transient state that will eventually be abandoned and replaced by a better one. The unique absorbing state is perfectly informative precedent ( $i_t = 1$ ), and the stationary distribution of the Markov chain is entirely concentrated on the absorbing state.

To evaluate the dynamic consequences of introducing a standard contract we use an



intertemporally additive time-consistent utilitarian welfare function

$$W_t = \sum_{s=0}^{\infty} \delta^s \mathbb{E}_t \Pi_{t+s} \text{ for } \delta \in (0, 1). \quad (23)$$

Recall our assumption that the standard is immediately upgraded when new precedents emerge. If a standard was introduced at time  $s < t$ , the standard contract at  $t$  can exploit the most informative precedent  $i_t$  even if  $i_t > i_s$ . Then the following results obtain.

**Proposition 7** *Suppose that condition (22) holds and that  $\alpha\sigma > 0$ .*

*As long as the informativeness of precedent is low ( $0 \leq i_t \leq i_{SC\sim LF}(\iota, \beta, \sigma, \alpha)$ ), partnership  $t$  is formed by writing an open-ended contract, whether a standard contract is available or not. As precedent becomes informative enough ( $i_{SC\sim LF}(\iota, \beta, \sigma, \alpha) < i_t \leq 1$ ), if a standard contract is available the parties use it and legal evolution stops.*

*There is a threshold  $i^*$  such that it is welfare-increasing to introduce a standard contract when precedent is sufficiently informative ( $i_t > i^*$ ), but it is welfare-reducing to introduce a standard contract when the informativeness of precedent is too low ( $i_t < i^*$ ). It is optimal to standardize when precedent is still imperfect ( $i^* < 1$ ), but it is optimal not to standardize when precedent is so imperfect that the standard contract would initially remain unused ( $i^* > i_{SC\sim LF}(\iota, \beta, \sigma, \alpha)$ ).*

The key dynamic difference between laissez faire and standardization is that at some point in the latter regime legal evolution stops. Initially, precedents are uninformative, so that the use of novel evidence is critical for contracting. In this early stage the standard contract is not used, even if available. As the law develops, however, the benefit of using the standard contract progressively increases. At some point, parties switch to it. Litigation of novel pieces of evidence and thus legal evolution stop.

Standardization dampens legal evolution by crowding out innovative and open-ended laissez-faire contracts. In this respect, Proposition 7 shows that society should wait before standardizing even though private parties are eager to use the standard ( $i^* > i_{SC\sim LF}$ ). This result obtains because in our model the use of laissez-faire contracts is a public good. Such contracts entail a current individual cost in terms of judicial bias but also a future

social benefit in terms of greater legal evolution. Atomistic and short-lived parties do not internalize this effect. As a result, if standardization occurs when the law is still undeveloped the evolution of precedent will stop too early.

On the other hand, imperfect enforcement imposes first-order costs even when precedents are perfectly informative, so long as there are judges who are both capable and desirous of ignoring them in a *laissez-faire* regime ( $\alpha\sigma > 0$ ). As a consequence, it is never optimal to wait for legal evolution to reach perfection before standardizing ( $i^* < 1$ ). Eventually, the benefits of further marginal improvements in informativeness are themselves marginal, and it is socially optimal to forego them in order to eliminate the adverse impact of contractual ambiguity and judicial biases.

Figure 4 depicts one realized path of legal evolution under *laissez faire*, and the long-run levels of legal quality attained for the case of early standardization, when the standard is introduced since the start, and the case of optimal standardization, in which the standard is introduced as soon as  $i_t$  goes above the optimal threshold  $i^*$ . We denote by  $i_{ES}$  the long-run legal evolution attained under early standardization and by  $i_{OS}$  the long run legal evolution attained under optimal standardization.

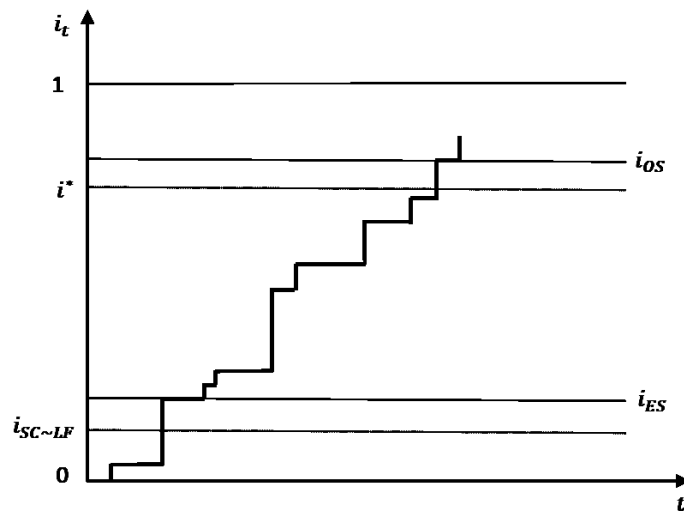


Figure 4: Legal Evolution under Early vs. Optimal Standardization

When standardization occurs at  $t = 0$ , legal evolution stops too early. This premature adoption of a standard contract maximizes the static benefit of the parties switching to the standard as soon as threshold  $i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$  is surpassed. However, it hurts future parties, who would benefit from more legal evolution. The welfare-maximizing level of legal evolution is attained by standardizing only after threshold  $i^*$  is crossed. Our model therefore implies that it is optimal to standardize only after the law has incorporated enough information from past partnerships.

By focusing on a representative partnership, Proposition 7 cannot address the possibility for standardization to increase the volume of trade. At the initial precedent  $i_0 = 0$ , the open-ended contract always dominates the standard contract. Thus, if for  $i_0$  the representative partnership does not contract under laissez faire, it does not contract under standardization either. If instead the representative partnership contracts under laissez faire for  $i_0 = 0$ , it also does for any  $i_t \geq 0$ . Thus, the adoption of the standard can only crowd out open-ended contracts and not also increase trade among parties.

To consider this additional possibility, suppose that partnerships vary in their ability to uncover novel evidence. In particular, suppose that  $\iota$  varies in the population according to the cumulative distribution function  $F_\iota(\cdot)$  on  $[0, 1]$ . In the context of Figure 2, at  $t = 0$  (and  $i_0 = 0$ ) different partnerships are distributed along the vertical axis: those characterized by low  $\iota$  do not contract, while those characterized by high  $\iota$  write an open ended contract.

**Proposition 8** *Let the ability to uncover novel evidence  $\iota_t$  be i.i.d. across partnerships with a cumulative distribution function  $F_\iota(\cdot)$  having full support on  $[0, 1]$ . Suppose that the buyer's outside option  $\underline{u}_B$  is sufficiently low and judicial biases  $\beta$  and  $\sigma$  sufficiently rare that some partnerships are formed under laissez faire for every  $i_t \geq 0$ :*

$$\frac{\sigma}{1 - \beta} < \frac{\bar{\Lambda}(\underline{u}_B) - \mathbb{E}\xi^2}{\mathbb{E}\xi - \mathbb{E}\xi^2}. \quad (24)$$

*Then, legal evolution under laissez faire is described by a Markov chain with the same properties described in Proposition 6. There is a threshold  $i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B) < 1$ , increasing in*

the buyer's outside option ( $\partial i_{LF \sim \emptyset} / \partial \underline{u}_B \geq 0$ ) and in enforcement frictions ( $\partial i_{LF \sim \emptyset} / \partial \beta \geq 0$ ,  $\partial i_{LF \sim \emptyset} / \partial \sigma \geq 0$ , and  $\partial i_{LF \sim \emptyset} / \partial \alpha \geq 0$ ), such that when  $i_t \geq i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B)$  all partnerships are formed under *laissez faire*.

Suppose furthermore that  $\alpha\sigma > 0$ . Then, as long as the informativeness of precedent is low ( $0 \leq i_t < i_{SC \sim \emptyset}(\underline{u}_B)$ ), no partnership uses a standard contract even if it is available; but as soon as the informativeness of precedent becomes sufficiently high ( $i_t > i_{SC \sim \emptyset}(\underline{u}_B)$ ) some partnerships that would have formed under *laissez faire* switch to using a standard contract if it is available. There is a threshold  $i_{SC \sim LF}(1, \beta, \sigma, \alpha) \in (i_{SC \sim \emptyset}(\underline{u}_B), 1)$ , decreasing in enforcement frictions ( $\partial i_{SC \sim LF} / \partial \beta \leq 0$ ,  $\partial i_{SC \sim LF} / \partial \sigma \leq 0$ , and  $\partial i_{SC \sim LF} / \partial \alpha \leq 0$ ), such that if the informativeness of precedent is above this threshold and a standard contract is available then all partnerships use it and the evolution of precedents stops.

Finally, suppose that the buyer's outside option  $\underline{u}_B$  and enforcement frictions  $\beta$ ,  $\sigma$  and  $\alpha$  are sufficiently high that

$$\frac{\alpha\sigma}{1-\beta} > \frac{\bar{\Lambda}(\underline{u}_B) - \int_{i_{SC \sim \emptyset}(\underline{u}_B)}^1 x dF_\xi(x)}{\mathbb{E}\xi - \int_{i_{SC \sim \emptyset}(\underline{u}_B)}^1 x dF_\xi(x)}. \quad (25)$$

Then there is a non-empty range  $[i_{SC \sim \emptyset}(\underline{u}_B), i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B))$  such that for values of  $i_t$  in this range the standard contract allows some partnerships to be formed that could not be formed under *laissez faire*.

The dynamics under *laissez faire* are analogous to those described by Proposition 6. Initially, only parties with a sufficiently high ability to search for novel evidence  $\iota_t$  choose to contract. Their contracting and litigation promote legal evolution. As precedent improves, parties characterized by lower  $\iota_t$  find it beneficial to contract. This expansion in the volume of trade speeds up legal evolution. In the limit, precedent is fully informative ( $i_t = 1$  remains the unique absorbing state) and all parties contract.

Consider what changes if standardization is implemented at  $t = 0$ . Just as in Proposition 7, at low levels of legal evolution ( $i_t < i_{SC \sim \emptyset}(\underline{u}_B)$ ), the standard contract is not used and the law evolves exactly as it does under *laissez faire*. As precedents become sufficiently informative ( $i_t \geq i_{SC \sim \emptyset}(\underline{u}_B)$ ), the standard contract becomes preferred to writing no contract at all. At this point, standardization exerts two effects.

First, it crowds out open-ended contracts, as in Proposition 7. Given that partnerships are heterogeneous, crowding out occurs gradually. As some parties (those having high  $\iota_t$ ) continue to write open-ended contracts, precedents, and with them the standard, keep improving. This fosters the use of the standard contract. When the crowding out is complete, legal evolution stops. This occurs while precedent is still less than fully informative, and precisely when  $i_t > i_{SC \sim LF}(1, \beta, \sigma, \alpha)$ . Laissez-faire contracting and the development of precedents cease earlier if enforcement frictions ( $\beta$ ,  $\sigma$ , and  $\alpha$ ) are more severe.<sup>19</sup>

Second, standardization causes a static expansion in the volume of trade. When  $i_t \geq i_{SC \sim \emptyset}(\underline{u}_B)$ , everybody finds it profitable to transact. Thus, the volume of trade increases discontinuously if there are still some partnerships (those with low  $\iota_t$ ) that could not be formed under laissez faire. This is the case when  $i_{SC \sim \emptyset}(\underline{u}_B) < i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B)$ . This effect of standardization is present if and only if enforcement frictions ( $\beta$ ,  $\sigma$ , and  $\alpha$ ) and the buyer's outside option are high enough, i.e., under condition (25).<sup>20</sup> In this case, early standardization manages to maximize the volume of trade sooner than laissez faire: everybody contracts for  $i_t \geq i_{SC \sim \emptyset}(\underline{u}_B)$  whereas with laissez faire this occurs only for  $i_t \geq i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B) > i_{SC \sim \emptyset}(\underline{u}_B)$ .

The positive effect of standardization on the volume of trade tempers our finding that early standardization is suboptimal. An impatient society ( $\delta \simeq 0$ ) may wish to standardize early in order to reach maximal trade as soon as possible. On the other hand, if the social welfare function is patient enough ( $\delta \simeq 1$ ), premature standardization remains socially suboptimal (but still demanded by current parties). In fact, early achievement of maximum trading merely anticipates an outcome that laissez faire would also ultimately reach. But early standardization imposes a permanent cost because it interrupts evolution before the law has incorporated the optimal amount of information.

---

<sup>19</sup>The observable-quality outcome of Proposition 1 is then attainable only if standardization is delayed until laissez-faire contracting has reached the absorbing state of perfectly informative precedent  $i_t = 1$  (or if society is so lucky that the law jumps to fully informative precedent before everybody stops writing open-ended contracts).

<sup>20</sup>The Appendix proves that there is a non-empty range of intermediate values of  $\beta$ ,  $\sigma$ ,  $\alpha$ , and  $\underline{u}_B$  that satisfy simultaneously conditions (24) and (25).

## 7 Real World Episodes of Contract Standardization

This section presents some historical evidence corroborating our key idea that standard contracts and commercial codes can be viewed as means to reduce legal uncertainty and thus to foster the creation of new markets. We focus on standardization efforts undertaken in common-law legal systems.

The largest movement toward commercial codification in modern history is perhaps the so called “golden age of commercial codification” (Gutteridge 1935), which occurred in the nineteenth century in all leading economies, including common-law countries such as Britain and its colonies such as India. The classic examples of codifying statutes that systematized prior case law and converted existing precedents into a uniform act are the British Bills of Exchange Act 1882 and Sales of Goods Act 1893 (Ilbert 1920). Following the British lead, the United States also began enacting uniform commercial legislation in the same period (Uniform Negotiable Instruments Law of 1896, Uniform Sales Act of 1906), starting a process that would eventually culminate with Llewellyn’s Uniform Commercial Code.

Legal thinkers and historians viewed this trend toward codification of commercial law as a way to create a reliable basis for contracting and market development. Consistent with these objectives, reforms focused on harmonizing, standardizing sources and facilitating the understanding of the law by both judges and the public (Diamond, 1968). In historically more unequal societies codification was seen as providing the fundamental tool to eliminate en masse the privileges and servitudes reflecting the traditional power of landowners, which encumbered the active use and transfer of assets necessary for trade and industry (Horwitz 1977). Class stratification contributed to create costly enforcement distortions, not least because judges predominantly came from the upper classes. The nineteenth century was also a period of booming industry and long-distance commerce, in which the potential benefits from expanding trade were large, but the cultural and legal differences among geographically distant partners made enforcement risk particularly severe. We now review two specific episodes of contract codification to see in detail the main drivers and instruments of standardization.

## 7.1 The Indian Codification of Contract Law

The English admirers of the French *Code Civil*, including Bentham and Macaulay, believed that, by producing fairer and more reliable enforcement, standardization would encourage trade across the diverse peoples and nations of the British Empire. Under their influence, in the nineteenth century the British strictly codified criminal and contract law in India to overhaul a chaotic juridical situation. Under the original Law Charters of India, English, Muslim and Hindu residents were to be governed by their own laws in matters of contract. Soon there was broad dissatisfaction with this principle. Traditional laws differed across religions and castes, and had minimal tradition of supporting formal contracting, while English common law had a residual role. Contractual litigation was seen as producing arbitrary resolutions, and made contracting very difficult. This resembles our *laissez-faire* regime, in which legal ambiguity affects not just novel contract features but also precedents, creating enforcement risk.

After a Penal Code based on a draft by Macaulay was enacted, its success gave impulse to efforts to codify contract law. The Indian Contract Act and the Evidence Act of 1872 imposed on Indian judges a strict statutory interpretation of contracts which took precedence on other sources of law, including common, Hindu and Moslem law as well as local traditions. It stipulated general principles to define and resolve contractual conflicts, formulated explicit rules on supplying evidence to courts, and provided templates in the form of “illustrations” to highlight how judicial decisions should be guided.

The authors of the India Law Commission admitted that “we have deemed it expedient to depart ... from English law in several particulars.” The Act simplified interpretation on specific issues relative to the more nuanced common-law practice, such as in the area of contractual damages for non-performance. In England, judges had discretion on determining whether contractual provisions represented damages or penalties, which were enforced differently depending on circumstances. This required more extensive evidence gathering and legal argument. The Indian Contract Act significantly simplified the enforcement of property transfers when a buyer in good faith acquired an asset from someone in possession who was not the legitimate owner (a form of *marché ouvert*).

Even if its adoption was not voluntary, the codification of Anglo-Hindu law was warmly received in India as a more rational system of law (Derret 1968). Codes drawn from the Indian Contract Act were subsequently introduced in East Africa and other colonies.

Consistent with our model, contract standardization in India can be seen as an attempt to reduce legal uncertainty arising from conflicting laws and insufficient jurisprudence. Interestingly, the Indian Negotiable Instruments Act preceded the equivalent British Bills of Exchange Act 1882. One explanation is that the social stratification of India, its cultural heterogeneity, and the lower expertise of its judges all contributed to enhance enforcement risk, making standardization more urgent there.

## 7.2 The Bills of Exchange Act 1882

The Bills of Exchange Act 1882, a milestone in the process of developing negotiability of financial contracts, “codifie[d] the greater portion of the common law relating to Bills of Exchange, Cheques, and Promissory Notes” (Diamond 1968). Before this code, English law relative to bills of exchange, promissory notes and cheques was to be found in 17 statutes dealing with specific issues, and about 2,600 cases scattered over some 300 volumes of reports. The code defined a template contract that could be chosen over general contracting under common law. This standardization remarkably simplified enforcement by reducing uncertainty, and it was critical for the diffusion of financial contracting (Diamond 1968).

The extensive commentary to the Act allows some insight in identifying its effect on common-law contracting rules. The authors went to great lengths to restate the supremacy of common law: “The rules of the common law, including the law merchant, save in so far as they are inconsistent with the express provisions of this Act, shall continue to apply.” Yet they also clearly indicated that “where a rule is laid out in express terms [in the Act] ... the general [common-law] rule ought not to be applied in ... limiting its effect.”

The sharpest innovation relative to common-law practice is mentioned in the commentary to the Act §29(2), and refers to the case when under common law “a signature to a bill obtained by force and fear is valueless even in the hand of an innocent third part.” In contrast, the Act established that any promissory note that conforms to the Act held by an acquirer in good faith is always valid irrespective of any irregularity in intermediate endorsements of the



bill. This provision ensured entitlement by any holder, independently from the legitimacy of all previous transfers. Another innovation of the Act is that **it** sets the default rule that each bill of exchange is negotiable unless explicitly excluded by the text, while previously negotiability had to be explicitly included in the text. The spirit of the Bills of Exchange Act 1882 is thus also consistent with the notion that contract standardization ensured more reliable enforcement by reducing the uncertainties involved in contract litigation.

## 8 Conclusions

We study the causes and consequences of commercial codification. We showed that standardization that preserves a general freedom of contract is beneficial in terms of expanding the volume of trade and helping to overcome distorted enforcement caused by partial courts and chaotic precedents. Thus, codification of specific contracts can be justified as a means to reduce enforcement risk and allow society to exploit new opportunities to trade among diverse and distant parties. However, a strict codification of specific contracts may contribute to a more rigid legal orientation, and suppresses contractual innovation (Beck and Levine 2005). In fact, our model suggests that standardization should optimally occur after private commercial practices have developed for a while.

We discussed some historical episodes of contract standardization, but our broad message holds some relevance for current efforts to improve contract enforcement in the face of endemic legal uncertainty. In line with current real-world trends, our model suggests that standardization should be beneficial in mature domains such as international trade. Here, conflict among national laws may create strong legal uncertainty, and existing laws and trade arrangements already provide a reliable basis for harmonization. The case of developing economies is more difficult. Here, softening legal uncertainty is critical, but the undeveloped state of the law renders standardization problematic. In this case, introducing very basic (if not rudimentary) contractual templates that gradually lose force as new private practices develop may statically enhance trade without stifling commercial evolution.

# A Mathematical Appendix (Not for Publication)

## A.1. Proof of Proposition 1

The minimum cost to induce effort  $a$  given the non-negativity constraint is  $p_0 = 0$  and  $p_v = C'(a)$ . Then second best effort solves the surplus-maximization problem

$$\max_{a \in [0,1]} \{av - C(a)\} \quad (\text{A1})$$

subject to the participation constraint

$$\pi_B(a) \equiv a[v - C'(a)] \geq \underline{u}_B. \quad (\text{A2})$$

The buyer's share of joint surplus  $\pi_B(a)$  is a concave function:

$$\pi_B''(a) = -2C''(a) - aC'''(a) < 0 \quad (\text{A3})$$

because  $C''(a) > 0$  and  $C'''(a) \geq 0$  for all  $a \in (0, 1)$ . It has limits  $\pi_B(0) = \pi_B(a_{FB}) = 0$  and thus a unique maximum

$$a_B = \arg \max_{a \in [0,1]} \pi_B(a) \in (0, a_{FB}). \quad (\text{A4})$$

If  $\underline{u}_B > \pi_B(a_B)$  the partnership is infeasible. Otherwise, second-best effort is  $a_{SB} \in [a_B, a_{FB})$  such that  $\pi_B(a_{SB}) = \underline{u}_B$  and  $\pi_B'(a_{SB}) < 0$  for all  $\underline{u}_B \in (0, \max_{a \in [0,1]} \{a[v - C'(a)]\})$ . By the implicit-function theorem

$$\frac{\partial a_{SB}}{\partial \underline{u}_B} = \frac{1}{\pi_B'(a_{SB})} < 0. \quad (\text{A5})$$

Second-best surplus is  $\Pi_{SB} = a_{SB}v - C(a_{SB})$  such that

$$\frac{\partial \Pi_{SB}}{\partial \underline{u}_B} = [v - C'(a_{SB})] \frac{\partial a_{SB}}{\partial \underline{u}_B} < 0 \text{ for all } a_{SB} < a_{FB} \Leftrightarrow \underline{u}_B > 0. \quad (\text{A6})$$

## A.2. Evidence Collection

Evidence about each partnership is drawn from a universe  $W$ , which admits a time-invariant partition into a set  $I$  of informative signals and a set  $U$  of uninformative signals. The realization  $e_t(w)$  of each signal  $w \in W$  is independent across partnerships  $t$ . The universe  $W$  has the cardinality of the continuum, and so do  $U$  and  $I$ . The informative set  $I$  has measure  $\iota \in (0, 1)$ , while the uninformative set  $U$  has measure  $1 - \iota$ . Intuitively, we can visualize the universe  $W$  as a filing cabinet, whose folders  $w$  are filled in each period with information  $e_t(w)$  about partnership  $t$ .

For all uninformative signals  $w \in U$ , the realization  $e_t(w)$  is independent of the true quality  $q_t$  of the widget. It occurs as soon as partnership  $t$  is formed, before contracting, investment, and production take place. One signal  $u_t^0 \in U$  has a misleading negative real-

ization  $e_t(u_t^0) = -1$ . One signal  $u_t^0 \in U$  has an misleading positive realization  $e_t(u_t^v) = 1$ .<sup>21</sup> These two signals are privately observed by both parties as soon as they are realized. Thus, the contract can—and optimally will—specify that evidence based on the signals  $u_t^0$  and  $u_t^v$  is misleading and unacceptable in court. All uninformative signals other than  $u_t^0$  and  $u_t^v$  are realized as missing for partnership  $t$ : formally,  $e_t(w) = \emptyset \forall w \in U \setminus \{u_t^0, u_t^v\}$ . At the time of partnership formation, uninformative signals with a missing realization are indistinguishable from informative signals that are yet to be realized. Intuitively, when the parties first meet they observe privately that the filing cabinet  $W$  has two folders ( $u_t^0$  and  $u_t^v$ ) already filled with misleading information. All other folders are empty, and the parties do not know which ones will still be empty at the time of litigation ( $w \in U$ ) and which ones will instead be filled with material evidence ( $w \in I$ ).

Informative signals are realized after investment, production, and consumption have taken place. The realization  $e_t(w)$  of each signal  $w \in I$  depends on the true value  $q_t$  of the widget produced by partnership  $t$ , and on the time-invariant informativeness  $i(w)$  of the signal. Informativeness is described by a one-to-one function  $i : I \rightarrow [0, 1]$  that maps the set of informative signals  $I$  onto the unit interval. If the widget produced in partnership  $t$  is of high quality ( $q_t = v$ ), then  $e_t(w) = 1$  for all  $w \in I$ . If instead the widget is of low quality ( $q_t = 0$ ), then the informative pieces of evidence  $w \in I$  take values

$$e_t(w) = \begin{cases} 1 & \text{if } i(w) < \xi_t \\ -1 & \text{if } i(w) \geq \xi_t \end{cases}, \quad (\text{A7})$$

where  $\xi_t$  is an i.i.d random variable with cumulative distribution function  $F_\xi(\cdot)$  and continuous density  $f_\xi(\cdot) > 0$  on the interval  $[0, 1]$ .

The mapping  $i(w)$  is generically unknown to all agents. Intuitively, there is no general index to the filing cabinet  $W$ . Users approaching it do not know which folders they should look into (the informative set  $I$ ) and which they should avoid (the uninformative set  $U$ ), and a fortiori they do not know which folders contain more diagnostic information (i.e., have higher values of  $i(w)$ ). When parties write and litigate contracts tailored to their specific needs, two non-generic exceptions to this lack of knowledge emerge.

First, each partnership  $t$  optimally rules out misleading evidence  $u_t^0$  and  $u_t^v$ . Thus, the set of contracts written up to and including  $t$  characterizes a set  $U_t = \bigcup_{s=1}^t \{u_s^0, u_s^v\} \subset U$  of signals that are publicly known to be uninformative. For all  $t$ , the set  $U_t$  is countable and thus has measure zero, while  $U \setminus U_t$  is of full measure  $1 - \iota$ .

Second, signals  $\omega \in I$  whose realizations  $e_s(\omega)$  have been used cases prior to  $t$  (and cited in the judicial opinions justifying their outcome) constitute a body of precedents  $P_t$ . For each signal  $\omega \in P_t$ , not only is it common knowledge that it is informative ( $P_t \subset I$ ), but its precise informativeness  $i(\omega)$  is known and can be contracted upon. The state of precedents at time  $t$  is summarized by the informativeness  $i_t = \max_{\omega \in P_t} i(\omega)$  of the signal  $\omega_t^P = \arg \max_{\omega \in P_t} i(\omega)$  that provides a sufficient statistic for  $q_t$  given the entire set  $P_t$ . Since litigants in each case can collect a finite amount of evidence, the set  $P_t$  is countable for all  $t$  and thus has measure zero, while  $I \setminus P_t$  is of full measure  $\iota$ .

In court, the realization  $e_t(\omega_t^P)$  that summarizes all evidence based on precedent is

---

<sup>21</sup>More generally, we could allow for a stochastic countable number of misleading realizations.

observed by the judge as well as the parties. All signals  $\omega \in P_t \setminus \{\omega_t^P\}$  are publicly known to provide no information conditional on  $e_t(\omega_t^P)$ . All signals  $\omega \in U_{t-1}$  are publicly known to be uninformative. Moreover, the parties can write a contract that rules out as evidence the misleading signals  $u_t^0$  and  $u_t^v$ . If they do not, they have an opportunity for cheap talk because they can collect and present  $e_t(u_t^0) = -1$  or  $e_t(u_t^0) = 1$  to a judge who only knows that  $u_t^0, u_t^v \in W \setminus (P_t \cup U_{t-1})$  but has no ability to discern they belong to  $U$  instead of  $I$ .

If the contract optimally rules out  $u_t^0$  and  $u_t^v$ , each litigant  $L \in \{B, S\}$  can search for novel evidence by inspecting the realization of an unknown signal  $w_t^L \in W \setminus (P_t \cup U_t)$ . The parties have no information about these signals and thus can do no better than inspecting one at random. Intuitively, each litigant checks a random folder from all those that were not previously indexed ( $P_t \cup U_{t-1}$ ) and were also not already full of misleading evidence at the moment of partnership formation ( $u_t^0$  and  $u_t^v$ ).

With probability  $\iota$ , litigant  $L$  inspects a novel informative signal  $w_t^L \in I \setminus P_t$  whose realization  $e_t(w_t^L) \in \{-1, 1\}$  is informative of true quality  $q_t$ . With complementary probability  $1 - \iota$ , the litigant inspects instead an uninformative signal  $w_t^L \in U \setminus (U_t \cup \{u_t^0, u_t^v\})$  that is realized as missing:  $e_t(w_t^L) = \emptyset$ . Signals with a missing realization cannot be produced as evidence in court because such a realization is unprovable. It is impossible to distinguish if a litigant who claims to have observed  $e_t(w_t^L) = \emptyset$  has indeed observed it, or has not observed the realization of  $w_t^L$  at all, or has observed a different realization but is hiding it. On the other hand, parties are unable to fake the realization of informative signals. Thus, novel informative evidence  $e_t(w_t^L)$  for  $w_t^L \in I \setminus P_t$  is “hard” in the sense that it can be hidden or presented truthfully, but not falsified.

### A.3. Proof of Proposition 2

We begin by solving for the optimal mechanism when misleading evidence  $U_t$  is ruled out, so the litigants’ truth-telling constraints are (12) and (13). If misleading evidence were allowed, these constraints would turn into (19) and (20) because the reports ( $e_B, e_S$ ) would become cheap talk instead of hard evidence. We shall show that the additional constraints impose further restrictions on the optimal mechanism, proving that ruling out misleading evidence  $U_t$  is optimal, according to intuition.

The first-step problem of minimizing the cost of eliciting effort  $a$  is

$$\min_{p(\dots)} \mathbb{E} [p(0, 0; e_P, e_B, e_S; b, \omega) | q_t = 0] \quad (\text{A8})$$

subject to three equality constraints—the incentive-compatibility constraint in equation (10) and the truth-telling constraints in equations (15) and (16)—and several inequality constraints—the non-negativity and truth-telling constraints in equations (11) to (14).

Only some of the inequality constraints are binding. A first set of binding constraints reflects the impossibility of making payment contingent on direct revelation of high quality ( $q_t = v$ ) without also paying for low quality ( $q_t = 0$ ) to induce truthful revelation. When payment is contingent on novel evidence ( $e_t(i_t^B)$  and  $e_t(i_t^S)$ ), the minimand likelihood ratio in equation (17) is increasing in the amount of negative evidence and decreasing in the amount of positive evidence. As a consequence, a second set of binding constraints reflects the litigants’ and biased judges’ ability to hide positive or negative evidence.

### A.3.1. Pro-Buyer Judges

Pro-buyer judges use cheap talk to minimize payment, so for any report  $(q_B, q_S; e_B, e_S)$  made by the litigants they enforce the same price regardless of cheap talk  $q_B, q_S \in \{0, v\}$ :

$$p(q_B, q_S; e_P, e_B, e_S; b_B, \omega) = p(e_P, e_B, e_S; b_B, \omega). \quad (\text{A9})$$

Since the seller's payoff and a pro-buyer judge's are antithetical, revelation of the seller's informative private signal  $(e_t(i_t^S) \neq 0)$  through a pro-buyer judge requires a payment independent of  $e_S \in \{-1, 0, 1\}$ :

$$p(e_P, e_B, e_S; b_B, \omega) = p(e_P, e_B; b_B, \omega) \quad (\text{A10})$$

for all  $e_P \in \{-1, 1\}$ ,  $e_B, e_S \in \{-1, 0, 1\}$ , and  $\omega \in \{0, 1\}$ . When the buyer presents a positive signal  $e_t(i_t^B) = 1$ , pro-buyer judges' ability to hide information implies the binding constraints

$$p(e_P, 1; b_B, \omega) \leq p(e_P, 0; b_B, \omega) \text{ for } e_S \in \{0, 1\}. \quad (\text{A11})$$

for all  $e_P \in \{-1, 1\}$  and  $\omega \in \{0, 1\}$ .

When the buyer presents a negative signal  $e_t(i_t^B) = -1$  it provides incontrovertible evidence of low quality. Thus the non-negativity constraints binds:

$$p(e_P, -1; b_B, \omega) = 0 \quad (\text{A12})$$

for all  $e_P \in \{-1, 1\}$  and  $\omega \in \{0, 1\}$ . For non-negative realizations of the buyer' private signals, the binding truth-telling constraints impose a single price

$$p(e_P, 0; b_B, \omega) = p(e_P, 1; b_B, \omega) = p(e_P; b_B, \omega) \quad (\text{A13})$$

for all  $e_P \in \{-1, 1\}$  and  $\omega \in \{0, 1\}$ .

Intuitively, the best verification that can be obtained from pro-buyer judges is to distinguish whether the buyer can prove low quality ( $e_t(i_t^B) = -1$ ). If he cannot, no further nuance is possible. The contract cannot rely on evidence of low quality presented by the seller against his own interest ( $e_t(i_t^S) = -1$ ), nor can it ask the pro-buyer judge to raise payment when the parties have produced positive signals that he can hide ( $e_t(i_t^L) = 1$ ).

Whenever  $e_t(i_t) = -1$  precedent suffices to establish incontrovertible evidence of low quality so the optimal payment is nil. By the truth-telling constraint (15),

$$p(1; b_B, 1) = p(-1; b_B, 1) = p(-1; b_B, 0). \quad (\text{A14})$$

Thus, the optimal price schedule for pro-buyer judges consists of at most two prices  $\bar{p}_B \geq 0$  and  $p_B \geq 0$  such that

$$\bar{p}_B \equiv p(1; b_B, 1) = p(-1; b_B, 1) = p(-1; b_B, 0) \leq p(1; b_B, 0) \equiv \bar{p}_B + p_B. \quad (\text{A15})$$

Then pro-buyer judges provide a reward for high quality

$$\mathbb{E}[p(v, v; 1, e_B, e_S; b_B, \omega) | q_t = v] = \bar{p}_B + (1 - \alpha)p_B \quad (\text{A16})$$

and a wasteful payment for low quality

$$\begin{aligned} \mathbb{E} [p(0, 0; e_P, e_B, e_S; b_B, \omega) | q_t = 0] &= \\ & \bar{p}_B \Pr \{e_t(i_t^B) \neq -1 | q_t = 0\} + (1 - \alpha) p_B \Pr \{e_t(i_t) = 1, e_t(i_t^B) \neq -1 | q_t = 0\} \\ &= \bar{p}_B \int_0^1 (1 - \iota + \iota x) dF_\xi(x) + (1 - \alpha) p_B \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x). \end{aligned} \quad (\text{A17})$$

If all judges have a pro-buyer bias ( $\beta = 1$ ) and only one among  $\bar{p}_B$  and  $p_B$  is positive, the minimand likelihood ratio is respectively

$$\Lambda(\bar{p}_B) = \int_0^1 (1 - \iota + \iota x) dF_\xi(x) \geq \Lambda(p_B) = \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x). \quad (\text{A18})$$

Thus, the optimal contract has  $\bar{p}_B = 0 \leq p_B$ , unless  $\alpha = 1$ .

If there are both pro-buyer and unbiased judges, the truth-telling constraint (14) imposes

$$p_B \leq \min_{q \in \{0, v\}, e_B \in \{0, 1\}, e_S \in \{-1, 0, 1\}} p(q, q; 1, e_B, e_S; u) \quad (\text{A19})$$

### A.3.2. Unbiased Judges

Unbiased judges impose no truth-telling constraints of their own because their preferences consist in faithfully applying the contract. Thus, in particular, it is irrelevant if an unbiased judge is bound by precedent or not because he never wishes to disregard precedents: for all  $\omega \in \{0, 1\}$ ,

$$p(q_B, q_S; e_P, e_B, e_S; u, \omega) = p(q_B, q_S; e_P, e_B, e_S; u). \quad (\text{A20})$$

On the other hand, unbiased judges introduce additional truth-telling constraints for the litigants, who must honestly report quality to a judge who is willing to make payment depend on their cheap talk if the contract so stipulates.

The buyer must be induced to reveal truthfully  $q_t = v$ . Then  $e_t(i_t) = 1$  with certainty, while  $e_t(i_t^B) = 0$  with probability  $1 - \iota$  and  $e_t(i_t^B) = 1$  with probability  $\iota$  independent of all other random variables. Hence, we can simplify his conditional expectation and write the constraint

$$\mathbb{E} [p(v, v; 1, e_B, e_S; u) - p(0, v; 1, e_B, e_S; u) | q_t = v] \leq 0 \text{ for } e_B \in \{0, 1\}. \quad (\text{A21})$$

For ease of notation, define the conditional probability

$$F_e(e_S | v) \equiv \Pr \{e_t(i_t^S) = e_S | q_t = v\}. \quad (\text{A22})$$

Then the buyer's truth-telling constraint is

$$\sum_{e_S \in \{0, 1\}} F_e(e_S | v) p(v, v; 1, e_B, e_S; u) \leq \sum_{e_S \in \{0, 1\}} F_e(e_S | v) p(0, v; 1, e_B, e_S; u) \quad (\text{A23})$$

for  $e_B \in \{0, 1\}$ .

The seller must be induced to reveal truthfully  $q_t = 0$  even if  $e_t(i_t) = 1$ :

$$\mathbb{E} [p(0, 0; 1, e_B, e_S; u) - p(0, v; 1, e_B, 0; u) | q_t = 0, e_t(i_t) = 1, e_t(i_t^S) = e_S] \geq 0. \quad (\text{A24})$$

For ease of notation, define the conditional probability

$$F_e(e_B | q, e_P, e_S) \equiv \Pr \{e_t(i_t^B) = e_B | q_t = q, e_t(i_t) = e_P, e_t(i_t^S) = e_S\}. \quad (\text{A25})$$

Then the seller's truth-telling constraint is

$$\begin{aligned} \sum_{e_B \in \{-1, 0, 1\}} F_e(e_B | 0, 1, e_S) p(0, 0; 1, e_B, e_S; u) &\geq \sum_{e_B \in \{-1, 0, 1\}} F_e(e_B | 0, 1, e_S) p(0, v; 1, e_B, e_S; u) \\ &\geq \sum_{e_B \in \{0, 1\}} F_e(e_B | 0, 1, e_S) p(0, v; 1, e_B, e_S; u) \text{ for } e_S \in \{-1, 0, 1\}. \end{aligned} \quad (\text{A26})$$

The second inequality follows by the non-negativity constraint. It reflects the intuitive optimality of punishing the seller when he falsely reports  $q_S = v$  and his lie is exposed by the buyer's hard evidence  $e_t(i_t^B) = -1$ .

The buyer's and the seller's constraints jointly imply that

$$\begin{aligned} \sum_{e_B \in \{0, 1\}} \frac{F_e(e_B | 0, 1, 1)}{F_e(1 | 0, 1, 1)} \sum_{e_S \in \{0, 1\}} F_e(e_S | v) p(v, v; 1, e_B, e_S; u) \\ \leq \sum_{e_B \in \{0, 1\}} \frac{F_e(e_B | 0, 1, 1)}{F_e(1 | 0, 1, 1)} \sum_{e_S \in \{0, 1\}} F_e(e_S | v) p(0, v; 1, e_B, e_S; u) \\ \leq \sum_{e_S \in \{0, 1\}} \frac{F_e(e_S | v)}{F_e(1 | 0, 1, e_S)} \sum_{e_B \in \{0, 1\}} F_e(e_B | 0, 1, e_S) p(0, v; 1, e_B, e_S; u) \\ \leq \sum_{e_S \in \{0, 1\}} \frac{F_e(e_S | v)}{F_e(1 | 0, 1, e_S)} \sum_{e_B \in \{0, 1\}} F_e(e_B | 0, 1, e_S) p(0, 0; 1, e_B, e_S; u). \end{aligned} \quad (\text{A27})$$

The first and last inequality are linear combinations of equations (A23) and (A26), respectively. The inner inequality reduces to

$$\frac{F_e(0 | 0, 1, 1)}{F_e(1 | 0, 1, 1)} p(0, v; 1, 0, 0; u) \leq \frac{F_e(0 | 0, 1, 0)}{F_e(1 | 0, 1, 0)} p(0, v; 1, 0, 0; u) \quad (\text{A28})$$

which is true for all  $p(0, v; 1, 0, 0; u) \geq 0$  because the probability that the buyer's search is unsuccessful is  $F_e(0 | 0, 1, 1) = F_e(0 | 0, 1, 0) = 1 - \iota$  independently of the seller's signal, while the probability that the buyer uncovers a positive signal is increasing in the seller's signal:

$$F_e(1 | 0, 1, 1) = \iota \frac{\int_{i_t}^1 x^2 dF_\xi(x)}{\int_{i_t}^1 x dF_\xi(x)} > F_e(1 | 0, 1, 0) = \iota \frac{\int_{i_t}^1 x dF_\xi(x)}{1 - F_\xi(x)}. \quad (\text{A29})$$

Intuitively, a positive signal given low quality induces inference of high  $\xi_t$  and thus a higher

likelihood that another signal is also positive.

We conjecture that the only binding constraint for the litigants' truthful reporting of quality  $q_t$  is

$$\begin{aligned} \sum_{e_B \in \{0,1\}} \sum_{e_S \in \{0,1\}} \frac{F_e(e_B|0,1,1)}{F_e(1|0,1,1)} F_e(e_S|v) p(v,v;1,e_B,e_S;u) \\ \leq \sum_{e_B \in \{0,1\}} \sum_{e_S \in \{0,1\}} \frac{F_e(e_B|0,1,e_S)}{F_e(1|0,1,e_S)} F_e(e_S|v) p(0,0;1,e_B,e_S;u). \end{aligned} \quad (\text{A30})$$

Then another binding constraint results from the need to induce the buyer to reveal truthfully a positive signal ( $e_t(i_t^B) = 1$ ) when quality is high ( $q_t = v \Rightarrow e_t(i_t) = 1$ ):

$$\sum_{e_S \in \{0,1\}} F_e(e_S|v) p(v,v;1,1,e_S;u) \leq \sum_{e_S \in \{0,1\}} F_e(e_S|v) p(v,v;1,0,e_S;u). \quad (\text{A31})$$

Any combination of the four prices  $p(v,v;1,e_B,e_S;u) \geq p_B$  for  $e_B, e_S \in \{0,1\}$  such that

$$\sum_{e_S \in \{0,1\}} F_e(e_S|v) p(v,v;1,e_B,e_S;u) = p_B + \iota p_U \text{ for } e_B \in \{0,1\} \quad (\text{A32})$$

for some constant  $p_U \geq 0$  is optimal given the truth-telling constraints we have considered so far, though only those with  $p(v,v;1,0,1;u) \geq p(v,v;1,1,0;u)$  are actually feasible, because the seller must also be incentivized to disclose a positive private signal. Then unbiased judges provide a reward for high quality

$$\begin{aligned} \mathbb{E}[p(v,v;1,e_B,e_S;u) | q_t = v] = \\ \sum_{e_B \in \{0,1\}} \sum_{e_S \in \{0,1\}} F_e(e_B|v) F_e(e_S|v) p(v,v;1,e_B,e_S;u) = p_B + \iota p_U, \end{aligned} \quad (\text{A33})$$

recalling that the success of the two litigants' searches is independent.

The wasteful payment for low quality is minimized by minimizing payment whenever a negative signal is obtained. Thus, the non-negativity constraint is binding for  $e_t(i_t^B) = -1$ :

$$p(0,0;1,-1,e_S;u) = 0 \text{ for all } e_S \in \{-1,0,1\}. \quad (\text{A34})$$

The truth-telling constraint (A19) is binding for  $e_t(i_t^S) = -1$ :

$$p(0,0;1,e_B,-1;u) = p_B \text{ for } e_B \in \{0,1\}. \quad (\text{A35})$$

Intuitively, the seller should be punished when quality is revealed to be low. When the buyer presents a negative signal ( $e_t(i_t^B) = -1$ ) punishment is constrained because the seller is judgment proof. When the seller collects a negative signal ( $e_t(i_t^S) = -1$ ) punishment is further limited by truth-telling constraints—as we are about to show, at the optimum  $p(0,0;1,e_B,0;u) = p_B$  too.



For ease of notation, define the conditional probability

$$F_{|q}(e_P, e_B, e_S|q) \equiv \Pr \{e_t(i_t) = e_P, e_t(i_t^B) = e_B, e_t(i_t^S) = e_S | q_t = q\}. \quad (\text{A36})$$

Unbiased judges enforces a wasteful payment for low quality

$$\begin{aligned} \mathbb{E}[p(0, 0; e_P, e_B, e_S; u) | q_t = 0] = \\ \sum_{e_B \in \{0,1\}} F_{|q}(1, e_B, -1|0) p_B + \sum_{e_B \in \{0,1\}} \sum_{e_S \in \{0,1\}} F_{|q}(1, e_B, e_S|0) p(0, 0; 1, e_B, e_S; u). \end{aligned} \quad (\text{A37})$$

The four prices  $p(0, 0; 1, e_B, e_S; u)$  for  $e_B, e_S \in \{0, 1\}$  are optimally set to minimize it given the binding constraint for truthful reporting of  $q_t$ :

$$\begin{aligned} \sum_{e_B \in \{0,1\}} \sum_{e_S \in \{0,1\}} \frac{F_e(e_B|0, 1, e_S)}{F_e(1|0, 1, e_S)} F_e(e_S|v) p(0, 0; 1, e_B, e_S; u) \\ = \left[ 1 + \frac{F_e(0|0, 1, 1)}{F_e(1|0, 1, 1)} \right] (p_B + \iota p_U). \end{aligned} \quad (\text{A38})$$

Thus, all prices should be minimized except those that minimize

$$L(e_B, e_S) \equiv F_{|q}(1, e_B, e_S|0) \frac{F_e(1|0, 1, e_S)}{F_e(e_B|0, 1, e_S) F_e(e_S|v)}, \quad (\text{A39})$$

such that

$$L(0, 0) = L(1, 0) = \iota \int_{i_t}^1 x dF_\xi(x) > L(0, 1) = L(1, 1) = \iota \int_{i_t}^1 x^2 dF_\xi(x) \quad (\text{A40})$$

By the binding truth-telling constraint (A19), the optimum is

$$p(0, 0; 1, e_B, 0; u) = p_B \text{ for } e_B \in \{0, 1\}, \quad (\text{A41})$$

with any pair  $p(0, 0; 1, e_B, 1; u) \geq p_B$  for  $e_B \in \{0, 1\}$  such that

$$\sum_{e_B \in \{0,1\}} F_e(e_B|0, 1, 1) p(0, 0; 1, e_B, 1; u) = [F_e(0|0, 1, 1) + F_e(1|0, 1, 1)] (p_B + p_U), \quad (\text{A42})$$

recalling that  $F_e(1|v) = \iota$ . Any such pair is optimal given the truth-telling constraints we have considered so far, though only those with  $p(0, 0; 1, 1, 1; u) \leq p(0, 0; 1, 0, 1; u)$  are actually feasible, because the buyer must also be induced to reveal truthfully a positive signal when quality is low.

Then unbiased judges enforce a wasteful payment for low quality

$$\begin{aligned} \mathbb{E}[p(0, 0; e_P, e_B, e_S; u) | q_t = 0] &= \\ &= p_B \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x) + \iota p_U \left[ (1 - \iota) \int_{i_t}^1 x dF_\xi(x) + \iota \int_{i_t}^1 x^2 dF_\xi(x) \right]. \end{aligned} \quad (\text{A43})$$

Intuitively, pro-buyer judges can be made to pay  $p_B > 0$  when the buyer fails to present evidence of low quality only if unbiased judges make the same payment in the same conditions. Moreover, unbiased judges can make an extra payment  $p_U \geq 0$  when not only the buyer fails to present evidence of low quality, but the seller also manages to present evidence of high quality.

If there are no pro-seller judges ( $\sigma = 0$ ) and only one among  $p_B$  and  $p_U$  is positive, the minimand likelihood ratio is respectively

$$\Lambda(p_B) = \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x) \geq \Lambda(p_U) = (1 - \iota) \int_{i_t}^1 x dF_\xi(x) + \iota \int_{i_t}^1 x^2 dF_\xi(x). \quad (\text{A44})$$

Then the optimal contract for  $\sigma = 0$  has  $p_B = 0 < p_U$  unless  $\beta = 1$ .

### A.3.3. Pro-Seller Judges

Pro-seller judges use cheap talk to maximize payment, so for any report  $(q_B, q_S; e_B, e_S)$  made by the litigants they enforce the same price regardless of cheap talk  $q_B, q_S \in \{0, v\}$ :

$$p(q_B, q_S; e_P, e_B, e_S; b_S, \omega) = p(e_P, e_B, e_S; b_S, \omega) \quad (\text{A45})$$

Since the buyer's payoff and a pro-seller judge's are antithetical, revelation of the buyer's informative private signal ( $e_t(i_t^B) \neq 0$ ) through a pro-seller judge requires a payment independent of  $e_B \in \{-1, 0, 1\}$ :

$$p(e_P, e_B, e_S; b_S, \omega) = p(e_P, e_S; b_S, \omega) \quad (\text{A46})$$

for all  $e_P \in \{-1, 1\}$ ,  $e_B, e_S \in \{-1, 0, 1\}$ , and  $\omega \in \{0, 1\}$ . When the seller presents a negative signal  $e_t(i_t^S) = -1$ , pro-seller judges' ability to hide information implies the binding constraints

$$p(e_P, -1; b_S, \omega) \geq p(e_P, 0; b_S, \omega) \quad (\text{A47})$$

for all  $e_P \in \{-1, 1\}$ ,  $e_B \in \{-1, 0, 1\}$ , and  $\omega \in \{0, 1\}$ .

Whenever  $e_t(i_t) = -1$  precedent suffices to establish incontrovertible evidence of low quality. Thus the non-negativity constraint is binding,

$$p(-1, e_S; b_S, 0) = 0 \quad (\text{A48})$$

for all  $e_B, e_S \in \{-1, 0, 1\}$ . By the truth-telling constraint (16),

$$p(-1, e_S; b_S, 1) = p(1, e_S; b_S, 1) = p(1, e_S; b_S, 0). \quad (\text{A49})$$

Thus, the optimal price schedule for pro-seller judges consists of at most two prices  $\bar{p}_S \geq 0$  and  $p_S \geq 0$  such that

$$\begin{aligned} \bar{p}_S &\equiv p(-1, -1; b_S, 1) = p(-1, 0; b_S, 1) = p(1, -1; b_S, \omega) = p(1, 0; b_S, \omega) \\ &\leq p(-1, 1; b_S, 1) = p(1, 1; b_S, \omega) \equiv \bar{p}_S + p_S \end{aligned} \quad (\text{A50})$$

for all  $\omega \in \{0, 1\}$ .

Intuitively, the best verification that can be obtained from pro-seller judges is to distinguish whether the seller can present evidence of high quality ( $e_t(i_t^S) = 1$ ). If he can, no further nuance is possible. The mechanism cannot rely on evidence of high quality presented by the buyer against his own interest ( $e_t(i_t^B) = 1$ ), nor can it ask the pro-seller judge to lower payment when the parties have produced negative signals that he can hide ( $e_t(i_t^L) = -1$ ).

Thus, pro-seller judges provide a reward for high quality

$$\mathbb{E}[p(v, v; 1, e_B, e_S; b_S) | q_t = v] = \bar{p}_S + p_S \Pr\{e_t(i_t^S) = 1 | q_t = v\} = \bar{p}_S + \iota p_S \quad (\text{A51})$$

and a wasteful payment for low quality

$$\begin{aligned} \mathbb{E}[p(0, 0; e_P, e_B, e_S; b_S) | q_t = 0] &= \bar{p}_S [(1 - \alpha) \Pr\{e_t(i_t) = 1 | q_t = 0\} + \alpha] \\ &+ p_S [(1 - \alpha) \Pr\{e_t(i_t) = 1, e_t(i_t^S) = 1 | q_t = 0\} + \alpha \Pr\{e_t(i_t^S) = 1 | q_t = 0\}] \\ &= [1 - (1 - \alpha) F_\xi(i_t)] \bar{p}_S + \iota \left[ \int_{i_t}^1 x dF_\xi(x) + \alpha \int_0^{i_t} x dF_\xi(x) \right] p_S. \end{aligned} \quad (\text{A52})$$

If all judges have a pro-seller bias ( $\sigma = 1$ ) and only one among  $\bar{p}_S$  and  $p_S$  is positive, the minimand likelihood ratio is respectively

$$\Lambda(\bar{p}_S) = 1 - (1 - \alpha) F_\xi(i_t) \geq \Lambda(p_S) = \int_{i_t}^1 x dF_\xi(x) + \alpha \int_0^{i_t} x dF_\xi(x). \quad (\text{A53})$$

Then the optimal contract has  $\bar{p}_S = 0 < p_S$ .

If there are both pro-seller and unbiased judges, the truth-telling constraint (14) imposes

$$\bar{p}_S \geq \max_{q \in \{0, v\}, e_B \in \{-1, 0, 1\}, e_S \in \{-1, 0\}} p(q, q; 1, e_B, e_S; u) \quad (\text{A54})$$

and

$$\bar{p}_S + p_S \geq \max_{q \in \{0, v\}, e_B \in \{-1, 0, 1\}} p(q, q; 1, e_B, 1; u). \quad (\text{A55})$$

#### A.3.4. Optimal Contract

Since the optimal contract for pro-seller judges has  $\bar{p}_S = 0 < p_S$ , the binding truth-telling constraint (14) uniquely pins down the optimal combination of the four prices  $p(v, v; 1, e_B, e_S; u)$

$\geq p_B$  for  $e_B, e_S \in \{0, 1\}$ :

$$\begin{aligned} p(v, v; 1, 0, 0; u) &= p(v, v; 1, 1, 0; u) = p_B \\ &< p(v, v; 1, 0, 1; u) = p(v, v; 1, 1, 1; u) = p_B + p_U, \end{aligned} \quad (\text{A56})$$

which enables the minimization of

$$\bar{p}_S = p_B. \quad (\text{A57})$$

The optimal contracts for the extreme cases in which judges are respectively all pro-seller or all unbiased are ranked by

$$\begin{aligned} \Lambda(p_S) &= \int_{i_t}^1 x dF_\xi(x) + \alpha \int_0^{i_t} x dF_\xi(x) \\ &> \Lambda(p_U) = (1 - \iota) \int_{i_t}^1 x dF_\xi(x) + \iota \int_{i_t}^1 x^2 dF_\xi(x). \end{aligned} \quad (\text{A58})$$

Intuitively, unbiased judges provide the best verification, even if they cannot achieve perfect revelation of  $q_t$  for any  $i_t < 1$ . Thus, it is optimal to minimize  $p_S$  for any  $p_U$ , so the binding truth-telling constraint (14) also uniquely pins down the optimal pair  $p(0, 0; 1, e_B, 1; u) \geq p_B$  for  $e_B \in \{0, 1\}$ :

$$p(0, 0; 1, e_B, 1; u) = p(0, 0; 1, e_B, 1; u) = p_B + p_U, \quad (\text{A59})$$

which enables the minimization of

$$p_S = p_U. \quad (\text{A60})$$

Then, for any  $p_B = \bar{p}_S \geq 0$  and  $p_U = p_S \geq 0$ , the optimal contract provides a reward for high quality

$$\mathbb{E}[p(v, v; 1, e_B, e_S; b, \omega) | q_t = v] = (1 - \alpha\beta) p_B + (1 - \beta) \iota p_U \quad (\text{A61})$$

and a wasteful payment for low quality

$$\begin{aligned} \mathbb{E}[p(0, 0; e_P, e_B, e_S; b, \omega) | q_t = 0] &= \\ &\left[ (1 - \alpha\beta) \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x) + \sigma \iota \int_{i_t}^1 (1 - x) dF_\xi(x) + \alpha\sigma F_\xi(i_t) \right] p_B \\ &+ \left[ (1 - \beta) \int_{i_t}^1 x dF_\xi(x) - (1 - \beta - \sigma) \iota \int_{i_t}^1 x(1 - x) dF_\xi(x) + \alpha\sigma \int_0^{i_t} x dF_\xi(x) \right] \iota p_U. \end{aligned} \quad (\text{A62})$$

If only one among  $p_B$  and  $p_U$  is positive, the minimand likelihood ratio is respectively

$$\Lambda(p_B) = \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x) + \frac{\sigma}{1 - \alpha\beta} \left[ \iota \int_{i_t}^1 (1 - x) dF_\xi(x) + \alpha F_\xi(i_t) \right] \quad (\text{A63})$$

and

$$\Lambda(p_U) = \int_{i_t}^1 x dF_\xi(x) - \frac{1 - \beta - \sigma}{1 - \beta} \iota \int_{i_t}^1 x(1 - x) dF_\xi(x) + \frac{\alpha\sigma}{1 - \beta} \int_0^{i_t} x dF_\xi(x). \quad (\text{A64})$$

### A.3.5. Few Pro-Buyer Judges

The optimal contract sets

$$p_B = 0 < p_U \text{ if and only if } \Lambda(p_B) \geq \Lambda(p_U), \quad (\text{A65})$$

namely if and only if

$$\begin{aligned} \left(1 - \iota + \frac{\sigma}{1 - \alpha\beta}\iota\right) \int_{i_t}^1 (1 - x) dF_\xi(x) + \frac{1 - \beta - \sigma}{1 - \beta}\iota \int_{i_t}^1 x(1 - x) dF_\xi(x) \\ \geq \alpha\sigma \left[ \frac{1}{1 - \beta} \int_0^{i_t} x dF_\xi(x) - \frac{1}{1 - \alpha\beta} F_\xi(i_t) \right]. \end{aligned} \quad (\text{A66})$$

The left-hand side of this expression is monotone decreasing in  $i_t$ . The right-hand side is maximized at  $i_t = 1$ , since it is nil at  $i_t = 0$  and has derivative

$$\frac{\partial}{\partial i_t} \left[ \frac{1}{1 - \beta} \int_0^{i_t} x dF_\xi(x) - \frac{1}{1 - \alpha\beta} F_\xi(i_t) \right] = \left[ \frac{1}{1 - \beta} i_t - \frac{1}{1 - \alpha\beta} \right] f_\xi(i_t), \quad (\text{A67})$$

implying a unique minimum at  $i_t = (1 - \beta) / (1 - \alpha\beta)$ . Thus the condition is satisfied for all  $i_t \in [0, 1]$  if and only if it is satisfied at  $i_t = 1$ :

$$0 \geq \alpha\sigma \left( \frac{\mathbb{E}\xi}{1 - \beta} - \frac{1}{1 - \alpha\beta} \right). \quad (\text{A68})$$

Condition (18) is sufficient but not necessary for condition (A68):

$$\beta \leq 1 - \mathbb{E}\xi \leq \frac{1 - \mathbb{E}\xi}{1 - \alpha\mathbb{E}\xi} \Rightarrow p_B = 0 < p_U = p_{LF}. \quad (\text{A69})$$

When condition (A68) holds, the optimal mechanism stipulates that the price is nil ( $p(\dots) = 0$ ) except in the following two cases in which the buyer must pay the seller a positive price  $p_{LF} > 0$ .

1. The judge is unbiased, evidence based on precedent is positive, the buyer does not present novel negative evidence, and the seller presents novel positive evidence ( $p(q_B, q_S; 1, 0, 1; u, \omega) = p(q_B, q_S; 1, 1, 1; u, \omega) = p_{LF}$  for all  $q_B, q_S \in \{0, v\}$  and  $\omega \in \{0, 1\}$ ).
2. The judge is pro-seller, the seller presents novel positive evidence, and either
  - (a) evidence based on precedent is positive ( $p(q_B, q_S; 1, e_B, 1; b_S, \omega) = p_{LF}$  for all  $q_B, q_S \in \{0, v\}$ ,  $e_B \in \{-1, 0, 1\}$  and  $\omega \in \{0, 1\}$ ); or
  - (b) the judge can disregard contractual references to precedent ( $p(q_B, q_S; e_P, e_B, 1; b_S, 1) = p_{LF}$  for all  $q_B, q_S \in \{0, v\}$ ,  $e_P \in \{-1, 1\}$  and  $e_B \in \{-1, 0, 1\}$ ).

Under this optimal mechanism, all the truth-telling constraints we conjectured to be non-binding are slack. Pro-buyer judges attain their bliss point because they never en-

force payment. Thus, litigants are indifferent about their reports to pro-buyer judges. Pro-seller judges have no avenue to increase payment further: they would need to disregard precedent when lacking the ability to do so (because  $p(q_B, q_S; -1, e_B, 1; b_S, 0) = 0$ ) or to fake positive evidence that the seller failed to present (because  $p(q_B, q_S; e_P, e_B, -1; b_S, \omega) = p(q_B, q_S; e_P, e_B, 0; b_S, \omega) = 0$ ), both of which are impossible. The buyer is indifferent about his reports to pro-seller judges, who will completely ignore them, while the seller is happy to report truthfully to a pro-seller judge because their goals coincide.

When the judge is unbiased litigants are incentivized to report truthfully quality  $q_t$  because the optimal mechanism ignores their cheap talk  $q_B, q_S$ . They are incentivized to report truthfully their private signals because they cannot improve their payoffs by hiding them. The buyer may lower payment to zero by presenting  $e_t(i_t^B) = -1$  but can never raise it by presenting  $e_t(i_t^B) = 1$ . The seller may increase it to  $p_{LF} > 0$  by presenting  $e_t(i_t^S) = 1$  but can never lower it by presenting  $e_t(i_t^S) = -1$ .

If misleading evidence  $U_t$  were allowed, this mechanism would not induce collection and revelation of novel informative evidence. On the contrary, the buyer would always collect  $u_t^0$  and the seller would always collect  $u_t^v$ . Hence, the choice to rule out misleading evidence  $U_t$  and thus to avoid the additional truth-telling constraints in equations (19) and (20) is optimal.

The correspondence between the optimal direct revelation mechanism and the intuitive contract in Proposition 2 is straightforward. Under the latter, the buyer hides positive evidence  $e_t(i_t^B) = 1$  to minimize payment and the seller hides negative evidence  $e_t(i_t^S) = -1$  to maximize it. An unbiased judge reports truthfully all evidence presented in court. Thus, he enforces payment if and only if evidence based on precedent is positive ( $e_t(i_t) = 1$ ), the seller presented further positive evidence ( $e_t(i_t^S) = 1$ ), and the buyer failed to present negative evidence ( $e_t(i_t^B) \neq -1$ ). A pro-buyer judge can and does hide any positive evidence presented by the seller and thus succeeds in never enforcing payment. A pro-seller judge can and does hide any negative evidence presented by the buyer. He also disregards negative evidence based on precedent if he has the ability to do so. Thus, he enforces payment whenever the seller presents positive evidence ( $e_t(i_t^S) = 1$ ), unless he is bound to respect contractual references to precedent and the corresponding evidence is negative ( $\omega_t = 0$  and  $e_t(i_t) = -1$ ).

### A.3.6. Many Pro-Buyer Judges

When condition (A68) fails, the optimal mechanism sets  $p_U = 0 < p_B = p_{LF}$  and is characterized as follows.

**Proposition A1** *If there are pro-seller judges with the ability to disregard contractual references to precedent and the share of pro-buyer judges is so high that*

$$\alpha\sigma > 0 \text{ and } \beta > \frac{1 - \mathbb{E}\xi}{1 - \alpha\mathbb{E}\xi}, \quad (\text{A70})$$

*then the optimal laissez-faire contract for partnership  $t$  stipulates that uninformative evidence  $\{u_t^v, u_t^0\}$  is inadmissible, and that the buyer must pay the seller a price  $p_{LF} > 0$  if and only if the court verifies no evidence of low quality (either novel or based upon precedent).*

The price  $p_{LF} > 0$  is enforced in the following cases.

1. The judge is pro-buyer ( $b_t = b_B$ ) and bound to respect contractual references to precedent ( $\omega_t = 0$ ); evidence based on precedent is positive ( $e_t(i_t) = 1$ ); and the buyer does not present negative evidence ( $e_t(i_t^B) \in \{0, 1\}$ ).
2. The judge is unbiased ( $b_t = u$ ), evidence based on precedent is positive ( $e_t(i_t) = 1$ ), and the buyer does not present negative evidence ( $e_t(i_t^B) \in \{0, 1\}$ ).
3. The judge is pro-seller ( $b_t = b_S$ ) and evidence based on precedent is positive ( $e_t(i_t^S) = 1$ ) or can be disregarded ( $\omega_t = 1$ ).

In any other circumstances the enforced payment is nil.

When condition (A68) fails, the optimal mechanism stipulates that the price is nil ( $p(\dots) = 0$ ) except in the following three cases in which the buyer must pay the seller a positive price  $p_{LF} > 0$ .

1. The judge is pro-buyer and bound to respect contractual references to precedent, evidence based on precedent is positive, and the buyer does not present novel negative evidence ( $p(q_B, q_S; 1, 0, e_S; b_B, 0) = p(q_B, q_S; 1, 1, e_S; b_B, 0) = p_{LF}$  for all  $q_B, q_S \in \{0, v\}$  and  $e_S \in \{-1, 0, 1\}$ ).
2. The judge is unbiased, evidence based on precedent is positive, and the buyer does not present novel negative evidence ( $p(q_B, q_S; 1, 0, e_S; u, \omega) = p(q_B, q_S; 1, 1, e_S; u, \omega) = p_{LF}$  for all  $q_B, q_S \in \{0, v\}$ ,  $e_S \in \{-1, 0, 1\}$ , and  $\omega \in \{0, 1\}$ ).
3. The judge is pro-seller and either
  - (a) evidence based on precedent is positive ( $p(q_B, q_S; 1, e_B, e_S; b_S, \omega) = p_{LF}$  for all  $q_B, q_S \in \{0, v\}$ ,  $e_B, e_S \in \{-1, 0, 1\}$  and  $\omega \in \{0, 1\}$ ); or
  - (b) the judge can disregard contractual references to precedent ( $p(q_B, q_S; e_P, e_B, e_S; b_S, 1) = p_{LF}$  for all  $q_B, q_S \in \{0, v\}$ ,  $e_P \in \{-1, 1\}$  and  $e_B, e_S \in \{-1, 0, 1\}$ ).

Under this alternative mechanism, just as under the one described by Proposition 2, all the truth-telling constraints we conjectured to be non-binding are slack. The seller is always indifferent about his reports  $q_S$  and  $e_S$ , which are disregarded. The buyer is similarly indifferent about his cheap talk about quality  $q_B$ .

Pro-buyer judges have no avenue to lower payment further: they would need to disregard precedent when lacking the ability to do so or to fake negative evidence that the buyer failed to present, both of which are impossible. The buyer is happy to report truthfully to a pro-buyer judge because their goals coincide.

Pro-seller judges attain their bliss point if they have the ability to disregard precedent, which enables them to enforce payment in all circumstances. If they lack this ability, they have no way to increase payment when evidence based on precedent is negative. The buyer is indifferent about his report to pro-seller judges, who will completely ignore it.

When the judge is unbiased the buyer is incentivized to report truthfully his private evidence because he cannot improve his payoffs by hiding them. He may lower payment to zero by presenting  $e_t(i_t^B) = -1$  but can never raise it by presenting  $e_t(i_t^B) = 1$ .

If misleading evidence  $U_t$  were allowed, the mechanism described by Proposition A1 would not induce collection and revelation of novel informative evidence. On the contrary, the buyer would always collect  $u_t^0$ . Hence, the choice to rule out misleading evidence  $U_t$  and thus to avoid the additional truth-telling constraints in equations (19) and (20) is optimal.

The correspondence between the optimal direct revelation mechanism and the intuitive contract in Proposition A1 is straightforward. The seller can simply avoid to collect evidence, while the buyer could present all evidence truthfully or indifferently hide positive evidence. Pro-buyer judges can avoid enforcing payment by relying on hard negative evidence provided by the buyer ( $e_t(i_t^B) = -1$ ), on negative evidence based upon precedent ( $e_t(i_t) = -1$ ), or on their ability to disregard contractual references to precedent ( $\omega_t = 1$ ). Pro-seller judges hide negative evidence presented by the seller, but are unable to enforce payment if and only if evidence based on precedent is negative ( $e_t(i_t) = -1$ ) and they are bound to respect it ( $\omega_t = 0$ ).

This alternative contract differs from the one described by Proposition 2 purely in that it disregards positive novel evidence (presented by the seller in equilibrium), so as to force pro-buyer judges to enforce payment under some circumstances, despite their ability to hide such evidence.

#### A.4. Proof of Proposition 3

Due to the binary nature of the optimal mechanism described by Proposition 2, we can define the probability that the incentive payment  $p_{LF}$  is enforced given that  $q_t = v$ ,

$$\eta_{LF}^v(\iota, \beta) = (1 - \beta)\iota. \quad (\text{A71})$$

and the probability that it is enforced when  $q_t = 0$ ,

$$\eta_{LF}^0(i_t, \iota, \beta, \sigma, \alpha) = \iota \left[ (1 - \beta) \int_{i_t}^1 x dF_\xi(x) - (1 - \beta - \sigma)\iota \int_{i_t}^1 x(1 - x) dF_\xi(x) + \alpha\sigma \int_0^{i_t} x dF_\xi(x) \right]. \quad (\text{A72})$$

These probabilities characterize the minimized likelihood ratio

$$\Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) \equiv \frac{\mathbb{E}[p(0, 0; e_P, e_B, e_S; b, \omega) | q_t = 0]}{\mathbb{E}[p(v, v; 1, e_B, e_S; b, \omega) | q_t = v]} = \frac{\eta_{LF}^0(i_t, \iota, \beta, \sigma, \alpha)}{\eta_{LF}^v(\iota, \beta)} \quad (\text{A73})$$

and the solution of the first-stage cost-minimization problem.<sup>22</sup>

Then the seller's incentive-compatibility constraint implies that effort  $a$  is induced at

---

<sup>22</sup>Under the alternative mechanism described by Proposition A1 we would have instead  $\eta_{LF}^v(\beta, \alpha) = (1 - \alpha\beta)$  and  $\eta_{LF}^0(i_t, \iota, \beta, \sigma, \alpha) = (1 - \alpha\beta) \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x) + \sigma\iota \int_{i_t}^1 (1 - x) dF_\xi(x) + \alpha\sigma F_\xi(i_t)$ .



minimum cost by an incentive payment

$$p_{LF}(a; i_t, \iota, \beta, \sigma, \alpha) = \frac{C'(a)}{\eta_{LF}^v(\iota, \beta) - \eta_{LF}^0(i_t, \iota, \beta, \sigma, \alpha)}. \quad (\text{A74})$$

Substituting this solution, the optimal contract induces effort

$$a_{LF} = \arg \max_{a \in [0,1]} \{av - C(a)\} \quad (\text{A75})$$

subject to the buyer's participation constraint

$$\pi_B^{LF}(a, \Lambda_{LF}) \equiv av - \left(a + \frac{\Lambda_{LF}}{1 - \Lambda_{LF}}\right) C'(a) \geq \underline{u}_B. \quad (\text{A76})$$

The buyer's share of joint surplus  $\pi_B^{LF}(a)$  is a concave function:

$$\frac{\partial^2 \pi_B^{LF}}{\partial a^2} = -2C''(a) - \left(a + \frac{\Lambda_{LF}}{1 - \Lambda_{LF}}\right) C'''(a) < 0 \quad (\text{A77})$$

because  $C''(a) > 0$  and  $C'''(a) \geq 0$  for all  $a \in (0, 1)$ . It has limit  $\pi_B^{LF}(0, \Lambda_{LF}) = 0$  and a unique maximum

$$a_B^{LF}(\Lambda_{LF}) \equiv \arg \max_{a \in [0,1]} \pi_B^{LF}(a, \Lambda_{LF}). \quad (\text{A78})$$

For sufficiently high values of  $\Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha)$ , contract enforcement is so poor that  $\pi_B^{LF}$  is maximized at  $a = 0$ :

$$a_B^{LF}(\Lambda_{LF}) = 0 \text{ for all } \Lambda_{LF} \geq \frac{v}{v + C''(0)} \quad (\text{A79})$$

because

$$\frac{\partial \pi_B^{LF}}{\partial a}(0, \Lambda_{LF}) = v - \frac{\Lambda_{LF}}{1 - \Lambda_{LF}} C''(0). \quad (\text{A80})$$

By the envelope theorem,

$$\frac{\partial \pi_B^{LF}}{\partial \Lambda_{LF}}(a_B^{LF}(\Lambda_{LF}), \Lambda_{LF}) = -\frac{C'(a_B^{LF}(\Lambda_{LF}))}{(1 - \Lambda_{LF})^2} < 0 \text{ for all } \Lambda_{LF} < \frac{v}{v + C''(0)}. \quad (\text{A81})$$

In the limit as  $\Lambda_{LF} \rightarrow 0$ , quality becomes perfectly contractible and

$$\lim_{\Lambda_{LF} \rightarrow 0} \pi_B^{LF}(a_B^{LF}(\Lambda_{LF}), \Lambda_{LF}) = \max_{a \in [0,1]} \{a[v - C'(a)]\} \quad (\text{A82})$$

as in Proposition 1. Condition (6) ensures that this is greater than  $\underline{u}_B$ . Therefore, there is a threshold

$$\bar{\Lambda}(\underline{u}_B) \in \left[0, \frac{v}{v + C''(0)}\right] \quad (\text{A83})$$

such that partnership  $t$  is formed under laissez faire if and only if  $\Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) \leq \bar{\Lambda}(\underline{u}_B)$ .

By the implicit function theorem,  $\bar{\Lambda}(\underline{u}_B)$  is decreasing in the buyer's outside option  $\underline{u}_B$ .

If the partnership can be formed, optimal effort is  $a_{LF}(\underline{u}_B, \Lambda_{LF})$  such that

$$\pi_B^{LF}(a_{LF}, \Lambda_{LF}) = \underline{u}_B, \quad (\text{A84})$$

which implies

$$a_B^{LF}(\Lambda_{LF}) \leq a_{LF}(\underline{u}_B, \Lambda_{LF}) < a_{FB} \quad (\text{A85})$$

and

$$\frac{\partial \pi_B^{LF}}{\partial a}(a_{LF}, \Lambda_{LF}) < 0 \text{ for all } \Lambda_{LF} < \bar{\Lambda}(\underline{u}_B). \quad (\text{A86})$$

By the implicit-function theorem  $a_{LF}$  is decreasing in  $\underline{u}_B$  and  $\Lambda_{LF}$ . Welfare is given by joint surplus

$$\Pi_{LF} = a_{LF}v - C(a_{LF}), \quad (\text{A87})$$

which is monotone increasing in  $a_{LF}$  for all  $a_{LF} < a_{FB}$ , namely whenever  $\Lambda_{LF}\underline{u}_B > 0$ .

Under the optimal mechanism described by Proposition 2,

$$\Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) = \int_{i_t}^1 x dF_\xi(x) - \frac{1-\beta-\sigma}{1-\beta} \iota \int_{i_t}^1 x(1-x) dF_\xi(x) + \frac{\alpha\sigma}{1-\beta} \int_0^{i_t} x dF_\xi(x) \quad (\text{A88})$$

such that

$$\frac{\partial \Lambda_{LF}}{\partial i_t} = - \left[ 1 - \frac{1-\beta-\sigma}{1-\beta} \iota (1-i_t) - \frac{\alpha\sigma}{1-\beta} \right] i_t f_\xi(i_t) \leq 0, \quad (\text{A89})$$

$$\frac{\partial \Lambda_{LF}}{\partial \iota} = - \frac{1-\beta-\sigma}{1-\beta} \int_{i_t}^1 x(1-x) dF_\xi(x) \leq 0, \quad (\text{A90})$$

$$\frac{\partial \Lambda_{LF}}{\partial \beta} = \frac{\sigma}{(1-\beta)^2} \left[ \iota \int_{i_t}^1 x(1-x) dF_\xi(x) + \alpha \int_0^{i_t} x dF_\xi(x) \right] \geq 0, \quad (\text{A91})$$

$$\frac{\partial \Lambda_{LF}}{\partial \sigma} = \frac{1}{1-\beta} \left[ \iota \int_{i_t}^1 x(1-x) dF_\xi(x) + \alpha \int_0^{i_t} x dF_\xi(x) \right] \geq 0, \quad (\text{A92})$$

and

$$\frac{\partial \Lambda_{LF}}{\partial \alpha} = \frac{\sigma}{1-\beta} \int_0^{i_t} x dF_\xi(x) \geq 0. \quad (\text{A93})$$

The comparative statics on  $a_{LF}$  and  $\Pi_{LF}$  follow immediately, with opposite signs from those on  $\Lambda_{LF}$ .

Since  $\Lambda_{LF}$  is monotone decreasing in  $i_t$ , ranging from

$$\Lambda_{LF}(0, \iota, \beta, \sigma, \alpha) = \mathbb{E}\xi - \frac{1-\beta-\sigma}{1-\beta} \iota (\mathbb{E}\xi - \mathbb{E}\xi^2) \quad (\text{A94})$$

to

$$\Lambda_{LF}(1, \iota, \beta, \sigma, \alpha) = \frac{\alpha\sigma}{1-\beta} \mathbb{E}\xi, \quad (\text{A95})$$

for any

$$\frac{\alpha\sigma}{1-\beta}\mathbb{E}\xi \leq \bar{\Lambda}(\underline{u}_B) \leq \mathbb{E}\xi - \frac{1-\beta-\sigma}{1-\beta}\iota(\mathbb{E}\xi - \mathbb{E}\xi^2) \quad (\text{A96})$$

we can define a threshold  $i_{LF\sim\emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) \in [0, 1]$  such that

$$\Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) \leq \bar{\Lambda}(\underline{u}_B) \Leftrightarrow i_t \geq i_{LF\sim\emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B). \quad (\text{A97})$$

By the implicit-function theorem,  $\partial\bar{\Lambda}/\partial\underline{u}_B < 0 \Rightarrow \partial i_{LF\sim\emptyset}/\partial\underline{u}_B > 0$ , while for each parameter  $z \in (\iota, \beta, \sigma, \alpha)$  the derivative  $\partial i_{LF\sim\emptyset}/\partial z$  has the same sign as  $\partial\Lambda_{LF}/\partial z$ . We can extend the definition to

$$i_{LF\sim\emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) = 1 \text{ if } \bar{\Lambda}(\underline{u}_B) < \frac{\alpha\sigma}{1-\beta}\mathbb{E}\xi \quad (\text{A98})$$

and

$$i_{LF\sim\emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) = 0 \text{ if } \bar{\Lambda}(\underline{u}_B) > \mathbb{E}\xi - \frac{1-\beta-\sigma}{1-\beta}\iota(\mathbb{E}\xi - \mathbb{E}\xi^2), \quad (\text{A99})$$

and the derivatives are then nil.

Finally, quality is directly contractible if and only if

$$\Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) = 0 \Leftrightarrow i_t = 1 \wedge \alpha\sigma = 0. \quad (\text{A100})$$

By Proposition 1, the first best is then attainable if and only if, furthermore,  $\underline{u}_B = 0$ .

## A.5. Proof of Lemma 1

Since the standard contract cannot rule out uninformative evidence  $U_t$ , the litigants' reports of private signals  $e_B$  and  $e_S$  become mere cheap talk. Formally, the litigants' truth-telling constraints (12) and (13) are replaced by the more restrictive (19) and (20).

Moreover, the judge's type  $\omega_t$  becomes irrelevant because all judges are fully bound by references to precedent made by standard contracts. Thus we can drop  $\omega_t$  from the remainder of the proof, and consider judicial preferences  $b_t \in \{b_B, u, b_S\}$  only.

Litigants facing an unbiased judge can report multidimensional cheap talk  $c_L = (q_L, e_L)$ . For a given value of  $e_t(i_t) = e_P \in \{-1, 1\}$  the litigants' cheap-talk zero-sum game has a unique value  $p(e_P)$ , so there is no loss of generality in making payment independent of cheap talk.

When the judge is biased, he enforces the same price regardless of cheap talk  $q_B, q_S \in \{0, v\}$ :

$$p(q_B, q_S; e_P, e_B, e_S; b) = p(e_P, e_B, e_S; b) \text{ for } b \in \{b_B, b_S\} \quad (\text{A101})$$

for all  $e_P \in \{-1, 1\}$  and  $e_B, e_S \in \{-1, 0, 1\}$ . A biased judge cannot similarly manipulate evidence  $e_B, e_S$ , which is cheap talk for the parties but not for judges. However, since a biased judge's payoffs are antithetical to one litigant's, revelation of this litigant's evidence through a judge with the opposite bias requires a payment independent of the evidence revealed. The payment must also be independent of the evidence presented by the litigant whom the biased judge favors. Otherwise, the favored litigant would always report, and the biased judge verify, the single realization that induces the most favorable outcome.

Thus, contract enforcement can only be conditional on the evidence based on precedent

$e_t(i_t)$  and on the judge's type:

$$p(q_B, q_S; e_P, e_B, e_S; b) = p(e_P; b) \quad (\text{A102})$$

for all  $q_B, q_S \in \{0, v\}$ ,  $e_P \in \{-1, 1\}$ ,  $e_B, e_S \in \{-1, 0, 1\}$ , and  $b \in \{b_B, u, b_S\}$ . The judge's type is independent of quality  $q_t$ , so without loss of generality the optimal mechanism sets a single price  $p(e_P)$  irrespective of judicial preferences.<sup>23</sup>

Whenever  $e_t(i_t) = -1$  precedent suffices to establish incontrovertible evidence of low quality. Thus the non-negativity constraint is binding,

$$p(q_B, q_S; -1, e_B, e_S; b) = 0 \quad (\text{A103})$$

for all  $q_B, q_S \in \{0, v\}$ ,  $e_B, e_S \in \{-1, 0, 1\}$ , and  $b \in \{b_B, u, b_S\}$ .

The optimal standard contract requires payment of a positive price if and only if the evidence based on standardized precedents is positive:

$$p(q_B, q_S; 1, e_B, e_S; b) = p_{SC} > 0 \quad (\text{A104})$$

for all  $q_B, q_S \in \{0, v\}$ ,  $e_B, e_S \in \{-1, 0, 1\}$ , and  $b \in \{b_B, u, b_S\}$ .

## A.6. Proof of Proposition 4

Parties prefer the standard contract to the innovative contract if and only if

$$\begin{aligned} \Lambda_{SC}(i_t) &= 1 - F_\xi(i_t) < \Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) \\ &= \int_{i_t}^1 x dF_\xi(x) - \frac{1 - \beta - \sigma}{1 - \beta} \iota \int_{i_t}^1 x(1 - x) dF_\xi(x) + \frac{\alpha\sigma}{1 - \beta} \int_0^{i_t} x dF_\xi(x), \end{aligned} \quad (\text{A105})$$

namely if and only if

$$\begin{aligned} \Delta(i_t, \iota, \beta, \sigma, \alpha) &\equiv \alpha\sigma \int_0^{i_t} x dF_\xi(x) - (1 - \beta) \int_{i_t}^1 (1 - x) dF_\xi(x) \\ &\quad - (1 - \beta - \sigma) \iota \int_{i_t}^1 x(1 - x) dF_\xi(x) > 0. \end{aligned} \quad (\text{A106})$$

The function  $\Delta$  is increasing in  $i_t$ ,

$$\frac{\partial \Delta}{\partial i_t} = \alpha\sigma i_t f_\xi(i_t) + (1 - \beta)(1 - i_t) f_\xi(i_t) + (1 - \beta - \sigma) \iota i_t (1 - x) f_\xi(i_t) > 0 \quad (\text{A107})$$

and has limit behavior

$$\lim_{i_t \rightarrow 0} \Delta = -(1 - \beta) \int_0^1 (1 - x) dF_\xi(x) - (1 - \beta - \sigma) \iota \int_0^1 x(1 - x) dF_\xi(x) \leq 0 \quad (\text{A108})$$

---

<sup>23</sup>Since all agents are risk neutral, the mechanism could identically involve stochastic prices, randomizing on the basis of the judges' preferences or equivalently of sunspots.

and

$$\lim_{i_t \rightarrow 1} \Delta = \alpha \sigma \int_0^1 x dF_\xi(x) \geq 0. \quad (\text{A109})$$

Thus, the condition can be rewritten

$$i_t > i_{SC \sim LF}(t, \beta, \sigma, \alpha) \quad (\text{A110})$$

for a threshold  $i_{SC \sim LF} \in [0, 1]$  such that

$$\begin{aligned} \alpha \sigma \int_0^{i_{SC \sim LF}} x dF_\xi(x) &= (1 - \beta) \int_{i_{SC \sim LF}}^1 (1 - x) dF_\xi(x) \\ &\quad + (1 - \beta - \sigma) \iota \int_{i_{SC \sim LF}}^1 x(1 - x) dF_\xi(x). \end{aligned} \quad (\text{A111})$$

By the implicit-function theorem,

$$\frac{\partial i_{SC \sim LF}}{\partial \alpha} = -\frac{1}{\partial \Delta / \partial i_t} \sigma \int_0^{i_t} x dF_\xi(x) \leq 0, \quad (\text{A112})$$

$$\frac{\partial i_{SC \sim LF}}{\partial \beta} = -\frac{1}{\partial \Delta / \partial i_t} \int_{i_t}^1 (1 - x)(1 + \iota x) dF_\xi(x) \leq 0, \quad (\text{A113})$$

$$\frac{\partial i_{SC \sim LF}}{\partial \sigma} = -\frac{1}{\partial \Delta / \partial i_t} \left[ \alpha \int_0^{i_t} x dF_\xi(x) + \iota \int_{i_t}^1 x(1 - x) dF_\xi(x) \right] \leq 0 \quad (\text{A114})$$

and

$$\frac{\partial i_{SC \sim LF}}{\partial \iota} = \frac{1}{\partial \Delta / \partial i_t} (1 - \beta - \sigma) \int_{i_t}^1 x(1 - x) dF_\xi(x) \geq 0. \quad (\text{A115})$$

## A.7. Proof of Proposition 5

Recall from Proposition 3 that partnership  $t$  is formed under laissez faire if  $i_t$  is above a threshold  $i_{LF \sim \emptyset}(t, \beta, \sigma, \alpha, \underline{u}_B)$  defined by

$$\Lambda_{LF}(i_{LF \sim \emptyset}(t, \beta, \sigma, \alpha, \underline{u}_B), t, \beta, \sigma, \alpha) = \bar{\Lambda}(\underline{u}_B), \quad (\text{A116})$$

which is increasing in the buyer's reservation value ( $\partial i_{LF \sim \emptyset} / \partial \underline{u}_B \geq 0$ ) and all enforcement frictions ( $\partial i_{LF \sim \emptyset} / \partial \alpha \geq 0$ ,  $\partial i_{LF \sim \emptyset} / \partial \beta \geq 0$ ,  $\partial i_{LF \sim \emptyset} / \partial \sigma \geq 0$ , and  $\partial i_{LF \sim \emptyset} / \partial \iota \leq 0$ ).

Recall from Proposition 4 that partnership  $t$  prefers the standard contract to a laissez-faire contract if  $i_t$  is above a threshold  $i_{SC \sim LF}(t, \beta, \sigma, \alpha)$  defined by

$$\Lambda_{SC}(i_{SC \sim LF}(t, \beta, \sigma, \alpha)) = \Lambda_{LF}(i_{SC \sim LF}(t, \beta, \sigma, \alpha), t, \beta, \sigma, \alpha), \quad (\text{A117})$$

which is independent of the buyer's reservation value and decreasing in all enforcement frictions ( $\partial i_{SC \sim LF} / \partial \alpha \leq 0$ ,  $\partial i_{SC \sim LF} / \partial \beta \leq 0$ ,  $\partial i_{SC \sim LF} / \partial \sigma \leq 0$ , and  $\partial i_{SC \sim LF} / \partial \iota \geq 0$ ).

Partnership  $t$  prefers the standard contract to no contract if  $i_t$  is above the threshold

$$i_{SC \sim \emptyset}(\underline{u}_B) = F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B)) \text{ such that } \Lambda_{SC}(i_{SC \sim \emptyset}(\underline{u}_B)) = \bar{\Lambda}(\underline{u}_B), \quad (\text{A118})$$

which is increasing in the buyer's reservation value ( $\partial \bar{\Lambda} / \partial \underline{u}_B < 0 \Rightarrow \partial i_{LF \sim \emptyset} / \partial \underline{u}_B > 0$ ) and independent of enforcement frictions.

Since  $0 > \partial \Lambda_{LF} / \partial i_t > \partial \Lambda_{SC} / \partial i_t$ , these definitions imply that

$$\begin{aligned} i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) > i_{SC \sim \emptyset}(\underline{u}_B) &\Leftrightarrow \\ \Lambda_{SC}(i_{SC \sim \emptyset}(\underline{u}_B)) = \bar{\Lambda}(\underline{u}_B) = & \\ \Lambda_{LF}(i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B), \iota, \beta, \sigma, \alpha) < \Lambda_{LF}(i_{SC \sim \emptyset}(\underline{u}_B), \iota, \beta, \sigma, \alpha) & \\ \Leftrightarrow i_{SC \sim \emptyset}(\underline{u}_B) > i_{SC \sim LF}(\iota, \beta, \sigma, \alpha). & \quad (\text{A119}) \end{aligned}$$

Therefore, the five-dimensional parameter space consisting of the buyer's reservation value ( $\underline{u}_B$ ) and all enforcement frictions ( $\beta$ ,  $\sigma$ ,  $\alpha$ , and  $1 - \iota$ ) can be partitioned into two regions separated by the four-dimensional plane

$$\begin{aligned} \bar{\Lambda}(\underline{u}_B) = \Lambda_{LF}(F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B)), \iota, \beta, \sigma, \alpha) &\Leftrightarrow \\ i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) = i_{SC \sim \emptyset}(\underline{u}_B) = i_{SC \sim LF}(\iota, \beta, \sigma, \alpha). & \quad (\text{A120}) \end{aligned}$$

Depending on the informativeness of precedent ( $i_t$ ), each of these two subspaces can be further partitioned into three regions.

1. If the buyer's reservation value and enforcement frictions are sufficiently low, then

$$\begin{aligned} \bar{\Lambda}(\underline{u}_B) \geq \Lambda_{LF}(F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B)), \iota, \beta, \sigma, \alpha) &\Leftrightarrow \\ i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) \leq i_{SC \sim \emptyset}(\underline{u}_B) \leq i_{SC \sim LF}(\iota, \beta, \sigma, \alpha). & \quad (\text{A121}) \end{aligned}$$

As the informativeness of precedent varies:

- (a) For  $i_t < i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B)$  partnership  $t$  cannot be formed under either regime.
- (b) For  $i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) \leq i_t \leq i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$  partnership  $t$  is always formed through a laissez-faire contract.
- (c) For  $i_t > i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$  partnership  $t$  is formed under laissez faire, but under standardization it uses the standard contract.

2. If the buyer's reservation value and enforcement frictions are too high, then

$$\begin{aligned} \Lambda_{LF}(F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B)), \iota, \beta, \sigma, \alpha) > \bar{\Lambda}(\underline{u}_B) &\Leftrightarrow \\ i_{SC \sim LF}(\iota, \beta, \sigma, \alpha) < i_{SC \sim \emptyset}(\underline{u}_B) < i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B). & \quad (\text{A122}) \end{aligned}$$

As the informativeness of precedent varies:

- (a) For  $i_t < i_{SC \sim \emptyset}(\underline{u}_B)$  partnership  $t$  cannot be formed under either regime.

- (b) For  $i_{SC \sim \emptyset}(\underline{u}_B) \leq i_t < i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B)$  partnership  $t$  cannot be formed under laissez faire, but it can be formed under standardization.
- (c) For  $i_t \geq i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B)$  partnership  $t$  is formed under laissez faire, but under standardization it uses the standard contract.

The economic situation of partnership  $t$  can be summarized by four cases.

1. Partnership  $t$  cannot be formed either under either laissez faire or standardization if

$$\begin{aligned} \bar{\Lambda}(\underline{u}_B) &< \min \{ \Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha), \Lambda_{SC}(i_t) \} \\ &\Leftrightarrow i_t < \min \{ i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B), i_{SC \sim \emptyset}(\underline{u}_B) \}. \end{aligned} \quad (\text{A123})$$

This region has non-zero measure, because

$$\bar{\Lambda}(\underline{u}_B) \leq \frac{v}{v + C''(0)} < 1 \Rightarrow i_{SC \sim \emptyset}(\underline{u}_B) > 0 \text{ for all } \underline{u}_B \geq 0, \quad (\text{A124})$$

while

$$\begin{aligned} i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) &> 0 \\ &\Leftrightarrow \bar{\Lambda}(\underline{u}_B) < \Lambda_{LF}(0, \iota, \beta, \sigma, \alpha) = \mathbb{E}\xi - \frac{1 - \beta - \sigma}{1 - \beta} \iota (\mathbb{E}\xi - \mathbb{E}\xi^2) \end{aligned} \quad (\text{A125})$$

is satisfied by a non-empty range of reservation values consistent with condition (6):

$$\begin{aligned} \max_{a \in [0,1]} \left\{ av - \left( a + \frac{\Lambda_{LF}(0, \iota, \beta, \sigma, \alpha)}{1 - \Lambda_{LF}(0, \iota, \beta, \sigma, \alpha)} \right) C'(a) \right\} < \\ \underline{u}_B \leq \max_{a \in [0,1]} \{ a [v - C'(a)] \}, \end{aligned} \quad (\text{A126})$$

which is non-empty even in the absence of enforcement frictions ( $\Lambda_{LF}(0, 1, 0, 0, 0) = \mathbb{E}\xi^2 \geq 0$ ) and expands as enforcement frictions increase (up to  $\Lambda_{LF}(0, 0, 0, 1, 1) = \mathbb{E}\xi$ ).

2. Partnership  $t$  is formed through a laissez-faire contract both under laissez faire and standardization if

$$\begin{aligned} \Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) &\leq \min \{ \bar{\Lambda}(\underline{u}_B), \Lambda_{SC}(i_t) \} \\ &\Leftrightarrow i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) \leq i_t \leq i_{SC \sim LF}(\iota, \beta, \sigma, \alpha), \end{aligned} \quad (\text{A127})$$

which requires sufficiently low reservation value ( $\underline{u}_B$ ) and enforcement frictions ( $\beta$ ,  $\sigma$ ,  $\alpha$ , and  $1 - \iota$ ).

In the limit as enforcement frictions disappear

$$\Lambda_{LF}(i_t, 1, 0, 0, 0) = \int_{i_t}^1 x^2 dF_\xi(x) \leq \Lambda_{SC}(i_t) = 1 - F_\xi(i_t), \quad (\text{A128})$$

with strict inequality if  $i_t < 1$ . If furthermore the buyer's reservation value is nil

$$\Lambda_{LF}(i_t, 1, 0, 0, 0) = \int_{i_t}^1 x^2 dF_\xi(x) \leq \bar{\Lambda}(0) = \frac{v}{v + C''(0)} \quad (\text{A129})$$

for a non-empty range of values  $i_t < 1$ . By continuity, the conditions are satisfied for  $\beta \simeq 0$ ,  $\sigma \simeq 0$ ,  $\alpha \simeq 0$ ,  $\iota \simeq 1$  and  $\underline{u}_B \simeq 0$  in a region with non-zero measure.

3. Partnership  $t$  is formed under laissez faire but under standardization it uses the standard contract if

$$\begin{aligned} \Lambda_{SC}(i_t) &< \Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) \leq \bar{\Lambda}(\underline{u}_B) \\ &\Leftrightarrow i_t \geq \max\{i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B), i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)\}. \end{aligned} \quad (\text{A130})$$

For all  $\alpha\sigma > 0$ , in the limit as precedent becomes perfectly informative

$$\Lambda_{SC}(1) = 0 < \Lambda_{LF}(1, \iota, \beta, \sigma, \alpha) = \frac{\alpha\sigma}{1 - \beta} \mathbb{E}\xi. \quad (\text{A131})$$

Moreover

$$\begin{aligned} i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) &< 1 \\ &\Leftrightarrow \Lambda_{LF}(1, \iota, \beta, \sigma, \alpha) = \frac{\alpha\sigma}{1 - \beta} \int_0^{i_t} x dF_\xi(x) < \bar{\Lambda}(\underline{u}_B) \leq \frac{v}{v + C''(0)} \end{aligned} \quad (\text{A132})$$

for a non-empty range of values  $\alpha\sigma > 0$  and  $\underline{u}_B \simeq 0$ . By continuity, the conditions are satisfied for  $\underline{u}_B \simeq 0$  and  $i_t \simeq 1$  in a region with non-zero measure.

4. Partnership  $t$  cannot be formed under laissez faire but it can be formed under standardization if

$$\begin{aligned} \Lambda_{SC}(i_t) &\leq \bar{\Lambda}(\underline{u}_B) < \Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha) \\ &\Leftrightarrow i_{SC \sim \emptyset}(\underline{u}_B) \leq i_t < i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B), \end{aligned} \quad (\text{A133})$$

which requires sufficiently high reservation value ( $\underline{u}_B$ ) and enforcement frictions ( $\beta$ ,  $\sigma$ ,  $\alpha$ , and  $1 - \iota$ ).

In the limit as enforcement frictions reach their maximum,

$$\Lambda_{LF}(i_t, 0, 0, 1, 1) = \mathbb{E}\xi \text{ for all } i_t, \quad (\text{A134})$$

so the condition reduces to

$$\begin{aligned} \max_{a \in [0,1]} \left\{ av - \left( a + \frac{\mathbb{E}\xi}{1 - \mathbb{E}\xi} \right) C'(a) \right\} &< \\ \underline{u}_B &\leq \max_{a \in [0,1]} \left\{ av - \left( a + \frac{1 - F_\xi(i_t)}{F_\xi(i_t)} \right) C'(a) \right\}, \end{aligned} \quad (\text{A135})$$



which is satisfied by a non-empty range of reservation values provided that  $i_t > F_\xi^{-1}(1 - \mathbb{E}\xi)$ . By continuity, the conditions are satisfied for  $\iota \simeq 0$ ,  $\beta \simeq 0$ ,  $\sigma \simeq 1$  and  $\alpha \simeq 1$  in a region with non-zero measure.

## A.8. Proof of Proposition 6

Recall that the judge may write four different decisions when the optimal laissez-faire contract from Proposition 2 is litigated.

1. The seller wins the case because he presented positive evidence ( $e_t(i_t^S) = 1$ ), while no negative evidence was verified.
2. The buyer wins the case because evidence based on precedent is negative ( $e_t(i_t) = -1$ ).
3. The buyer wins the case because he presented negative evidence ( $e_t(i_t^B) = -1$ ).
4. The buyer wins the case because the seller failed to present positive evidence.

If evidence based on precedent suffices to settle the case, it is summarily decided without considering novel evidence. Moreover, judges prefer citing novel evidence than grounding their ruling on the insufficiency of available evidence. Given these assumptions, the conditions under which each decision is written are the following:

1. The seller presents positive evidence ( $e_t(i_t^S) = 1$ ) and one of two additional contingencies is realized.
  - (a) The judge is unbiased ( $b_t = u$ ) and neither precedent nor the buyer produce negative evidence ( $e_t(i_t) = 1$  and  $e_t(i_t^B) \in \{0, 1\}$ ).
  - (b) The judge has a pro-seller bias ( $b_t = b_S$ ) and evidence based on precedent is positive ( $e_t(i_t) = 1$ ) or can be disregarded ( $\omega_t = 1$ ).
2. Evidence based on precedent is negative ( $e_t(i_t) = -1$ ), unless the seller presents positive evidence ( $e_t(i_t^S) = 1$ ) and the judge has a pro-seller bias and the ability to disregard precedent ( $b_t = b_S$  and  $\omega_t = 1$ ).
3. The buyer presents negative evidence ( $e_t(i_t^B) = -1$ ), evidence based on precedent is positive ( $e_t(i_t) = 1$ ), and the judge does not have a pro-seller bias ( $b_t \in \{b_B, u\}$ ).
4. One of three residual cases is realized.
  - (a) The judge is pro-buyer ( $b_t = b_B$ ) and neither precedent nor the buyer produce negative evidence ( $e_t(i_t) = 1$  and  $e_t(i_t^B) \in \{0, 1\}$ ).
  - (b) The judge is unbiased ( $b_t = u$ ), the seller fails to present positive evidence ( $e_t(i_t^S) \in \{-1, 0\}$ ), and neither precedent nor the buyer produce negative evidence ( $e_t(i_t) = 1$  and  $e_t(i_t^B) \in \{0, 1\}$ ).
  - (c) The judge is pro-seller ( $b_t = b_S$ ), the seller fails to present positive evidence ( $e_t(i_t^S) \in \{-1, 0\}$ ), and evidence based on precedent is positive ( $e_t(i_t) = 1$ ).

Precedent does not evolve ( $P_{t+1} = P_t$ ) when decision 2 or 4 is made. When decision 1 is made precedent evolves ( $P_{t+1} = P_t \cup \{i_t^S\}$ ) but its informativeness increases only if the seller's novel evidence happens to be more informative than existing precedents ( $i_{t+1} = i_t^S > i_t$ ), while it is unchanged otherwise ( $i_{t+1} = i_t \geq i_t^S$ ). When decision 3 is made precedent evolves ( $P_{t+1} = P_t \cup \{i_t^B\}$ ) and its informativeness certainly increases ( $i_{t+1} = i_t^B > i_t$ ).

Suppose that given the current state of precedent  $i_t$  partnership  $t$  is formed with a laissez-faire contract that induces optimal effort

$$a_t = a_{LF}(\underline{u}_B, \Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha)) > 0. \quad (\text{A136})$$

Then the probability that the informativeness of precedent remains unchanged is

$$\begin{aligned} \Pr(i_{t+1} = i_t | i_t) &= (1 - \beta - \sigma) \iota i_t \left[ a_t + (1 - a_t) \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x) \right] \\ &\quad + \sigma \iota \left( a_t i_t + (1 - a_t) \left\{ i_t [1 - F_\xi(i_t)] + \alpha \int_0^{i_t} x dF_\xi(x) \right\} \right) \\ &\quad + (1 - a_t) F_\xi(i_t) - \alpha \iota \sigma (1 - a_t) \int_0^{i_t} x dF_\xi(x) \\ &\quad + \beta \left[ a_t + (1 - a_t) \int_{i_t}^1 (1 - \iota + \iota x) dF_\xi(x) \right] \\ &\quad + (1 - \beta - \sigma) \left\{ a_t (1 - \iota) + (1 - a_t) \int_{i_t}^1 [1 - \iota + \iota^2 x (1 - x)] dF_\xi(x) \right\} \\ &\quad + \sigma \left[ a_t (1 - \iota) + (1 - a_t) \int_{i_t}^1 (1 - \iota x) dF_\xi(x) \right], \quad (\text{A137}) \end{aligned}$$

where the first two lines corresponds to each subcase of decision 1 with  $i_t^S \leq i_t$ , the third to decision 2, and the last three to each sub-case of decision 4. Simplifying,

$$\begin{aligned} \Pr(i_{t+1} = i_t | i_t) &= 1 - a_t (1 - \beta) \iota (1 - i_t) \\ &\quad - (1 - a_t) \iota \int_{i_t}^1 \{(1 - \sigma)(1 - x) + [\sigma + (1 - \beta - \sigma)(1 - \iota + \iota x)](x - i_t)\} dF_\xi(x). \quad (\text{A138}) \end{aligned}$$

This rewriting is intuitive because it highlights the cases in which the informativeness of precedent improves ( $i_{t+1} > i_t$ ). If quality is high (with probability  $a_t$ ), a valuable new precedent is created if the seller's search is successful (with probability  $\iota$ ), his evidence happens to be more informative than the best existing precedent (with probability  $1 - i_t$ ), and the judge is willing to verify it because he doesn't have a pro-buyer bias (with probability  $1 - \beta$ ). If quality is low (with probability  $1 - a_t$ ), a valuable new precedent can be created only if evidence based on precedent is positive ( $\xi_t > i_t$ ).<sup>24</sup> Then, one possibility is that the buyer finds negative evidence (with probability  $\iota(1 - \xi_t)$ ), and the judge is willing to verify

<sup>24</sup>If instead a pro-seller judge disregards a negative precedent to rule in the seller's favor, he creates a new precedent by reporting positive evidence presented by the seller, but this evidence is certainly less informative than the disregarded precedent:  $e_t(i_t) = -1 < e_t(i_t^S) = 1 \Rightarrow i_t^S < \xi_t \leq i_t$ .

it because he doesn't have a pro-seller bias (with probability  $1 - \sigma$ ). The opposite possibility is that the seller finds evidence that is positive and yet more informative than precedents ( $i_t < i_t^S < \xi_t$ , with probability  $\iota(\xi_t - i_t)$ ). A pro-seller judge always reports it to rule in the seller's favor (with probability  $\sigma$ ). An unbiased judge (who decides the case with probability  $1 - \beta - \sigma$ ) does the same if and only if the buyer does not simultaneously report negative evidence (with probability  $1 - \iota + \iota\xi_t$ ).<sup>25</sup>

The informativeness of precedent improves when decision 3 is made, and also when decision 1 is made and the seller's novel evidence happens to be more informative than existing precedents ( $i_{t+1} = i_t^S > i_t$ ). For every value  $j \in [i_t, 1]$ , the probability that the new precedent is more informative equals

$$\begin{aligned} \Pr(i_{t+1} > j | i_t) &= (1 - \beta - \sigma) \iota \left[ a_t(1 - j) + (1 - a_t) \int_j^1 (1 - \iota + \iota x) (x - j) dF_\xi(x) \right] \\ &\quad + \sigma \iota \left[ a_t(1 - j) + (1 - a_t) \int_j^1 (x - j) dF_\xi(x) \right] \\ &\quad + (1 - \sigma) \iota (1 - a_t) \left[ \int_{i_t}^j (1 - j) dF_\xi(x) + \int_j^1 (1 - x) dF_\xi(x) \right], \quad (\text{A139}) \end{aligned}$$

where the first two lines corresponds to each subcase of decision 1 with  $i_t^S > j$ , and the last one to decision 3. Simplifying,

$$\begin{aligned} \Pr(i_{t+1} > j | i_t) &= a_t(1 - \beta) \iota(1 - j) \\ &\quad + (1 - a_t) \iota \int_j^1 [\sigma + (1 - \beta - \sigma)(1 - \iota + \iota x)] (x - j) dF_\xi(x) \\ &\quad + (1 - a_t) \iota (1 - \sigma) \left\{ (1 - j) [F_\xi(j) - F_\xi(i_t)] + \int_j^1 (1 - x) dF_\xi(x) \right\}. \quad (\text{A140}) \end{aligned}$$

In this intuitive rewriting, the first line describes the probability that precedent improves above informativeness  $j$  when quality is high (with probability  $a_t$ ). The seller's search must be successful (with probability  $\iota$ ), his evidence must happen to be more informative than  $j$  (with probability  $1 - j$ ), and the judge must be willing to verify it because he doesn't have a pro-buyer bias (with probability  $1 - \beta$ ). The second line represents the same decision in the seller's favor when quality is actually low (with probability  $1 - a_t$ ). Then evidence based on precedent must be positive ( $\xi_t > i_t$ ). The seller's search must be successful (with probability  $\iota$ ) and it must yield evidence that is positive and yet more informative than  $j$  ( $j < i_t^S < \xi_t$ , with probability  $\xi_t - j$ ). Moreover, either the judge must have a pro-seller bias (with probability  $\sigma$ ), or else he must be unbiased (with probability  $1 - \beta - \sigma$ ) and have observed no negative evidence produced by buyer. The latter condition obtains when the buyer's search fails or when it uncovers positive evidence (with probability  $1 - \iota + \iota\xi_t$ ).

<sup>25</sup>If an unbiased judge reports the buyer's negative evidence, he may also report the seller's positive evidence, but the latter is not only irrelevant for the outcome of the case but also necessarily less informative:  $e_t(i_t^B) = -1 < e_t(i_t^S) = 1 \Rightarrow i_t^S < \xi_t \leq i_t^B$ .

Given any starting point  $i_0 \geq i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B)$  consistent with partnership formation, the informativeness of precedent  $i_t$  evolves as a time-homogeneous Markov chain with transition kernel

$$P(i, dj) = p(i, j) dj + r(i) 1_i(dj), \quad (\text{A141})$$

where  $1_i$  denotes the indicator function  $1_i(dj) = 1$  if  $i \in dj$  and 0 otherwise;

$$r(i) = 1 - (1 - \beta) \iota (1 - i) a_{LF}(\underline{u}_B, \Lambda_{LF}(i, \iota, \beta, \sigma, \alpha)) - \iota [1 - a_{LF}(\underline{u}_B, \Lambda_{LF}(i, \iota, \beta, \sigma, \alpha))] \cdot \int_i^1 \{(1 - \sigma)(1 - x) + [\sigma + (1 - \beta - \sigma)(1 - \iota + \iota x)](x - i)\} dF_\xi(x) \quad (\text{A142})$$

describes the discrete probability of a transition from  $i_t = i$  to  $i_{t+1} = i$ ; and finally

$$p(i, j) = 0 \text{ for all } j \in [0, i] \quad (\text{A143})$$

and

$$p(i, j) = (1 - \beta) \iota a_{LF}(\underline{u}_B, \Lambda_{LF}(i, \iota, \beta, \sigma, \alpha)) + \iota [1 - a_{LF}(\underline{u}_B, \Lambda_{LF}(i, \iota, \beta, \sigma, \alpha))] \cdot \left\{ \int_j^1 [\sigma + (1 - \beta - \sigma)(1 - \iota + \iota x)] dF_\xi(x) + (1 - \sigma) [F_\xi(j) - F_\xi(i)] \right\} \quad (\text{A144})$$

for all  $j \in (i, 1]$  jointly describe the continuous probability density of a transition from  $i_t = i$  to  $i_{t+1} = j$ , which is positive if and only if  $j > i$ .

It follows that state  $j$  is accessible from state  $i$  if and only if  $j \geq 1$ . The state  $i = 1$  is absorbing because it is impossible to leave:  $r(1) = 1$  and  $p(1, j) = 0$  for all  $j \in [0, 1]$ . The absorbing state is immediately accessible from any other state, so the Markov chain is absorbing.

The Markov chain can start from any  $i_0 \geq 0$  if  $i_{LF \sim \emptyset}(\iota, \beta, \sigma, \alpha, \underline{u}_B) = 0$ . Equation (22) follows immediately from the definition of  $i_{LF \sim \emptyset}$ .

## A.9. Proof of Proposition 7

The first part of the proposition follows immediately from Propositions 4 and 6. The standard contract is preferred if and only if  $i_t \geq i_{SC \sim LF}(\iota, \beta, \sigma, \alpha) > 0$ . The evolution of precedent is ever improving:  $i_{t+1} \geq i_t$ . Initially, for  $i_0 = 0$  and any subsequent  $i_t \leq i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$ , partnership  $t$  is formed with a laissez-faire contract irrespective of the availability of a standard contract. As soon as the Markov chain reaches for the first time a value  $i_t \geq i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$ , parties switch to the standard contract. Since no new evidence is verified under the optimal standard contract, the evolution of precedent stops.

The joint surplus of partnership  $t$  is

$$\Pi_t = \Pi(\underline{u}_B, \Lambda_t) \equiv va(\underline{u}_B, \Lambda_t) - C(a(\underline{u}_B, \Lambda_t)) \quad (\text{A145})$$

where

$$a(\underline{u}_B, \Lambda_t) = \arg \max_{a \in [0,1]} \{av - C(a)\} \text{ s.t. } av - \left(a + \frac{\Lambda_t}{1 - \Lambda_t}\right) C'(a) \geq \underline{u}_B \quad (\text{A146})$$

and

$$\Lambda_t = \max \{\Lambda_{SC}(i_t), \Lambda_{LF}(i_t, \iota, \beta, \sigma, \alpha)\}. \quad (\text{A147})$$

By Proposition 3,  $\Pi$  is a continuous and monotone strictly decreasing function of  $\Lambda_t \in [0, \bar{\Lambda}(\underline{u}_B)]$ .

For  $i_t = 1$ , the likelihood ratio of the two contracts is

$$\Lambda_{SC}(1) = 0 < \Lambda_{LF}(1, \iota, \beta, \sigma, \alpha) = \frac{\alpha\sigma}{1 - \beta} \mathbb{E}\xi \text{ for all } \alpha\sigma > 0 \quad (\text{A148})$$

Then, given  $i_t = 1$  social welfare under laissez faire is

$$W_{LF}(\underline{u}_B, 1, \iota, \beta, \sigma, \alpha) = \frac{1}{1 - \delta} \Pi\left(\underline{u}_B, \frac{\alpha\sigma}{1 - \beta} \mathbb{E}\xi\right) \quad (\text{A149})$$

while under standardization it is

$$W_{SC}(\underline{u}_B, 1) = \frac{1}{1 - \delta} \Pi(\underline{u}_B, 0) > W_{LF}(\underline{u}_B, 1, \iota, \beta, \sigma, \alpha). \quad (\text{A150})$$

By continuity, for  $i_t = 1 - \varepsilon$  the likelihood ratios are

$$\Lambda_{SC}(1 - \varepsilon) = o(\varepsilon) \text{ and } \Lambda_{LF}(1 - \varepsilon, \iota, \beta, \sigma, \alpha) = \frac{\alpha\sigma}{1 - \beta} \mathbb{E}\xi + o(\varepsilon) \quad (\text{A151})$$

and joint profits are respectively

$$\Pi(\underline{u}_B, \Lambda_{SC}(1 - \varepsilon)) = \Pi(\underline{u}_B, 0) - o(\varepsilon). \quad (\text{A152})$$

and

$$\Pi(\underline{u}_B, \Lambda_{LF}(1 - \varepsilon, \iota, \beta, \sigma, \alpha)) = \Pi\left(\underline{u}_B, \frac{\alpha\sigma}{1 - \beta} \mathbb{E}\xi\right) - o(\varepsilon). \quad (\text{A153})$$

Social welfare under standardization is

$$W_{SC}(\underline{u}_B, 1 - \varepsilon) = \frac{1}{1 - \delta} \Pi(\underline{u}_B, \Lambda_{SC}(1 - \varepsilon)) = \frac{1}{1 - \delta} \Pi(\underline{u}_B, 0) - o(\varepsilon), \quad (\text{A154})$$

while social welfare under laissez faire is

$$\begin{aligned}
W_{LF}(\underline{u}_B, 1 - \varepsilon, \iota, \beta, \sigma, \alpha) &= \\
&\Pi(\underline{u}_B, \Lambda_{LF}(1 - \varepsilon, \iota, \beta, \sigma, \alpha)) + \sum_{s=1}^{\infty} \delta^s \mathbb{E}[\Pi(\underline{u}_B, \Lambda_{LF}(i_{t+s}, \iota, \beta, \sigma, \alpha)) | i_t = 1 - \varepsilon] \\
&< \Pi(\underline{u}_B, \Lambda_{LF}(1 - \varepsilon, \iota, \beta, \sigma, \alpha)) + \frac{\delta}{1 - \delta} \Pi(\underline{u}_B, \Lambda_{LF}(1, \iota, \beta, \sigma, \alpha)) \\
&= \frac{1}{1 - \delta} \Pi\left(\underline{u}_B, \frac{\alpha\sigma}{1 - \beta} \mathbb{E}\xi\right) - o(\varepsilon), \quad (\text{A155})
\end{aligned}$$

considering that the best case is a jump to the absorbing state  $i_{t+1} = 1$ . Thus,

$$\begin{aligned}
W_{SC}(\underline{u}_B, 1 - \varepsilon) &= \frac{1}{1 - \delta} \Pi(\underline{u}_B, 0) - o(\varepsilon) \\
&> \frac{1}{1 - \delta} \Pi\left(\underline{u}_B, \frac{\alpha\sigma}{1 - \beta} \mathbb{E}\xi\right) - o(\varepsilon) > W_{LF}(\underline{u}_B, 1 - \varepsilon, \iota, \beta, \sigma, \alpha) \quad (\text{A156})
\end{aligned}$$

for strictly positive values of  $\varepsilon$ . As a consequence, there is a non-empty left neighborhood of 1, which we can call  $(i^*, 1)$  for  $i^* < 1$ , such that standardization is welfare-increasing for  $i_t \in (i^*, 1]$ .

For  $i_t = i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$ , by definition the likelihood ratio of the two contracts is identical:

$$\Lambda_{SC}(i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)) = \Lambda_{LF}(i_{SC \sim LF}(\iota, \beta, \sigma, \alpha), \iota, \beta, \sigma, \alpha) \equiv \Lambda_{SC \sim LF}. \quad (\text{A157})$$

Thus joint surplus for partnership  $t$  is identical under the two contracts. Then social welfare under laissez faire is

$$\begin{aligned}
W_{LF}(\underline{u}_B, i_{SC \sim LF}(\iota, \beta, \sigma, \alpha), \iota, \beta, \sigma, \alpha) &= \\
&\Pi(\underline{u}_B, \Lambda_{SC \sim LF}) + \sum_{s=1}^{\infty} \delta^s \mathbb{E}[\Pi(\underline{u}_B, \Lambda_{LF}(i_{t+s}, \iota, \beta, \sigma, \alpha)) | i_t = i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)] \\
&> \frac{1}{1 - \delta} \Pi(\underline{u}_B, \Lambda_{SC \sim LF}) \quad (\text{A158})
\end{aligned}$$

since there is strictly positive probability that the transient state  $i_t = i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$  will be abandoned.

If parties adopted the standard for  $i_t = i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$ , when they are indifferent between using it or writing an open ended contract, social welfare under standardization would be

$$\begin{aligned}
W_{SC}(\underline{u}_B, i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)) &= \frac{1}{1 - \delta} \Pi(\underline{u}_B, \Lambda_{SC \sim LF}) \\
&< W_{LF}(\underline{u}_B, i_{SC \sim LF}(\iota, \beta, \sigma, \alpha), \iota, \beta, \sigma, \alpha). \quad (\text{A159})
\end{aligned}$$

By continuity, if  $i_t = i_{SC \sim LF}(\iota, \beta, \sigma, \alpha) + \varepsilon$  the likelihood ratios are

$$\Lambda_{SC}(i_{SC \sim LF} + \varepsilon) = \Lambda_{SC \sim LF} - o(\varepsilon) \quad (\text{A160})$$

and

$$\Lambda_{LF}(i_{SC \sim LF} + \varepsilon, \iota, \beta, \sigma, \alpha) = \Lambda_{SC \sim LF} - o(\varepsilon), \quad (\text{A161})$$

such that

$$W_{LF}(\underline{u}_B, i_{SC \sim LF} + \varepsilon, \iota, \beta, \sigma, \alpha) > \frac{1}{1 - \delta} \Pi(\underline{u}_B, \Lambda_{SC \sim LF}) + o(\varepsilon) \quad (\text{A162})$$

and

$$W_{SC}(\underline{u}_B, i_{SC \sim LF} + \varepsilon) = \frac{1}{1 - \delta} \Pi(\underline{u}_B, \Lambda_{SC \sim LF}) + o(\varepsilon). \quad (\text{A163})$$

Thus for sufficiently small  $\varepsilon > 0$  the adoption of the standard contract is welfare reducing; but

$$\Lambda_{SC}(i_{SC \sim LF} + \varepsilon) < \Lambda_{LF}(i_{SC \sim LF} + \varepsilon, \iota, \beta, \sigma, \alpha) \text{ for all } \varepsilon > 0, \quad (\text{A164})$$

so the standard is adopted by parties if it is available. Thus, there is a non-empty right neighborhood of  $i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$ ,  $(i_{SC \sim LF}(\iota, \beta, \sigma, \alpha), i^*)$ , such that for  $i_t \in (i_{SC \sim LF}, i^*)$  standardization is welfare-reducing.

If a standard is introduced while  $i_t \in [0, i_{SC \sim LF}]$ , it is adopted as soon as  $i_{t+s} > i_{SC \sim LF}(\iota, \beta, \sigma, \alpha)$ . By Proposition 6, there is strictly positive probability that the first such jump leads to a state  $i_{t+s} \in (i_{SC \sim LF}, i^*)$  such that standardization is welfare-reducing. If instead the jump leads to a state in  $i_{t+s} \in (i^*, 1]$  the standard can be introduced before partnership  $t + s$  is formed. Thus, standardization when  $i_t \in [0, i_{SC \sim LF}]$  is also welfare-reducing.

## A.10. Proof of Proposition 8

### A.10.1. Laissez Faire

There are partnerships that are willing to form under a laissez-faire contract if and only if

$$i_t \geq i_{LF \sim \emptyset}(1, \beta, \sigma, \alpha, \underline{u}_B) \Leftrightarrow \Lambda_{LF}(i_t, 1, \beta, \sigma, \alpha) \leq \bar{\Lambda}(\underline{u}_B), \quad (\text{A165})$$

where

$$\begin{aligned} i_{LF \sim \emptyset}(1, \beta, \sigma, \alpha, \underline{u}_B) &= 0 \\ &\Leftrightarrow \Lambda_{LF}(0, 1, \beta, \sigma, \alpha) \equiv \frac{\sigma}{1 - \beta} \mathbb{E}\xi + \left(1 - \frac{\sigma}{1 - \beta}\right) \mathbb{E}\xi^2 \leq \bar{\Lambda}(\underline{u}_B). \end{aligned} \quad (\text{A166})$$

All partnerships are willing to form under a laissez-faire contract if and only if

$$i_t \geq i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B) \Leftrightarrow \Lambda_{LF}(i_t, 0, \beta, \sigma, \alpha) \leq \bar{\Lambda}(\underline{u}_B), \quad (\text{A167})$$

where

$$i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B) > 0 \Leftrightarrow \bar{\Lambda}(\underline{u}_B) < \Lambda_{LF}(0, 0, \beta, \sigma, \alpha) \equiv \mathbb{E}\xi \quad (\text{A168})$$

and

$$i_{LF\sim\emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B) < 1 \Leftrightarrow \bar{\Lambda}(\underline{u}_B) > \Lambda_{LF}(1, 0, \beta, \sigma, \alpha) \equiv \frac{\alpha\sigma}{1-\beta}\mathbb{E}\xi, \quad (\text{A169})$$

which is weaker than condition (A166) and necessary for contracting ever to exist under laissez-faire.

Suppose that  $\beta + \sigma < 1$  and that condition (A166) holds. Then for all  $i_t \in [0, i_{LF\sim\emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B)]$  there is a threshold

$$\iota_{LF\sim\emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha) \equiv \frac{(1-\beta) \left[ \int_{i_t}^1 x dF_\xi(x) - \bar{\Lambda}(\underline{u}_B) \right] + \alpha\sigma \int_0^{i_t} x dF_\xi(x)}{(1-\beta-\sigma) \int_{i_t}^1 x(1-x) dF_\xi(x)} \in [0, 1] \quad (\text{A170})$$

such that partnership  $t$  is formed if and only if  $\iota_t \in [\iota_{LF\sim\emptyset}, 1]$ . From the comparative statics derived in Proposition 3 it follows that  $\partial \iota_{LF\sim\emptyset} / \partial \underline{u}_B > 0$ ,  $\partial \iota_{LF\sim\emptyset} / \partial i_t < 0$ ,  $\partial \iota_{LF\sim\emptyset} / \partial \beta \geq 0$ ,  $\partial \iota_{LF\sim\emptyset} / \partial \sigma > 0$ , and  $\partial \iota_{LF\sim\emptyset} / \partial \alpha \geq 0$ . We extend the definition to  $\iota_{LF\sim\emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha) = 0$  for all  $i_t \geq i_{LF\sim\emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B)$ .

In period  $t$ , if the parties draw an ability to collect novel evidence  $\iota_t < \iota_{LF\sim\emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha)$  the partnership is not formed. If  $\iota_t \geq \iota_{LF\sim\emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha)$  the partnership is formed and the seller exerts effort

$$a_t = a_{LF}(\underline{u}_B, \Lambda_{LF}(i_t, \iota_t, \beta, \sigma, \alpha)) > 0. \quad (\text{A171})$$

Considering that  $\iota_t$  is a random draw from the distribution  $F_\iota(\cdot)$ , the evolution of precedent is described by

$$\begin{aligned} \Pr(i_{t+1} > j | i_t) &= (1-\beta)\iota(1-j) \int_{\iota_{LF\sim\emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha)}^1 a_{LF}(\underline{u}_B, \Lambda_{LF}(i_t, h, \beta, \sigma, \alpha)) dF_\iota(h) \\ &+ \iota \left\{ \int_j^1 [\sigma + (1-\beta-\sigma)(1-\iota+\iota x)](x-j) dF_\xi(x) + (1-\sigma) \int_{i_t}^1 (1-\max\{j, x\}) dF_\xi(x) \right\} \\ &\cdot \int_{\iota_{LF\sim\emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha)}^1 [1 - a_{LF}(\underline{u}_B, \Lambda_{LF}(i_t, h, \beta, \sigma, \alpha))] dF_\iota(h) \text{ for all } j \in [i_t, 1]. \quad (\text{A172}) \end{aligned}$$

Thus, it is represented by an absorbing Markov chain with the same qualitative properties described by Proposition 6.

### A.10.2. Standardization

There are partnerships that prefer a standard contract to a laissez-faire contract if and only if

$$i_t > i_{SC\sim LF}(0, \beta, \sigma, \alpha) > 0 \Leftrightarrow \Lambda_{SC}(i_t) < \Lambda_{LF}(i_t, 0, \beta, \sigma, \alpha), \quad (\text{A173})$$

where  $\Lambda_{SC}(0) \equiv 1 > \Lambda_{LF}(0, 0, \beta, \sigma, \alpha) \equiv \mathbb{E}\xi$  implies that  $i_{SC\sim LF}(0, \beta, \sigma, \alpha) > 0$ .

All partnerships prefer a standard contract to a laissez-faire contract if and only if

$$i_{SC\sim LF}(1, \beta, \sigma, \alpha) < i_t \leq 1 \Leftrightarrow \Lambda_{SC}(i_t) < \Lambda_{LF}(i_t, 1, \beta, \sigma, \alpha), \quad (\text{A174})$$

where  $\Lambda_{SC}(1) \equiv 0 < \Lambda_{LF}(1, 1, \beta, \sigma, \alpha) \equiv [\alpha\sigma / (1-\beta)] \mathbb{E}\xi$  implies  $i_{SC\sim LF}(1, \beta, \sigma, \alpha) < 1$  for



all  $\alpha\sigma > 0$ .

If  $\beta + \sigma < 1$ , for all  $i_t \in [i_{SC \sim LF}(0, \beta, \sigma, \alpha), i_{SC \sim LF}(1, \beta, \sigma, \alpha)]$  there is a threshold

$$\iota_{SC \sim LF}(i_t, \beta, \sigma, \alpha) \equiv \frac{\alpha\sigma \int_0^{i_t} x dF_\xi(x) - (1 - \beta) \int_{i_t}^1 (1 - x) dF_\xi(x)}{(1 - \beta - \sigma) \int_{i_t}^1 x(1 - x) dF_\xi(x)} \in [0, 1] \quad (\text{A175})$$

such that partnership  $t$  prefers the standard contract to a laissez-faire contract if and only if  $\iota_t \in [0, \iota_{SC \sim LF}(i_t, \beta, \sigma, \alpha)]$ . Its comparative statics are  $\partial \iota_{SC \sim LF} / \partial i_t > 0$ ,  $\partial \iota_{SC \sim LF} / \partial \beta > 0$ ,  $\partial \iota_{SC \sim LF} / \partial \sigma > 0$ , and  $\partial \iota_{SC \sim LF} / \partial \alpha \geq 0$ . We extend the definition to  $\iota_{SC \sim LF}(i_t, \beta, \sigma, \alpha) = 0$  for all  $i_t \leq i_{SC \sim LF}(0, \beta, \sigma, \alpha)$  and  $\iota_{SC \sim LF}(i_t, \beta, \sigma, \alpha) = 1$  for all  $i_t \geq i_{SC \sim LF}(1, \beta, \sigma, \alpha)$ .

Recall that each and every partnership is willing to form under a standard contract if and only if

$$i_t \geq i_{SC \sim \emptyset}(\underline{u}_B) \equiv F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B)) \Leftrightarrow \Lambda_{SC}(i_t) \equiv 1 - F_\xi(i_t) \leq \bar{\Lambda}(\underline{u}_B). \quad (\text{A176})$$

The thresholds for contracting under laissez faire, for forming a partnership with a standard contract, and for switching from a laissez-faire to a standard contract are linked by

$$i_t \geq i_{SC \sim \emptyset}(\underline{u}_B) \Leftrightarrow \iota_{LF \sim \emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha) \leq \iota_{SC \sim LF}(i_t, \beta, \sigma, \alpha). \quad (\text{A177})$$

Outside of this region ( $i_t < i_{SC \sim \emptyset}(\underline{u}_B)$ ) a standard contract is not used even if it is available. In this region, the availability of a standard contract has two effects.

1. It crowds out some laissez-faire contracts for all

$$\begin{aligned} i_t > i_{SC \sim \emptyset}(\underline{u}_B) &\Leftrightarrow \Lambda_{SC}(i_t) < \bar{\Lambda}(\underline{u}_B) \\ &\Leftrightarrow \iota_{LF \sim \emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha) < \iota_{SC \sim LF}(i_t, \beta, \sigma, \alpha). \end{aligned} \quad (\text{A178})$$

It crowds out all laissez-faire contracts and stops the evolution of precedent if and only if

$$\begin{aligned} i_t \geq i_{SC \sim LF}(1, \beta, \sigma, \alpha) &\Leftrightarrow \Lambda_{SC}(i_t) \leq \Lambda_{LF}(i_t, 1, \beta, \sigma, \alpha) \\ &\Leftrightarrow \iota_{SC \sim LF}(i_t, \beta, \sigma, \alpha) = 1 \end{aligned} \quad (\text{A179})$$

There is a non-empty range of values  $i_t \in [i_{SC \sim \emptyset}(\underline{u}_B), i_{SC \sim LF}(1, \beta, \sigma, \alpha)]$  for which the standard and laissez-faire contracts coexist if and only if the buyer's reservation value  $\underline{u}_B$  and adjudication frictions  $\beta$ ,  $\sigma$ , and  $\alpha$  are low enough that

$$\begin{aligned} \bar{\Lambda}(\underline{u}_B) > \Lambda_{LF}(F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B)), 1, \beta, \sigma, \alpha) &\Leftrightarrow \\ i_{LF \sim \emptyset}(1, \beta, \sigma, \alpha, \underline{u}_B) < i_{SC \sim \emptyset}(\underline{u}_B) < i_{SC \sim LF}(1, \beta, \sigma, \alpha), \end{aligned} \quad (\text{A180})$$

which is implied by condition (A166) because  $\Lambda_{LF}(i_t, 1, \beta, \sigma, \alpha)$  is decreasing in  $i_t$ .

2. It expands the static volume of contracting if and only if

$$i_t < i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B) \Leftrightarrow \Lambda_{LF}(i_t, 0, \beta, \sigma, \alpha) > \bar{\Lambda}(\underline{u}_B) \\ \Leftrightarrow \iota_{LF \sim \emptyset}(\underline{u}_B, i_t, \beta, \sigma, \alpha) > 0. \quad (\text{A181})$$

This occurs for a non-empty range of values  $i_t \in [i_{SC \sim \emptyset}(\underline{u}_B), i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B)]$  if and only if the buyer's reservation value  $\underline{u}_B$  and adjudication frictions  $\beta$ ,  $\sigma$ , and  $\alpha$  are high enough that

$$\Lambda_{LF}(F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B)), 0, \beta, \sigma, \alpha) \equiv \\ \int_{F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B))}^1 x dF_\xi(x) + \frac{\alpha\sigma}{1 - \beta} \int_0^{F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B))} x dF_\xi(x) > \bar{\Lambda}(\underline{u}_B) \\ \Leftrightarrow i_{SC \sim LF}(0, \beta, \sigma, \alpha) < i_{SC \sim \emptyset}(\underline{u}_B) < i_{LF \sim \emptyset}(0, \beta, \sigma, \alpha, \underline{u}_B). \quad (\text{A182})$$

Conditions (A166) and (A182) can be rewritten respectively

$$\frac{\sigma}{1 - \beta} \leq \frac{\bar{\Lambda}(\underline{u}_B) - \mathbb{E}\xi^2}{\mathbb{E}\xi - \mathbb{E}\xi^2} \quad (\text{A183})$$

and

$$\frac{\alpha\sigma}{1 - \beta} > \frac{\bar{\Lambda}(\underline{u}_B) - \int_{F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B))}^1 x dF_\xi(x)}{\mathbb{E}\xi - \int_{F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B))}^1 x dF_\xi(x)}. \quad (\text{A184})$$

Using the definition of  $i_{SC \sim \emptyset}(\underline{u}_B) \equiv F_\xi^{-1}(1 - \bar{\Lambda}(\underline{u}_B)) \Leftrightarrow \bar{\Lambda}(\underline{u}_B) \equiv 1 - F_\xi(i_{SC \sim \emptyset}(\underline{u}_B))$ , we can write these jointly as

$$\frac{1 - F_\xi(i_{SC \sim \emptyset}(\underline{u}_B)) - \int_{i_{SC \sim \emptyset}(\underline{u}_B)}^1 x dF_\xi(x)}{\mathbb{E}\xi - \int_{i_{SC \sim \emptyset}(\underline{u}_B)}^1 x dF_\xi(x)} < \frac{\alpha\sigma}{1 - \beta} \\ \leq \frac{\sigma}{1 - \beta} \leq \frac{1 - F_\xi(i_{SC \sim \emptyset}(\underline{u}_B)) - \mathbb{E}\xi^2}{\mathbb{E}\xi - \mathbb{E}\xi^2}. \quad (\text{A185})$$

These conditions define a non-empty range for  $\sigma/(1 - \beta)$ , given a large enough  $\alpha$ , if and only if

$$\left[ \int_{i_{SC \sim \emptyset}(\underline{u}_B)}^1 x dF_\xi(x) - \mathbb{E}\xi^2 \right] [1 - F_\xi(i_{SC \sim \emptyset}(\underline{u}_B)) - \mathbb{E}\xi] < 0. \quad (\text{A186})$$

E.g., if  $\xi_t \sim U[0, 1]$  then conditions (A166) and (A182) simplify to

$$\left[ \frac{1 - i_{SC \sim \emptyset}(\underline{u}_B)}{i_{SC \sim \emptyset}(\underline{u}_B)} \right]^2 < \frac{\alpha\sigma}{1 - \beta} \leq \frac{\sigma}{1 - \beta} \leq 2[2 - 3i_{SC \sim \emptyset}(\underline{u}_B)], \quad (\text{A187})$$

and the range is non-empty if and only if

$$\frac{1}{2} < i_{SC \sim \emptyset}(\underline{u}_B) < \frac{\sqrt{3}}{3}. \quad (\text{A188})$$

## References

- [1] Ahdieh, Robert B. 2006. “The Strategy of Boilerplate.” *Michigan Law Review* 104(5): 1033–1074.
- [2] Allen, Carleton K. 1927. *Law in the Making*. Oxford: Clarendon Press.
- [3] Anderlini, Luca, Leonardo Felli, and Alessandro Riboni. 2013. “Why Stare Decisis?” Mimeo, Ecole Polytechnique.
- [4] Beck, Thorsten, and Ross Levine. 2005. “Legal Institutions and Financial Development.” In *Handbook for New Institutional Economics*, ed. Claude Menard and Mary M. Shirley. Dordrecht: Springer.
- [5] Bernstein, Lisa .2001. “Private Commercial Law in the Cotton Industry: Creating Cooperation Through Rules, Norms, and Institutions.” *Michigan Law Review* 99(7): 1724–1790.
- [6] Calabresi, Guido. 1982. *A Common Law for the Age of Statutes*. Cambridge, Mass.: Harvard University Press.
- [7] Cardozo, Benjamin N. 1921. *The Nature of the Judicial Process*. New Haven, Conn.: Yale University Press.
- [8] Cohen, Felix S. 1935. “Transcendental Nonsense and the Functional Approach.” *Columbia Law Review* 35(6): 809–849.
- [9] Derrett, J. Duncan M. 1968. *Religion, Law, and the State in India*. London: Faber and Faber.
- [10] Diamond, Aubrey L. 1968. “Codification of the Law of Contract.” *The Modern Law Review* 31(4): 361–385.
- [11] Dias, Reginald W. M. 1985. *Jurisprudence*. London: Butterworths.
- [12] Fernandez, Patricio A., and Giacomo A. M. Ponzetto. 2012. “Stare Decisis: Rhetoric and Substance.” *Journal of Law, Economics, and Organization* 28 (2): 313–336.
- [13] Frank, Jerome. 1930. *Law and the Modern Mind*. New York: Brentano’s.
- [14] ———. 1949. *Courts on Trial*. Princeton, N.J.: Princeton University Press.
- [15] Garner, Bryan A., ed. 2009. *Black’s Law Dictionary*. 9th edition. St. Paul, Minn.: Thomson West.
- [16] Gennaioli, Nicola. 2013. “Optimal Contracts with Enforcement Risk.” *Journal of the European Economic Association* 11(1): 59–82.
- [17] Gennaioli, Nicola, and Andrei Shleifer. 2007. “The Evolution of Common Law.” *Journal of Political Economy* 115: 43–68.

- [18] Glaeser, Edward L., Jose A. Scheinkman, and Andrei Shleifer. 2003. "The Injustice of Inequality." *Journal of Monetary Economics* 50(1): 199–222.
- [19] Glaeser, Edward L., and Andrei Shleifer. 2003. "The Rise of the Regulatory State." *Journal of Economic Literature* 41(2): 401–425.
- [20] Gutteridge, Harold C. 1935. "Contract and Commercial Law." *Law Quarterly Review* 51: 91–141.
- [21] Hadfield, Gillian K. 2011. "The Dynamic Quality of Law: The Role of Judicial Incentives and Legal Human Capital in the Adaptation of Law." *Journal of Economic Behavior and Organization* 79(1–2): 80–94.
- [22] Hayek, Friedrich A. 1960. *The Constitution of Liberty*. Chicago, Ill.: The University of Chicago Press.
- [23] Horwitz, Morton J. 1977. *The Transformation of American Law, 1780-1860*. Cambridge, Mass.: Harvard University Press.
- [24] Ilbert, Courtenay. 1920. "Unification of Commercial Law." *Journal of Comparative Legislation and International Law, Third Series* 2(1): 77–80.
- [25] Kahan, Marcel, and Michael Klausner. 1997. "Standardization and Innovation in Corporate Contracting (or 'The Economics of Boilerplate')." *Virginia Law Review* 83(4): 713–770.
- [26] LaPorta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2008. "The Economic Consequences of Legal Origins." *Journal of Economic Literature* 46(2): 285–332.
- [27] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1998. "Law and Finance." *Journal of Political Economy* 106(6): 1113–1155.
- [28] Llewellyn, Karl N. 1930. *The Bramble Bush: On Our Law and its Study*. New York: Oceana Publications.
- [29] ———. 1960. *The Common Law Tradition: Deciding Appeals*. Boston, Mass.: Little, Brown & Co.
- [30] Montrose, James L. 1957. "The *Ratio Decidendi* of a Case." *The Modern Law Review* 20(6): 587–595.
- [31] Niblett, Anthony. 2013a. "Tracking Inconsistent Judicial Behavior." *International Review of Law and Economics* 34(1): 9–20.
- [32] ———. 2013b. "Case-by-Case Adjudication and the Path of the Law." *Journal of Legal Studies* 42(2): 303–330.
- [33] Niblett, Anthony, Richard Posner, and Andrei Shleifer. 2010. "The Evolution of a Legal Rule." *Journal of Legal Studies* 39(2): 325–358.

- [34] Ponzetto, Giacomo A. M., and Patricio A. Fernandez. 2008. “Case law versus Statute Law: An Evolutionary Comparison.” *Journal of Legal Studies* 37(2): 379–430.
- [35] Posner, Richard A. [1973] 2010. *The Economic Analysis of Law*. [1st edition, 1973] 8th edition. New York: Aspen Publishers.
- [36] ———. 1990. *The Problems of Jurisprudence*. Cambridge, Mass.: Harvard University Press.
- [37] ———. 2005. “Judicial Behavior and Performance: an Economic Approach.” *Florida State University Law Review* 32: 1259–1279.
- [38] Priest, George L. 1977. “The Common Law Process and the Selection of Efficient Rules.” *Journal of Legal Studies* 6(1): 65–82.
- [39] Radin, Max. 1933. “Case Law and Stare Decisis: Concerning *Präjudizienrecht in Amerika*.” *Columbia Law Review* 33(2): 199–212.
- [40] Rubin, Paul H. 1977. “Why is the Common Law Efficient?” *Journal of Legal Studies* 6(1): 51–63.
- [41] Stone, Julius. 1946. *The Province and Function of Law*. Sydney: Associated General Publications.
- . 1964. *Legal Systems and Lawyers’ Reasonings*. Stanford, Calif.: Stanford University Press.
- [42] Varian, Hal R., Joseph Farrell, and Carl Shapiro. 2004. *The Economics of Information Technology: An Introduction*. Cambridge: Cambridge University Press.