

Contract Remedies for New-Economy Collaborations

Alan Schwartz* & Simone M. Sepe**

Productive activity that once took place within a single firm now occurs when two or more firms collaborate to form an “alliance.” The agreements that govern alliances are not typical contracts containing prices and quantities. Rather, they are “framework agreements” that regulate process and specify the parties’ tasks—e.g., conduct R&D; explore marketing opportunities; exchange proprietary knowledge; create a dispute-resolution structure; and develop a plan for a successful result.

The COVID-19 vaccines provide an example: alliance partners reciprocally exploited their flexibility and comparative advantages to create the vaccines. The COVID-19 collaborations, however, were unusual because there was both an assured demand for—and great reputational gains from—delivering the product, and public pressure to finish promptly deterred strategic behavior. In the usual case, it is difficult to induce potential parties to commit to a collaboration, to stay with it when doubts about success arise, and to exploit a successful result efficiently. Collaboration breakups at the startup and implementation stages are common. Yet, disappointed parties seldom sue.

This Article makes two principal contributions. Our first contribution is to show that lawsuits do not occur for new collaboration breakups because current contract law provides no remedies for a party disappointed by a counterparty’s defection. Our second contribution is to develop remedies that would encourage private parties to enter into and to stay with potentially productive collaborations. Thus, our goal is to extend contract law to a significant part of the economy whose deals today the law does not support.

| | |
|---|-----|
| INTRODUCTION | 751 |
| A. Traditional-Economy Transactions | 753 |
| B. New-Economy Collaborations | 754 |

* Sterling Professor of Law and Professor of Management, Yale Law School.

** Professor of Law and Finance, University of Arizona James E. Rogers College of Law, Université Toulouse 1 Capitole and Toulouse School of Economics. We are grateful for suggestions we received at the Relational Contracts Conference, Chicago Law School (2021), a Yale Law School faculty workshop and law and economics workshops at Arizona and Texas law schools, and the 2022 Annual Society of Institutional and Organization Economics Conference in Toronto. Jim Klick, Daniel Markovits, Florencia Marotta-Wurgler, Saura Masconale, Scott Masten, Kish Parella, Robert E. Scott, and Melody Wang also made helpful comments.

| | | |
|------|--|-----|
| C. | Remedies | 755 |
| 1. | <i>Traditional Remedies for Traditional-Economy Transactions</i> | 755 |
| 2. | <i>Traditional Remedies for New-Economy Collaborations</i> | 757 |
| 3. | <i>New Remedies for New-Economy Collaborations</i> | 759 |
| D. | Clarifications and a Roadmap | 761 |
| I. | A DESCRIPTION OF NEW-ECONOMY COLLABORATIONS | 764 |
| A. | Introducing New-Economy Collaborations | 765 |
| B. | How New-Economy Transactions Function | 768 |
| 1. | <i>Relational Contracting</i> | 768 |
| 2. | <i>Sustaining Cooperation</i> | 769 |
| 3. | <i>Managerial Provisions</i> | 770 |
| C. | Causes of Defection | 771 |
| D. | Remedies and Stages of Production..... | 772 |
| 1. | <i>The Participation Problem</i> | 773 |
| 2. | <i>The Interaction Problem</i> | 774 |
| 3. | <i>The Updating Problem</i> | 776 |
| 4. | <i>The Allocation Problem</i> | 777 |
| II. | TRADITIONAL REMEDIES FOR TRADITIONAL TRANSACTIONS.. | 777 |
| A. | An Overview | 777 |
| B. | The Market Context | 779 |
| C. | The Specialized-Goods Case..... | 781 |
| D. | Supplemental Remedies | 785 |
| 1. | <i>Reliance</i> | 785 |
| 2. | <i>Liquidated Damages</i> | 787 |
| III. | TRADITIONAL ENFORCEMENT OF TRADITIONAL TRANSACTIONS | 788 |
| IV. | NEW REMEDIES FOR NEW-ECONOMY COLLABORATIONS | 789 |
| A. | Encouraging Participation..... | 790 |
| 1. | <i>Reliance at the Pivot Stage</i> | 792 |
| 2. | <i>Allocative and Distributive Effects</i> | 793 |
| B. | Encouraging Efficient Continuance | 795 |
| 1. | <i>Defection</i> | 795 |
| 2. | <i>Noncooperation</i> | 802 |
| C. | Encouraging Performance | 805 |
| D. | Defaults, Addressees, and Procedure | 806 |
| | CONCLUSION..... | 808 |

Introduction

When the need for a COVID-19 vaccine became urgent, the federal government entrusted to private firms the tasks of developing and producing one.¹ The result was a set of successful vaccines, each identified by company names: Pfizer, Moderna, and Johnson & Johnson. The vaccines, however, were the product of multi-firm collaborations. As examples:

Johnson & Johnson has a deal with Merck & Co. to help make its single-dose vaccine and is seeking additional partnerships to ramp up supply. Moderna inked deals with Catalent Inc. and Baxter International Inc. to fill vaccine vials. Novartis AG has agreed to put Pfizer's shot into vials and formulate the mRNA that's necessary to make CureVac NV's Covid-19 vaccine candidate.²

A knowledgeable commentator observed: “companies have proactively been seeking to increase their own manufacturing capabilities as well as collaborate with other manufacturers who shared available capacity to support efforts to increase production.”³ Thus,

Sanofi in 2021, will provide support to manufacture two COVID-19 vaccines in order to help address global needs . . . BioNTech's COVID-19 vaccine (co-developed with Pfizer) will be manufactured at Sanofi's production facilities in Frankfurt Germany; Janssen's (J&J) COVID-19 vaccine will be manufactured at Sanofi's vaccine facility in Marcy l'Etoile, France.⁴

That multi-firm collaborations produced the vaccines is unsurprising; drug creation today often is a joint project. The vaccine collaborations, however, were unusual in three respects: the assurance of a market for the final product regardless of its price; the huge reputational boost to successful creators; and the almost daily public pressure to overcome—or, more accurately, to put aside—concerns about the allocation of intellectual

1. See Richard G. Frank, Leslie Dach & Nicole Lurie, *It Was the Government that Produced COVID-19 Vaccine Success*, HEALTH AFFAIRS (May 14, 2021), <https://www.healthaffairs.org/doi/10.1377/forefront.20210512.191448/full/> [<https://perma.cc/F774-92KN>] (describing contracts between the federal government and vaccine companies to test and manufacture millions of vaccine doses).

2. Ian Lopez, *Covid-19 Vaccine Deal-Making Is Fleeting Game Changer for Pharma*, BLOOMBERG LAW (Mar. 29, 2021, 4:30 AM), https://www.bloomberglaw.com/bloomberglawnews/health-law-and-business/X931MDUG000000?bna_news_filter=health-law-and-business [<https://perma.cc/5RPJ-AJ6L>].

3. Richard Moscicki, *How Industry Collaboration and Partnerships Are Supporting COVID-19 Vaccine Manufacturing*, PHARM. RSCH. & MFRS. OF AM. (Mar. 4, 2021), <https://catalyst.phrma.org/how-industry-collaboration-and-partnerships-are-supporting-covid-19-vaccine-manufacturing> [<https://perma.cc/FQ52-FC2L>] (Mar. 4, 2021).

4. *Id.* See also Editorial, *COVID-19 Validates Science–Industry Collaboration*, 594 NATURE 302, 302 (2021) (identifying collaborations between academia and industry in developing and delivering COVID-19 vaccines).

property the collaborating firms developed, and the temptation to behave strategically in favor of getting on with it. Our next case reflects a more typical scenario.

In 1997, Eli Lilly & Company (Eli Lilly, or Lilly) and Emisphere Technologies, Inc. signed the first of two Research Collaboration and Option Agreements (the RCOA).⁵ The parties' goal was to eliminate the need for injections by developing a pill to transport medicine into a patient's bloodstream before the patient's digestive system broke the pill's components down.⁶ Though Eli Lilly was a manufacturer, it brought marketing expertise to the collaboration; Emisphere brought technical expertise. The parties agreed to share information,⁷ to work together through the anticipated multi-year project, and to use a dispute-resolution system that required senior management of both companies to resolve difficulties jointly.⁸ The arrangement focused on a particular compound—parathyroid hormone (PTH)—as an initial vehicle.⁹ If the collaboration was successful, Eli Lilly would market a pill using PTH. Otherwise, Lilly had no right “to use the Emisphere Technology or Emisphere Program Technology other than insofar as they relate directly to the Field [i.e., the project] and are expressly granted herein.”¹⁰ After several years, the arrangement broke down before the parties developed a pill to deliver PTH. The court agreed with Emisphere's argument “that Lilly breached the final sentence in [the] provision [limiting Lilly's rights] . . . by carrying out secret, independent research projects using Emisphere's carriers with proteins other than PTH.”¹¹

The *Eli Lilly*¹² collaboration is paradigmatic in two respects. The collaboration's governing document—the RCOA—was not a contract in the usual sense. It did not set a price for the services each party was to provide to the venture, it did not set a price for a developed pill, and it did not have a marketing plan. Rather, the RCOA *created a structure* to govern the parties' collaboration. Further, the parties' dispute-resolution process required the parties to negotiate but did not specify the consequences of negotiation failure. The case, however, is unusual because it was in court at all. The only other reported case we found for a fallout that occurred at the production

5. *Eli Lilly & Co. v. Emisphere Techs., Inc.*, 408 F. Supp. 2d 668, 673 (S.D. Ind. 2006).

6. *Id.* at 671.

7. The RCOA stated that “[e]ach Party agrees to disclose Confidential information of another Party only to those employees, representatives and agents requiring knowledge . . . directly related to the fulfilling of the Party's obligations under this Agreement.” *Id.* at 674 (quoting the RCOA).

8. *Id.* at 673, 679.

9. *Id.* at 671.

10. *Id.* at 674 (quoting § 2.1 of the related License Agreement between the parties).

11. *Id.* Eli Lilly filed a patent on the product it secretly developed partly using Emisphere's information. *Id.* at 677.

12. *Eli Lilly & Co. v. Emisphere Techs., Inc.*, 408 F. Supp. 2d 668 (S.D. Ind. 2006).

stage¹³ was similar: a party attempted to exploit its counterparty's intellectual property.¹⁴

The Indiana district court in *Eli Lilly* applied the New York rules on contract interpretation to find that Lilly was in breach, but the court did not award Emisphere a contract remedy.¹⁵ This was because an agreement such as the RCOA could not create an expectation that a contract remedy could protect. Parties breach RCOA-type agreements at a collaboration's initial exploratory stage as well, by shirking a party's exploratory task or not reporting the results accurately, but contract law again is unavailing. As one of us has reported, "[t]he case data . . . show that, absent misrepresentation or deceit, there generally is no liability for inducing reliance investments during the negotiation process."¹⁶

Many thousands of multi-firm ventures attempt to develop new products or platforms and many of these fail, yet the case reports are almost silent. Few cases exist because contract law does not offer solutions to the problems of opportunism, exploitation, and differences of belief regarding project success that attend joint-development arrangements. As a result, an important segment of the U.S. economy functions today without a contract law. The justification for a state-supplied contract law, however, is that the law enables parties to make transactions that the parties would otherwise forgo. Collaborations performed well in the extraordinary circumstance of the COVID-19 pandemic. But an implication of contract law's absence is that the American economy underproduces productive collaborations in ordinary times. It is this possibility that poses the two tasks we address in this Article: to explain why today's contract law offers courts no tools for facilitating the new collaborations, and to begin to create a contract law for the facilitation of those collaborations. In pursuing these tasks, it is helpful to start by comparing the new collaborations to more traditional transactions.

A. *Traditional-Economy Transactions*

During the nineteenth and much of the twentieth century, parties primarily traded commodities and finished goods. We focus on goods, which

13. As we shall explain below, the new collaborations take place in stages: the pivot (or initial) stage, the middle (or implementation) stage, and the execution (or production) stage. *See infra* subpart I(D).

14. *See* *Medinol Ltd. v. Bos. Sci. Corp.*, 346 F. Supp. 2d 575, 589–90 (S.D.N.Y. 2004) (concerning a plaintiff claiming the defendant engaged in “a systematic project to copy and steal” the plaintiff's technology as part of a “broader conspiracy” to either buy out or “get rid of” the plaintiff (internal quotation marks omitted)).

15. *Eli Lilly*, 408 F. Supp. 2d at 680, 696–97.

16. Alan Schwartz & Robert E. Scott, *Precontractual Liability and Preliminary Agreements*, 120 HARV. L. REV. 661, 672 (2007).

had two defining features: (a) the goods left the seller in their finished state; and (b) the goods were standard rather than made-to-order.¹⁷ The contracts under which parties traded these goods also had two defining features: (a) the contracts were simple, containing a price, quantity, description of what the parties were trading, and sometimes a warranty; and (b) the transactions could be concluded in a single stage—the seller tendered and the buyer accepted. Later in the twentieth century, sellers began to make goods to suit particular buyers' needs, but again the buyers did not participate in production. The contracts that governed trade of these specialized products were also simple. A contract would describe the functions the specialized goods were supposed to perform, set a performance schedule, and, sometimes, specify a remedy for the seller's breach. We denote the trade of standard and specialized goods, together with the contracts that governed the goods' trade, the "traditional economy."

Common law courts in England and the United States developed the contract law that regulates traditional-economy transactions. The two Restatements of Contracts and the Uniform Commercial Code left the common law of contract largely intact, except for material changes in the interpretation rules and slight expansions in a court's ability to order specific performance and award consequential damages. Apart from these additions, the legal infrastructure for the traditional economy is judge-made.¹⁸

B. *New-Economy Collaborations*

Though traditional-economy transactions continue, many procurement transactions differ materially from the older deals. As the *Eli Lilly* case illustrated,¹⁹ defining features of the new collaborations include: (a) parties jointly produce complex products or platforms; (b) parties tailor these products or platforms to the buyer's particular needs; (c) production occurs in years-long stages, from conception of the deal to final assembly and marketing; and (d) parties create and commonly exchange proprietary information during a project's implementation stage.

17. From 1914 to 1925, every Ford Model T automobile was manufactured in a single color: black. See *The Model T*, FORD, <https://corporate.ford.com/articles/history/the-model-t.html> [<https://perma.cc/6FPT-DNAM>]. For a readable account of America's primarily trading economy in the first half of the nineteenth century, see generally T.J. STILES, *THE FIRST TYCOON: THE EPIC LIFE OF CORNELIUS VANDERBILT* (2009).

18. See Alan Schwartz & Robert E. Scott, *The Common Law of Contract and the Default Rule Project*, 102 VA. L. REV. 1523, 1540 (2016) ("American default rules originating in the English common law courts include the rules of offer and acceptance, conditions, impossibility, expectation damages, foreseeability, and indefiniteness." (footnotes omitted)).

19. See *supra* notes 5–12 and accompanying text.

The agreements under which parties produce new goods also differ materially from traditional-economy contracts. Parties conduct deals today under agreements that are not contracts as the Restatements define contracts;²⁰ rather, they are “framework agreements” that describe the cooperative behavior in which parties agree to engage. Many of the tasks that a framework agreement assigns to a party—e.g., exploring marketing opportunities—are not observable by the other party, but the task structure itself has a public component. For example, a framework agreement would not require a party to execute a particular task optimally when the counterparty could not observe how the party performed the task, but the agreement will require the party to report a task result. Reports are observable. In consequence of the exploratory nature of the parties’ project, framework agreements also do not set prices or specify quantities at early stages. This is because parties cannot precisely predict the cost and value of what they may ultimately produce. Finally, parties intend their framework agreements to be “self-enforcing”—that is, each party expects the other to comply independently of the state’s power to enforce. These commercial arrangements, together with the framework agreements that govern them, constitute what we call “new-economy collaborations.”²¹

C. Remedies

1. *Traditional Remedies for Traditional-Economy Transactions.*—In the traditional economy, breach usually consists of the seller not delivering goods or the buyer wrongfully rejecting them.²² The principal contract law response to breach is to protect the promisee’s expectation interest.²³ The

20. See RESTATEMENT (SECOND) CONTRACTS § 1 (AM. L. INST. 1981) (stating that “[a] contract is a promise . . . for the breach of which the law gives a remedy”).

21. See discussion *infra* Part I (containing an extensive description of new-economy collaborations).

22. This is not exactly accurate. The usual sales contract in the traditional economy is best interpreted as giving a party the option either to tender (the seller) or to accept (the buyer), or to compensate the counterparty for not tendering or accepting. See Daniel Markovits & Alan Schwartz, *The Myth of Efficient Breach: New Defenses of the Expectation Interest*, 97 VA. L. REV. 1939, 1948 (2011) (describing the “alternative obligations” imposed on a seller in a typical contract). Hence, breach is a failure to tender or to deliver *and* to not compensate. For convenience, we sometimes refer to a party only not tendering or accepting as “breaching.”

23. The Restatement (Second) of Contracts reads:

Ordinarily, when a court concludes that there has been a breach of contract, it enforces the broken promise by protecting the expectation that the injured party had when he made the contract. It does this by attempting to put him in as good a position as he would have been in had the contract been performed, that is, had there been no breach. The interest protected in this way is called the “expectation interest.”

RESTATEMENT (SECOND) OF CONTRACTS § 344 cmt. a (AM. L. INST. 1981).

expectation remedy facilitates exchange efficiency in two ways.²⁴ First, the remedy replicates the efficient transaction. The disappointed promisee-buyer receives a sum equal to the value the promisee-buyer expected to derive from the trade, or the disappointed promisee-seller receives a sum equal to the profit the promisee-seller expected to make. The expectation remedy thus puts the promisee in the same position financially that it would have occupied had the promisor performed.²⁵ Second, the expectation remedy permits parties to reallocate their resources efficiently when a deal turns out to be inefficient to conclude. A promisor thus may trade with a higher-valuing buyer on paying the promisee its expectation, thereby making the promisor better off without making the promisee worse off.

In practice, however, the expectation remedy facilitates exchange efficiency only when a court can observe the parameters on which the remedy conditions: price, cost, quantity, and value. For example, a court cannot award a disappointed seller its profit unless the court can observe the contract price and the seller's production cost. Prices are convenient for courts to observe; cost and value are sometimes not. The expectation remedy therefore facilitates exchange efficiency best in developed markets in which goods trade at their market prices.²⁶ Contract law also protects investment efficiency in developed markets because the disappointed promisee can resell to or repurchase from another market participant. Because the market provides parties with satisfactory substitutes for failed deals, the contract seller will invest to minimize its costs and the contract buyer will invest to maximize its value.²⁷

24. Exchange efficiency is satisfied when goods transfer from a party who valued them less (e.g., seller) to a party who would value them more (e.g., buyer) or, in situations with multiple interested parties, to the party with the highest valuation. See ANDREU MAS-COLELL, MICHAEL D. WHINSTON & JERRY R. GREEN, *MICROECONOMIC THEORY* 865–66 (1995) (providing an example of exchange efficiency in the context of sealed-bid auctions).

25. See RESTATEMENT (SECOND) OF CONTRACTS § 344(a) (AM. L. INST. 1981) (a promisee's expectation interest "is his interest in having the benefit of his bargain by being put in as good a position as he would have been in had the contract been performed"); U.C.C. § 1-106(1) (AM. L. INST. & UNIF. L. COMM'N 1987) ("The remedies provided by this Act shall be liberally administered to the end that the aggrieved party may be put in as good a position as if the other party had fully performed . . .").

26. By awarding the promisee the difference between the contract and market prices, the promisee is made as well off as if the promisor had transferred the contract goods. For a detailed explanation, see Alan Schwartz & Robert E. Scott, *Market Damages, Efficient Contracting, and the Economic Waste Fallacy*, 108 COLUM. L. REV. 1610, 1647–48 (2008).

27. Investment efficiency is satisfied when a party invests in increasing the value of its goods, or reducing their cost, until the marginal gain equals the marginal-investment cost. For example, by making specific investments, the buyer can increase its valuation of the good. Similarly, by making specific investments, the seller can reduce the cost of production of the good. For a detailed discussion of investment efficiency, see generally Philippe Aghion, Mathias Dewatripont & Patrick Rey, *Renegotiation Design with Unverifiable Information*, 62 *ECONOMETRICA* 257 (1994).

The expectation remedy performs less well when a seller agrees to specialize goods for the buyer. Because there is no market price for a specialized product, courts must observe actual values and costs in order to determine whether the seller invested as it promised and to measure the buyer's loss from breach. An informed court is necessary because parties have incentives to shade performance. Thus, a seller who is guaranteed the price may underinvest in performing the customization task, and a buyer who is guaranteed the goods' value may overinvest in increasing that value. Without being able to observe the investment level each party chose (or whether the investment was optimal), a court cannot deter such strategic behavior. In sum, contract law remedies protect exchange efficiency in traditional-economy deals, but sometimes do not protect investment efficiency.

2. *Traditional Remedies for New-Economy Collaborations.*—As the *Eli Lilly* case suggests, the expectation-interest remedy is a poor fit for new-economy transactions because the remedy protects the trade of finished goods in one-stage deals. In the new economy, by contrast, parties agree to develop jointly, in multistage collaborations, either a product to trade to third parties or a product that is tailored to the contract buyer's needs. Thus, in the new economy, "breach" consists of not performing unobservable assigned tasks, not performing the tasks that the public aspects of a framework agreement require, otherwise withholding or wrongfully exploiting private information, or just exiting before the end. Contract law cannot respond effectively to such breaches because the expectation remedy is conditioned on price, cost, quantity, and value. When a party defects from a new-economy collaboration early on or at the implementation stage, the development process is unfinished: parties have incurred costs but do not have a product. Hence, they do not have a price, nor can they predict product costs, how much they will trade, or ultimate transaction value. A disappointed buyer, say, cannot recover the difference between the product's value and the price, when value is yet to be determined and there is no price.

The remedies that substitute for a nonmonetizable expectation also would be unhelpful to a new-economy promisee as these remedies are currently applied. Specific performance is problematic because there is no product a court could order transferred. Rather, a court would have to supervise the development of a product, a role courts have been reluctant to assume.²⁸ A liquidated-damage clause would seldom avail because contract law requires the parties, at the contracting stage, to create a plausible estimate

28. RESTATEMENT (SECOND) OF CONTRACTS § 366 (AM L. INST. 1981).

of the value the buyer would later derive from the deal.²⁹ Estimating the value of a product that is not yet in existence and may never be produced is difficult.

Courts sometimes will award reliance—the costs a party incurred in preparing to perform—when the promisee cannot prove its expectation.³⁰ Awarding costs should be in the set of new-economy remedies, but parties incur many of these costs in exploring whether a deal would be profitable. As said, courts today do not protect the reliance of one party unless the counterparty has made an enforceable promise.

Finally, first-mover concerns disproportionately affect the new collaborations. To see why, suppose that a traditional-economy seller can produce specialized goods only by making a sunk-cost investment—that is, for example, by modifying its facilities so that the facilities can best produce the specialized product. *After* the seller invests, the parties bargain to set a price for the new product. The bargain will not compensate the seller for its relationship-specific investment because future-oriented bargains ignore sunk costs. Anticipating being “held up” by the buyer, the seller will not make the sunk-cost investment. This is an unrealistic example for the traditional economy, however, because the seller can protect itself by obtaining a legally binding promise from the buyer to pay the price.³¹ In contrast, in new-economy collaborations, parties must make exploratory and productive investments in order to see whether a new product is feasible and, if so, to create it. These investments are specific to the possible deal and parties must make them before contractual protection is possible. Therefore, new-economy sellers are more subject to holdup than traditional-economy sellers are. This is an important reason why new collaborations are probably underproduced.

29. *See id.* § 356(1) (“Damages for breach by either party may be liquidated in the agreement but only at an amount that is reasonable in the light of the anticipated or actual loss caused by the breach and the difficulties of proof of loss.”); U.C.C. § 2-718(1) (AM. L. INST. & NAT’L CONF. OF COMM’RS ON UNIF. STATE L. 2021) (“Damages for breach by either party may be liquidated in the agreement but only at an amount which is reasonable . . .”).

30. *See* RESTATEMENT (SECOND) OF CONTRACTS § 349 (AM. L. INST. 1981) (“As an alternative . . . , the injured party has a right to damages based on his reliance interest, including expenditures made in preparation for performance or in performance . . .”).

31. For a technical overview of the holdup problem, see generally PATRICK BOLTON & MATHIAS DEWATRIPONT, *CONTRACT THEORY* 560–78 (2005) and BERNARD SALANIÉ, *THE ECONOMICS OF CONTRACTS: A PRIMER* 195–200 (2d ed. 2005). *See also* Benjamin E. Hermalin, Avery W. Katz & Richard Craswell, *Contract Law*, in 1 *HANDBOOK OF LAW AND ECONOMICS* 3, 84–86 (A. Mitchell Polinsky & Steven Shavell eds., 2007) (discussing the holdup problem and renegotiation); Benjamin Klein, Robert G. Crawford & Armen A. Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 *J.L. & ECON.* 297, 298–99 (1978) (discussing how relationship-specific investment can allow a party to opportunistically hold up its counterparty); Benjamin Klein, *Why Hold-Ups Occur: The Self-Enforcing Range of Contractual Relationships*, 34 *ECON. INQUIRY* 444, 444–47 (1996) (explaining that holdup occurs because the contract form provides a place for opportunism).

3. *New Remedies for New-Economy Collaborations.*—New-economy collaborations, as the *Eli Lilly* case illustrated, occur in stages: (i) at the outset (or pivot) stage, the parties explore whether a collaboration would be profitable; (ii) in the middle (or implementation) stage, the parties cooperate to produce the new product; and (iii) at the last (or performance) stage, the parties decide how to exploit the result. Because parties face different incentives to perform or to defect from a collaboration at each of these stages, new-economy remedies should be stage-relevant.

At stage (i), parties face substantial uncertainty about whether a project will come to fruition, and each party often lacks hard information about a possible counterparty's abilities and commitment. The state's principal concern at this stage should be to induce parties to participate in potentially profitable arrangements. We suggest that reliance should be the default remedy when parties begin a transaction but one of them inappropriately defects. There are two reasons for this suggestion. First, as just stated, an expectation remedy may be impossible to implement when the variables on which it conditions are unknown. The second reason is more subtle: expectation damages, if a party could prove them, exceed reliance damages because parties expect a transaction's gain to exceed its costs. However, when both parties are highly uncertain about whether a deal will come to fruition but are certain that they will incur substantial costs in finding out, they often prefer being insured against the nontrivial probability that exploratory costs will be wasted to being insured against the much lower probability of not realizing expectation gains. Thus, a reliance remedy is often more likely to encourage participation in a new-economy collaboration than the expectation remedy, even when an expectation is provable.³²

We also suggest a change in the liquidated-damage rules. Exploratory reliance costs may sometimes be hard to prove. Courts should extend the liquidated-damage rules to enforce contractual transfers that are not substitutes for unprovable expectations but rather are reimbursements for costs incurred in exploring whether a transaction would be possible.

Current contract remedies are particularly ill-suited for the middle stage of a new-economy collaboration. The state's concern at this stage should be to encourage parties to "continue to play the mechanism"—that is, to comply with their framework-agreement plan. Defection can occur for several reasons, set out in subpart I(C) of this Article, but a particularly important cause of a possible breakup is that parties may come to have different beliefs regarding the efficient path forward and about the adequacy of the framework agreement as written to direct the right path to success. Recalling that parties

32. We develop this argument with the support of an analytical illustration in *infra* section II(D)(1).

intend framework agreements to be self-enforcing, parties today address the defection problem in two ways. Their principal method is to make a party's continuation payoff exceed its defection payoff. For example, a framework agreement may enable a compliant party to access the intellectual property their arrangement created but deny access to a defecting party. Also, framework agreements sometimes specify monetary sanctions for uncooperative behavior.

We suggest three extensions of current contract law remedies to reinforce these private efforts. First, the prohibition against penalties should be relaxed so that courts enforce framework-agreement sanctions. Our second extension is directly responsive to the inconsistent-beliefs cause of arrangement breakdowns. There should be a new contract-reformation doctrine³³ that would permit courts to reform a contract not only to correct a mistake of fact made at the time of formation but also to reform a framework agreement so that it reflects the efficient course forward in light of what has come to be known *ex post*. Traditional contract interpretation occurs after a breach, while the "midstream" reformation we propose would prevent breach by permitting a court to adapt the parties' contractual mechanism to changing circumstances.³⁴ Finally, cooperation may fail even when parties hold consistent beliefs. For example, a party's outside option may improve so that defection becomes more attractive. We suggest an extension of the specific-performance rules for such cases. A cooperative party should get specific performance, *not* to require its counterparty to deliver a product, but rather to compel a potential defector to follow the public aspects of the framework procedure.

At the last stage, remedies that approximate the expectation may be optimal. In particular, a traditional specific-performance order could be feasible because there would be a product that a court could require a recalcitrant party to deliver. However, some asymmetric information about values and costs may remain, and this could prevent parties from creating an efficient marketing plan. Parties, however, can design a "revelation mechanism" to induce each of them to disclose payoff-relevant

33. For a description of the law of reformation, see *infra* subsection IV(B)(1)(a).

34. While reformation is commonly understood as a doctrine "other than" interpretation in the United States (one that remains relatively understudied), the literature on its predecessor in English contract law—"rectification"—tends instead to highlight that the two "operat[e] on a spectrum." See CATHERINE MITCHELL, *INTERPRETATION OF CONTRACTS* 104–05 (2d ed. 2019). That is, the differences between these doctrines would be more a "matter[] of degree rather than kind." *Id.* at 105. More particularly, "one could move from interpretation of the express words, to correcting mistakes through construction of the text, to implication and then to rectification," so that the line between one doctrine and the other would be difficult to draw. *Id.* This fluid view of interpretation and reformation rectification makes our proposal for a midstream reformation doctrinally grounded in the common law tradition.

information.³⁵ The new remedy at this stage, similar to the middle-stage remedy just suggested, would permit a court to order a reluctant party to play the end-stage mechanism.

D. Clarifications and a Roadmap

We end this Introduction with four explanatory remarks and a roadmap. First, economic contract theory shows how the existence of asymmetric information can cause contract failure: parties' inability to make contracts that induce them to trade efficiently or invest efficiently in transactions.³⁶ The principal solution to contract failure in the literature is vertical integration: managers can more conveniently learn what their employees know than an independent firm can learn what a potential counterparty knows.³⁷ The "boss" can then direct parties to perform efficiently.

Commentators, however, have identified tens of thousands of "hybrid" arrangements, such as the ones we study, under which independent firms collaborate to perform research and development functions jointly that once were performed entirely "in-house." A few law-and-economics articles,³⁸

35. Eric Maskin showed that it is possible to design a mechanism that induces the parties truthfully and publicly to verify the observed state of the world by fining them if they disagree on what the realized state is. See generally Eric Maskin, *Nash Equilibrium and Welfare Optimality*, 66 REV. ECON. STUD. 23 (1999) (showing that "a social choice rule on an arbitrary domain of preferences can be implemented by a game form if it satisfies two arguably reasonable properties: *monotonicity* and *no veto power*"). John Moore and Rafael Repullo also showed that when some dynamic is introduced in the game, revelation is truthful and implementation is unique as long as fines can be imposed on the parties. See John Moore & Rafael Repullo, *Subgame Perfect Implementation*, 56 ECONOMETRICA 1191, 1194–95 (1988) (explaining the "Revelation Principle"). Fines, however, are unenforceable under current law, so we look elsewhere for a truthful revealing mechanism. For a general discussion of the use of revelation mechanisms in contract law, see Alan Schwartz & Simone M. Sepe, *Economic Challenges for the Law of Contract*, 38 YALE J. ON REG. 678, 696–97 (2021).

36. See generally BOLTON & DEWATRIPONT, *supra* note 31 (explaining general contract theories).

37. On vertical integration, see Sanford J. Grossman & Oliver D. Hart, *The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration*, 94 J. POL. ECON. 691, 692–93 (1986).

38. See, e.g., Tracy R. Lewis & Alan Schwartz, *Pay to Play: A Theory of Hybrid Arrangements*, 17 AM. L. & ECON. REV. 462, 467–68 (2015) (collecting sources); Matthew Jennejohn, *The Private Order of Innovation Networks*, 68 STAN. L. REV. 281, 291 (2016) (same); Ronald J. Gilson, Charles F. Sabel & Robert E. Scott, *Text and Context: Contract Interpretation as Contract Design*, 100 CORNELL L. REV. 23, 29–30 (2014) [hereinafter Gilson et al., *Text and Context*] (discussing implications of "new forms of contracting among legally sophisticated parties unanticipated in earlier discussions"); Ronald J. Gilson, Charles F. Sabel & Robert E. Scott, *Braiding: The Interaction of Formal and Informal Contracting in Theory, Practice, and Doctrine*, 110 COLUM. L. REV. 1377, 1382–83 (2010) [hereinafter Gilson et al., *Braiding*] (explaining that contemporary contracts build trust by combining formal and informal methods of enforcement); Ronald J. Gilson, Charles F. Sabel & Robert E. Scott, *Contracting for Innovation: Vertical Disintegration and Interfirm Collaboration*, 109 COLUM. L. REV. 431, 433–35 (2009) [hereinafter Gilson et al.,

and an increasingly significant literature in the business journals,³⁹ address the question of how the new-economy collaborations actually overcome the asymmetric-information problems that commentators once thought would prevent efficient market contracting. But because the scholarly focus has been on how collaborations succeed, little attention has been paid to the question of how collaborations fail. Deal failure, however, is an ever-present possibility,⁴⁰ and it is the possibility on which lawyers should focus. Thus, we ask a largely original question: how can *contract law* increase the probability that parties enter new-economy collaborations and efficiently implement them? In addressing this question, we become the first to propose a legal infrastructure for modern relational contracts.⁴¹

Second, courts enforce contracts by requiring a breaching promisor to compensate the promisee. Contract theorists have argued that courts should be a part of the parties' contract framework itself rather than only award remedies *ex post*. For example, a court could require each party to produce reports of the *ex post* state of the world and fine parties when their reports differ.⁴² This mechanism can induce accurate reports, which the court could disclose to both parties. The parties then could renegotiate to the *ex post* efficient state because the parties would be symmetrically informed. These schemes are obviously unrealistic, but the basic contract-theory insight holds: efficiency would improve if courts participate *during* a collaboration rather than pick up the pieces after.⁴³

Contracting for Innovation] (arguing that vertical disintegration is mediated by contracting for innovation).

39. See sources cited *infra* note 72.

40. Informal expert opinions hold that between twenty and twenty-five percent of all outsourcing relationships fail in any two-year period, and fifty percent will fail within five years. Steve Andriole, *Vanguard and Infosys Are Now Billion Dollar Outsourcing Partners. Good, Bad and Always Risky.*, FORBES (Aug. 2, 2020, 11:17 PM), <https://www.forbes.com/sites/steveandriole/2020/08/02/vanguard--infosys-are-now-billion-dollar-outsourcing-partners-good-bad--risky/?sh=3fdb0a532672> [<https://perma.cc/LK2A-ZVFZ>]; see also Jennejohn, *supra* note 38, at 288 (stating that “[a] number of studies have found that a majority of alliances fail”).

41. Cf. Melvin A. Eisenberg, *Why There Is No Law of Relational Contracts*, 94 NW. U. L. REV. 805, 821 (2000) (arguing that there is no law of relational contracts because there is no significant difference between contracts as a class and relational contracts). We explain why the new collaborations are a modern version of relational contracts in section I(B)(1).

42. This is the Moore–Repullo mechanism. See Moore & Repullo, *supra* note 35, at 1194–95 (explaining that the revelation principle is enhanced with nonrevelation mechanisms such as threats).

43. We have previously explored this claim in more general terms in Schwartz & Sepe, *supra* note 35, at 691–92. For an accessible description of how to involve courts, see Alan Schwartz & Joel Watson, *The Law and Economics of Costly Contracting*, 20 J. LAW, ECON., & ORG. 2, 26 (2004). For the point that courts do not act as the contract theorists' advocate, see Eric A. Posner, *Fault in Contract Law*, 107 MICH. L. REV. 1431, 1436–37 (2009).

We pursue this insight here by suggesting realistic roles for a court to play as part of a collaboration mechanism. At the pivot stage, court intervention through an expanded reliance remedy encourages parties to enter into collaborations by enforcing the parties' commitments to explore opportunities. At the implementation stage, we suggest that the court should actively coordinate the parties' behavior in two ways. Initially, courts can respond to the parties' epistemic conflict arising from inconsistent beliefs by reforming their contract so that it reflects the efficient path forward. And where realigning party beliefs is insufficient to keep parties on that path, the court can mandate cooperation by requiring adherence to the framework agreement. Adjudication will refine these remedies, but we stress the central point: new-economy collaborations require new roles for common law courts.⁴⁴

Third, the principal effect of the new remedial powers we suggest for courts will be to empower parties. Today, parties attempt to enforce framework agreements by (i) using reputational sanctions; (ii) reducing a party's payoff for defecting from a project relative to continuing; and (iii) specifying social norms in the framework agreement that the parties hope will reduce strategic behavior. We add to this toolkit new default legal remedies⁴⁵ that parties could use when the remedies would increase the parties' ability to induce entry into and compliance with a framework agreement. When one party is weak (i.e., when the parties have unequal bargaining power), this empowerment also might have distributive effects, facilitating collaborations that otherwise would not take place when the weaker party lacks access to self-enforcing reputational mechanisms.

Fourth, we stress the significance of our project. We cannot directly test our claim that the absence of an effective contract law materially reduces the number of collaborations because deterred transactions are impossible to observe. There is, however, a telling analogy: the correlation between a country's contract law and the amount of foreign direct investment (FDI) the country attracts. Numerous studies show that this correlation is unambiguously positive. The stronger a country's contract law is, the more

44. One of us has recently shown that much of today's contract law is obsolete and suggested administrative solutions to make contract law relevant for new-economy markets—for instance, a new administrative agency to create efficient default rules. Alan Schwartz & Robert E. Scott, *Obsolescence: The Intractable Production Problem in Contract Law*, 121 COLUM. L. REV. 1659, 1728 (2021). In contrast, this Article is addressed primarily to courts, for two reasons. First, there is as yet no new agency, but there are courts. They can adopt our recommendations for extensions of common law contract rules today. Second, litigation is a residual category: an agency could not resolve all of the disputes that arise. For a fuller discussion of this Article's addressees, see *infra* subpart IV(D).

45. Current contract remedies are mandatory. For example, parties cannot contract out of the expectation remedy. In contrast, the new-economy remedies we suggest should be defaults.

FDI it attracts.⁴⁶ This finding suggests that creating a contract law for the new collaborations would substantially increase their number.

We proceed as follows. Part I details the three stages of a new-economy collaboration and specifies in more depth the causes of framework-arrangement breakdown. Part II then analyzes the strengths and limitations of current contract law remedies. This discussion looks back in our Article to show how today's remedies would be inefficient responses to the commercial problems that present at each stage of the new-economy collaborations. Part II also looks forward to suggest which current remedies courts could extend to new-collaboration breaches. Because we envision a new role for courts, Part III next discusses how courts today enforce contracts as a prelude for showing what else courts could efficiently do. Part IV then sets out the new remedies that we believe would be effective responses to the economic concerns that Part I identifies and that Part II shows contract law today cannot solve. The final Part concludes.⁴⁷

I. A Description of New-Economy Collaborations

New-economy collaborations are complex. We focus here on two significant elements. Initially, collaborations occur in stages, with parties performing different functions and facing different incentives to continue or

46. See Farok J. Contractor, Ramesh Dangol, N. Nuruzzaman & S. Raghunath, *How Do Country Regulations and Business Environment Impact Foreign Direct Investment (FDI) Inflows?*, INT'L BUS. REV., April 2020, at 1, 9–10 (summarizing prior studies and itself finding that the “association between contract enforcement and FDI inflows variables is positive and statistically significant,” and explaining that multinational enterprises (MNEs) “are more likely to invest in countries where profits can be higher by reducing the risk and costs of enforcing contracts” and further finding “the strength of a country’s contract enforcement, and ease of trade across the nation’s borders to be unequivocally strong considerations for MNEs”). See also Michael Trebilcock & Jing Leng, *The Role of Formal Contract Law and Enforcement in Economic Development*, 92 VA. L. REV. 1517, 1572, 1575 (2006) (summarizing studies and describing the state’s important role in providing predictability in economic transactions, and the “adverse implications” of a lack of formal contract-enforcement mechanisms on FDI).

47. We do not consider two modern commercial areas. Initially, online sales between firms and individual consumers are a major part of today’s economy. We do not consider these sales for two reasons. First, our subject is the business contract. More basically, this Article works in the space in which it is empirically plausible to attribute rationality to the contracting parties. Such an attribution may require justification or modification when one of the parties is an individual person. See, e.g., Alan Schwartz, *Regulating for Rationality*, 67 STAN. L. REV. 1373, 1375–76 (2015) (explaining that studies show that individual “consumers exhibit numerous reasoning errors” that are “attributed to ‘cognitive biases’”). Also, though the deal vehicle is the internet, the typical sale is a traditional-economy transaction which, as defined above, occurs when the firm sells finished goods to an individual consumer in a one-stage transaction under a simple contract. We also do not consider how firms perform when embedded in networks because our focus is procurement—a task networks seldom are created to achieve. For a discussion of how modern networks perform, see, e.g., Alan Schwartz & Robert E. Scott, *Third-Party Beneficiaries and Business Networks*, 7 J. LEGAL ANALYSIS 325, 334–35 (2015).

to defect at each stage. Second, asymmetric information—the inability of a party to observe its counterparty’s actions, knowledge, capabilities, or expected payoffs—exists at each stage. As Parts II and III later show, the implication of these common elements is that effective remedies should be stage-relevant and respond to the asymmetric-information concern.

A. *Introducing New-Economy Collaborations*

Commercial procurement patterns have changed materially over the last four decades.⁴⁸ In the traditional economy, a seller may make an agreement to produce a specialized product for a counterparty, but the stages of production—from research and development to assembly of the final product—take place *within* a single firm. In the new economy, production has become a process of “vertical disintegration,”⁴⁹ under which the several stages of production are organized by agreements *among* firms rather than by the direction of a single firm’s senior employees.

The new arrangements take different organizational forms: joint ventures, strategic alliances,⁵⁰ and outsourcing of supply chains for goods and services. Outsourcing, in particular, has grown exponentially, so that scholars now talk of an “outsourcing revolution”⁵¹ or “an age of outsourcing.”⁵² The global market for outsourced services has more than

48. For a concise summary of new-economy procurement transactions, see generally Lisa Bernstein & Brad Peterson, *Managerial Contracting: A Preliminary Study* (Feb. 16, 2022) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4036051 [<https://perma.cc/WX4J-8UXW>]. For other extensive descriptions of new-economy transactions, see generally Gilson et al., *Text and Context*, *supra* note 38; Gilson et al., *Braiding*, *supra* note 38; Gilson et al., *Contracting for Innovation*, *supra* note 38; and JOSH WHITFORD, *THE NEW OLD ECONOMY: NETWORKS, INSTITUTIONS, AND THE ORGANIZATIONAL TRANSFORMATION OF AMERICAN MANUFACTURING* (2005). One scholar characterizes new-economy collaborations as “contracts . . . [that] contain a creative element at their core” with the “central purpose [being] to structure a joint discovery process by which new technology is created.” Jennejohn, *supra* note 38, at 297.

49. See Gilson et al., *Contracting for Innovation*, *supra* note 38, at 438–49 (explaining that, due to “developments in industrial organization,” firms are no longer compelled in the same way to vertically integrate); Gene M. Grossman & Elhanan Helpman, *Outsourcing in a Global Economy*, 72 *REV. ECON. STUD.* 135, 135 (2005) (noting that vertical disintegration is especially prominent in international trade).

50. See Donald Gerwin & J. Stephen Ferris, *Organizing New Product Development Projects in Strategic Alliances*, 15 *ORG. SCI.* 22, 34 (2004) (discussing solutions to the organizational difficulties firms face when forming strategic alliances for new product development research); Lewis & Schwartz, *supra* note 38, at 463 (noting various commonalities that exist among flexible arrangements created by independent firms such as hybrids, alliances, joint ventures, and platforms).

51. George S. Geis, *The Space Between Markets and Hierarchies*, 95 *VA. L. REV.* 99, 126 (2009).

52. Grossman & Helpman, *supra* note 49, at 135.

doubled, from around \$45 billion in 2000 to over \$92 billion in 2019.⁵³ Companies also increasingly engage in the outsourcing of a broad range of activities. These activities include technology, finance and accounting services, human resource management, and legal services.⁵⁴ Global outsourcing is forecasted to grow more than six percent annually.⁵⁵

Companies today outsource not only to reduce costs⁵⁶ but also to innovate through strategic collaborations.⁵⁷ Outsourcing, as well as other collaborative agreements between new-economy firms, is conducted under agreements that are not contracts in the traditional sense. Rather, they are framework agreements that specify procedures the parties must follow as they interact to produce a product or platform. The new agreements are created to facilitate mutual adjustments in the face of bilateral uncertainty, the exchange of proprietary knowledge, and the making of reciprocal, relation-specific investments.

The governance structure of framework arrangements adds multilateral contracting among individual units of both firms to bilateral contracting between the firms.⁵⁸ The role of the framework agreement itself is to establish the broad contours of the firms' relationship. Firms then implement the agreements with detailed work statements: shorter modular agreements, developed and frequently revised by middle managers that set and update the precise duties of the firms' individual units as well as a project's checkpoints.⁵⁹

The Cisco-Foxconn agreement to manufacture a new, low-cost, powerful router, code-named "Viking," illustrates these new-collaboration

53. *Global Market Size of Outsourced Services from 2000 to 2019 (in Billion U.S. Dollars)*, STATISTA, <https://www.statista.com/statistics/189788/global-outsourcing-market-size> [<https://perma.cc/UX3D-KLYE>].

54. Mary C. Lacity & Leslie P. Willcocks, *Outsourcing Business Processes for Innovation*, MIT SLOAN MGMT. REV., Spring 2013, at 63, 63.

55. See *Business Process Outsourcing: Worldwide*, STATISTA, <https://www.statista.com/outlook/tmo/it-services/business-process-outsourcing/worldwide> [<https://perma.cc/E2NJ-RL6E>] ("Revenue is expected to show an annual growth rate (CAGR 2022–2027) of 6.69%, resulting in a market volume of US\$0.45tn by 2027.").

56. See Geis, *supra* note 51, at 101 (explaining that this was the traditional reason for both outsourcing and offshoring).

57. Lacity & Willcocks, *supra* note 54, at 63; see also BENJAMIN GOMES-CASSERES, REMIX STRATEGY: THE THREE LAWS OF BUSINESS COMBINATIONS 9 (2015) (listing outsourcing as one way companies can use business combinations to promote innovation).

58. See Bernstein & Peterson, *supra* note 48 (manuscript at 3 & n.11) (discussing managerial contract provisions used to govern collaborative business relationships, including outsourcing agreements).

59. Geis, *supra* note 51, at 130.

features.⁶⁰ Cisco wanted to debut China as the low-cost manufacturing base for the product,⁶¹ and it selected Foxconn Technology Group, then a fast-growing Taiwanese manufacturer (now a market leader), to produce the router, although Foxconn had never made a complex product for Cisco.⁶² While Cisco had used collaborative outsourcing for over a decade, delegating increasing responsibilities to its manufacturing partners, the Viking project entailed an unusually high level of technical sophistication.⁶³ The companies met the challenge by designing a framework arrangement that required them to engage in global, cross-functional collaboration.⁶⁴ Among other notable features, the arrangement carved out a broad role for Foxconn, assigning the company responsibility for all major subassemblies as well as for the final assembly of the product and filling orders.⁶⁵ The Foxconn engineering team worked closely with the Cisco engineering team in the early stage of development, spending several months in the United States.⁶⁶ Cisco later sent its engineers to the Foxconn manufacturing facility in Shenzhen, as consultants.⁶⁷ Teams on both sides used Cisco's NPI Metrics, a website tool that provided a single view of timelines and tasks for the far-flung teams.⁶⁸ Each party also had remote access to the other's software system to facilitate and coordinate operations.⁶⁹ The result was a new, innovative product.

The joint-production model that framework arrangements instantiate therefore resembles more the Ricardian model of comparative advantage (applied to firms rather than states)⁷⁰ than the Coasean model of the independent firm. In the new economy, the organizational question no longer is whether the transaction costs that attend market transactions exceed the

60. Maria Shao & Hau Lee, *Cisco Systems, Inc.: Collaborating on New Product Introduction*, STAN. GRADUATE SCH. BUS. 1, 1 (June 5, 2009), <https://hbsp.harvard.edu/product/GS66-PDF-ENG> [<https://perma.cc/NZJ9-ED76>].

61. *Id.*

62. *Id.* at 13–14.

63. *See id.* at 14 (noting that “[i]n the past, Cisco’s high-end routers had been produced by its three other major contract manufacturers” and that Foxconn had only “produced simpler, high-volume items for Cisco”).

64. *See id.* at 18 (illustrating the Viking project’s “global, cross-functional teamwork” through product sites across the United States and Asia).

65. *Id.* at 15.

66. *See id.* at 17 (explaining how Cisco ensured success in the Viking project by involving Foxconn in the development process and training Foxconn engineers in the United States).

67. *Id.*

68. *Id.* at 18.

69. *See id.* at 18–19 (noting that Cisco engineers could remotely log in to Foxconn to test prototypes and Foxconn could access Cisco’s software system for resource planning).

70. For a contemporary treatment of Ricardo’s theory, see generally Arnaud Costinot & Dave Donaldson, *Ricardo’s Theory of Comparative Advantage: Old Idea, New Evidence*, AM. ECON. REV., May 2012, at 453.

organization costs of within-firm production.⁷¹ Rather, the question is whether potential partner firms can specialize efficiently in doing particular tasks and delegate other tasks to possible partners. Within this framework, the outsourcing of products and services is efficient when it (i) frees resources to allow the delegating firm to perform certain tasks best, capturing the firm's comparative advantage; and (ii) allows the partner firm to perform other tasks or produce the final goods at cheaper cost, capturing this firm's absolute advantage.

B. How New-Economy Transactions Function

1. Relational Contracting.—Framework arrangements implement a modern version of relational contracting.⁷² The arrangements are relational because they facilitate repeated cooperation between parties rather than locate production within individual firms.⁷³ Social bonds among firms are the “glue” that helps to hold framework arrangements together, but, unlike traditional relational contracts, the arrangements formally embed social norms in the specification of mutual performance goals and guiding principles. The arrangements then implement these norms with a

71. See R.H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386, 394–98 (1937) (asking this question).

72. See David Frydlinger, Oliver Hart & Kate Vitasek, *An Innovative Way to Prevent Adversarial Supplier Relationships*, *HARV. BUS. REV.* (Oct. 8, 2020), <https://hbr.org/2020/10/an-innovative-way-to-prevent-adversarial-supplier-relationships> [<https://perma.cc/S3PH-NYBM>] [hereinafter Frydlinger et al., *An Innovative Way*] (discussing framework arrangements as “formal relational contracts”); David Frydlinger, Oliver Hart & Kate Vitasek, *A New Approach to Contracts: How to Build Better Long-Term Strategic Partnerships*, *HARV. BUS. REV.* (Sept.–Oct. 2019), <https://hbr.org/2019/09/a-new-approach-to-contracts> [<https://perma.cc/C94U-A83R>] [hereinafter Frydlinger et al., *A New Approach*] (same); Naomi R. Lamoreaux, Daniel M.G. Raff & Peter Temin, *Beyond Markets and Hierarchies: Toward a New Synthesis of American Business History*, 108 *AM. HIST. REV.* 404, 408–09 (2003) (discussing the advantages of “[l]ong-term relationships” in contracting, noting that such relationships “are sometimes superior to both markets and hierarchies”); John M. de Figueiredo & Brian S. Silverman, *On the Genesis of Interfirm Relational Contracts*, 2 *STRATEGY SCI.* 234, 234, 236 (2017) (discussing the advantages of relational contracting, and noting that it “becomes relevant when uncertainty is prevalent and incomplete contracts arise”). For a general discussion of relational contracts from a theoretical economic perspective, in which the authors analyze self-enforcing agreements between sophisticated parties where reputational mechanisms suffice to solve most contracting problems, see generally George Baker, Robert Gibbons & Kevin J. Murphy, *Relational Contracts and the Theory of the Firm*, 117 *Q.J. ECON.* 39 (2002) and Jonathan Levin, *Relational Incentive Contracts*, 93 *AM. ECON. REV.* 835 (2003).

73. For seminal early works on relational contracting, see generally Stewart Macaulay, *Non-Contractual Relations in Business: A Preliminary Study*, 28 *AM. SOCIO. REV.* 55 (1963); Ian R. Macneil, *Whither Contracts?*, 21 *J. LEGAL EDUC.* 403 (1969); and Ian R. Macneil, *Contracts: Adjustment of Long-Term Economic Relations Under Classical, Neoclassical, and Relational Contract Law*, 72 *NW. U. L. REV.* 854 (1978).

relationship-management process.⁷⁴ Guiding principles lay the foundation of trust, while parties intend the relationship-management process to ensure that the parties' expectations and interests remain aligned over time. The process also details how the partners should approach unforeseen circumstances as they arise.⁷⁵ Thus, "[t]he [formal relational] contract is not something the parties simply put in a drawer and pull out when something goes wrong; rather [parties] view it as a playbook for working through issues fairly and flexibly."⁷⁶

2. *Sustaining Cooperation.*—Contracting for innovation supports “iterative collaboration,” which helps manage the uncertainty inherent in the innovation process. Under collaboration, parties invest in learning about their collaborators' capacities, preferences, and needs. These investments increase the probability that parties can cooperate to produce something new, but they also erect barriers to either party taking advantage of its partner. For an example of how such a barrier functions, suppose that the larger the stock of knowledge a party has about its counterparty, the lower the marginal cost of continuing to work with the counterparty is. It follows that defecting from a framework arrangement to pursue a similar project with another firm would initially be more costly than continuing with the current partner. Because the potential defector has no stock of knowledge about the new firm, it would have to incur high startup costs again. Denote the difference between the initial high marginal cost a new relationship would require and the low marginal cost of staying with the contract partner as a “switching cost.”⁷⁷ Investment in learning about the counterparty thus facilitates cooperation *within* a framework collaboration by creating switching costs that would attend defection. Parties actually design their framework process to create “coordination cascades,” where the specific investment of one party requires coordination with the other, whose response then requires further coordination with the first party.⁷⁸ All along, a party's stock of knowledge

74. See Frydlinger et al., *A New Approach*, *supra* note 72 (discussing how legally-binding relationship-management processes may be included in “formal relational contracts”); James M. Malcomson, *Relational Incentive Contracts*, in *THE HANDBOOK OF ORGANIZATIONAL ECONOMICS* 1014–15 (Robert Gibbons & John Roberts eds., 2013) (demonstrating how long-term relationships may prevent cheating in relational contracts that are not legally binding).

75. Frydlinger et al., *An Innovative Way*, *supra* note 72.

76. *Id.* The literature sometimes discusses the role of generally accepted social norms, such as a commitment to fairness or transparency, as inducing parties to adhere to otherwise hard-to-enforce framework agreements. We do not explore the role of social norms here—though we agree that they can play an important role—because our focus is the contribution legal remedies make toward inducing compliance.

77. Gilson et al., *Contracting for Innovation*, *supra* note 38, at 481–89 (providing a thorough treatment of the incentives arising from switching costs in new-economy collaborations).

78. *Id.* at 476.

about its counterparty increases. The result is that the process of collaboration itself mitigates the defection risk.⁷⁹

Switching costs are one application of a general theory for sustaining cooperation within a framework arrangement. The theory holds that cooperation is facilitated when, at each stage, a party's continuation payoff exceeds its defection payoff. Other applications of the theory include preventing a defecting party from exploiting intellectual property developed by the collaboration or otherwise using knowledge the arrangement developed.⁸⁰

3. *Managerial Provisions.*—Framework arrangements sometimes attempt to replicate techniques used within firms to organize relationships and increase productivity.⁸¹ While the relational-contracting and the contracting-for-innovation approaches focus on the collaborative elements of framework arrangements, managerial approaches exploit hierarchy.⁸² The “managerial provisions” provide a roadmap for employees of the collaborating firms to carry out workaday actions and interactions.⁸³ Parties expect reputational sanctions to induce compliance with their roadmap.⁸⁴ New-economy transactions, in some aspects, thus structurally resemble intrafirm relationships.

To summarize so far, the reputational sanctions sketched here and the theory that maximizing continuation payoffs relative to defection payoffs best sustains cooperation reflect party attempts to make collaborations work without legal sanctions. Efforts to make contracts self-enforcing also exist in traditional economies; parties everywhere prefer self-enforcement because it is cheap relative to legal enforcement. The goal of self-enforcement, however, assumes heightened importance in the new economy for two reasons: first, as shown, the intertwined and intertemporal nature of framework arrangements precludes frequent recourse to outside enforcers;

79. We formalize the process by which parties progressively learn more about counterparties in section IV(B)(1) below and show that inefficient collaborative breakups occur largely when and because this process fails.

80. Parties also attempt to defer defections by requiring important figures in both parties to sign noncompete clauses. We are unaware of how prevalent this practice is.

81. Bernstein & Peterson, *supra* note 48 (manuscript at 4); *see also* ARTHUR L. STINCHCOMBE, INFORMATION AND ORGANIZATIONS 194–240 (1990) (arguing that additions “put in contracts besides to establish the right to damages if specific performances are not carried out” are to “serve as the regulations of a formal organization”).

82. *See* Bernstein & Peterson, *supra* note 48 (manuscript at 30) (explaining how managerial approaches affect a firm's hierarchy).

83. *Id.* (manuscript at 3–4).

84. *Id.* (manuscript at 4–5). Framework agreements also sometimes create jointly staffed committees that permit each partner to veto particular deviations by the other. Jennejohn, *supra* note 38, at 290. We discuss the role of these committees further in subsection IV(B)(1)(c).

second, current contract law remedies are not suitable for new-economy collaborations.

C. *Causes of Defection*

Legal remedies would increase cooperation in new-economy collaborations for two reasons. First, self-enforcing arrangements are not perfect: parties sometimes defect.⁸⁵ When the *ex post* state materially differs from parties' projections, or when parties will not disclose private information in the *ex post* state, off-the-equilibrium-path behavior can occur.⁸⁶ Consider, for example, a fallout between Apple and Foxconn in 2009, after Apple was accused of permitting labor-rights violations at Foxconn, one of the company's major suppliers.⁸⁷ In response, Apple moved some of its business from Foxconn to Pegatron, another Taiwanese manufacturing company.⁸⁸ Of commercial interest, Apple also may have been motivated to defect because Pegatron would accept thinner margins than Foxconn, thereby allowing Apple to produce a lower cost version of the iPhone 5.⁸⁹

Divergent beliefs about the possibilities for success are another important cause of defection from framework arrangements. As the theory of belief formation teaches,⁹⁰ parties may come to disagree about the facts when

85. See Schwartz & Scott, *supra* note 16, at 682–85 (noting that a party might “not invest at all when he must share the expected gain with his partner” and may strategically defect when his costs are high, he is more patient than the other party, or his expected return is not high enough).

86. The “equilibrium path” is the road forward that a framework agreement directs each party to walk. “Off-the-equilibrium-path” behavior is a step—sometimes large—off that road.

87. See Sun Hye Lee, Michael J. Mol & Kamel Mellahi, *Apple and Its Suppliers: Corporate Social Responsibility*, RICHARD IVEY SCH. BUS. FOUND. 1, 1 (Mar. 22, 2016), <https://hbsp.harvard.edu/product/W16147-PDF-ENG> [<https://perma.cc/3EQY-8Q4K>].

88. *Id.* at 3.

89. Neil McAllister, *Apple Says ‘Zai Jian’ to Foxconn, Taps Pegatron for New iPhones*, THE REGISTER (May 30, 2013, 12:07 AM), https://www.theregister.com/2013/05/30/apple_taps_pegatron_for_cheaper_iphones/ [<https://perma.cc/8YAQ-EGTP>]. As the *Eli Lilly* introductory case showed, a party also may defect when it can exploit information an arrangement developed in an alternative venture. See *Eli Lilly & Co. v. Emisphere Techs., Inc.*, 408 F. Supp. 2d 668, 671 (S.D. Ind. 2006) (noting the breakdown of the relationship between Eli Lilly and Emisphere after Eli Lilly pursued “its own secret research projects” with proprietary information Emisphere had shared).

90. See MICHAEL MASCHLER, EILON SOLAN & SHMUEL ZAMIR, *GAME THEORY* 365 (Mike Borns ed., Ziv Hellman trans., 2013) (explaining the concept of “interim beliefs” as a player’s “beliefs after they have been updated in light of new information he has privately received”). On the formation of pessimistic beliefs, see JOHN MAYNARD KEYNES, *THE GENERAL THEORY OF EMPLOYMENT, INTEREST AND MONEY* 154 (1936). For a creditor–debtor application, see M. Dewatripont & E. Maskin, *Credit and Efficiency in Centralized and Decentralized Economies*, 62 REV. ECON. STUD. 541, 541–42 (1995). Note that in game theory models, the information sets off the equilibrium path are reached with probability zero by definition. Hence, we cannot apply

they begin a relationship with different prior beliefs regarding the state of the world (although they see the same later evidence).⁹¹ Parties also may develop different beliefs even when they start from common priors if they see different evidence.⁹² The longer a collaborative process lasts, the greater the likelihood is that the parties to it will develop different beliefs about the possible success of their project. This is because of “errors in the calculation of conditional probability, lack of knowledge of the prior distribution, psychologically induced deviations from calculated probabilities, or in general any ‘subjective feeling’ regarding the probability of any particular event, apart from any calculations” that could arise.⁹³ If the parties’ beliefs diverge too materially, one of them may come to prefer exit. Parties can reduce the probability of divergent-belief exits, however, by disclosing the basis for their beliefs. Part IV below shows that current law creates almost no incentives for parties to disclose, but that a remedy we propose—midstream reformation—would.

D. Remedies and Stages of Production

In the traditional economy, as Part II below shows, remedies have a one-size-fits-all character: whenever or however a breach occurs, contract law supplies parties with the expectation-interest remedy. It should be otherwise

Bayes’ formula to compute off-the-equilibrium path beliefs (that is, attempting to apply Bayes’ rule produces an undefined expression). Nevertheless, if players learn how to behave off the equilibrium path, they can sustain the equilibrium over time. But when parties do not know how to behave off the equilibrium path, inefficiency will generally occur. See Yves Breitmoser, Jonathan H.W. Tan & Daniel John Zizzo, *On the Beliefs Off the Path: Equilibrium Refinement Due to Quantal Response and Level-k*, 86 GAMES & ECON. BEHAV. 102, 118–19 (2014) (summarizing the results in a study that “analyzed strategic choice in an experiment where subjects played dynamic ‘club games’ with incomplete information and varying parameters”).

91. See Stephen Morris, *The Common Prior Assumption in Economic Theory*, 11 ECON. & PHIL. 227, 228 (1995) (“Any outcome . . . is consistent with heterogenous prior beliefs.”).

92. Divergent beliefs can also be originated by limits of actors’ abilities to project the future. Some events are inconceivable. See Jean-Jacques Laffont, *A Brief Overview of the Economics of Incomplete Markets*, 65 ECON. REC. 54, 55 (1989) (explaining that economic theory has not considered people’s inability to know the future or to conceive of some events). Projections of predictable events are impaired by “bounded rationality,” which are limits on the ability to calculate optimal strategies. See John Geanakoplos, *An Introduction to General Equilibrium with Incomplete Asset Markets*, 19 J. MATHEMATICAL ECON. 1, 2 n.1 (1990) (“[One] reason that asset markets are incomplete has to do with the bounded rationality of the agents. It is impossible to think of all the future contingencies it would be necessary to specify to have complete asset markets.”). Note that bounded rationality is different from irrationality, under which the agents in the economy make systematic mistakes and cannot exactly anticipate the central moment of distributions. Conversely, under bounded rationality, the agents are rational but have computational limitations. Bounded rationality is one of the working assumptions of the literature of incomplete markets. See MICHAEL MAGILL & MARTINE QUINZII, 1 THEORY OF INCOMPLETE MARKETS 12–13 (1996) (identifying bounded rationality as one of the axioms on which transactions-cost literature is based).

93. See MASCHLER ET AL., *supra* note 90, at 365.

in the new economy, where both production and transaction occurs in stages. In consequence, parties face different incentives to defect or to continue at each stage. We next review the different stages and the defection possibilities that attend them.

Production stages in new-economy joint contracting resemble production stages that take place within firms in the traditional economy.⁹⁴ The first stage is the “pivot stage,” during which parties investigate collaboration possibilities, run compatibility tests, collect preliminary information on their collaborators (as well as disclose initial information to them), design initial blueprints, and begin to structure the governance framework of their arrangement, both at the macro- and micro-levels. At the end of this stage, each party decides whether to move to the “implementation stage,” in which production takes place: goods or intellectual property are developed and produced, and perhaps prototypes for further production are created. During this stage, work statements are continuously revised by each collaborator’s team to update the terms of collaboration vis-à-vis new circumstances (i.e., both solved uncertainty and novel uncertainty). The final stage is the “execution stage,” when quality controls are performed, and the goods or services are produced and marketed.

Transaction problems track production stages. The “participation problem” is how to induce parties at the pivot stage to enter into *ex ante* efficient collaborations. Note that, unlike deals in the traditional economy, the participation decision is importantly a function of how the agent thinks later stages will go—that is, whether the implementation and execution stages will eventuate in the production of a marketable product. The “interaction problem” is how to induce parties to cooperate during the implementation stage: to share information, to work as anticipated, and to update the framework agreement itself if needed. The “production problem” is to induce parties at the execution stage to cooperate in pricing, allocating, and distributing the product, if the arrangement succeeds in creating one. We next provide an illustration that yields some intuition about each of these problems.⁹⁵

1. The Participation Problem.—Suppose that two firms are considering whether to enter into a new-economy collaboration. Beginning the collaboration requires each firm to incur sunk costs in attempting to develop

94. Consider, for example, the well-known stage-gate process in managerial science, according to which a project is divided into stages where at each stage there is a decision node. *See, e.g.,* Glen L. Urban & Eric von Hippel, *Lead User Analyses for the Development of New Industrial Products*, 34 *MGMT. SCI.* 569, 570–71 (1988) (detailing the stages of lead user methodology in managerial sciences).

95. We elaborate on the use of contract remedies for each of these problems in *infra* Part IV.

a framework agreement. These costs entail acquiring specific knowledge about the possible partner and the business opportunity, and sometimes making tangible investments in beginning to produce. Each firm also may explore alternative opportunities that the parties would have to forego. Parties' expectations about success probabilities may differ, however. As a result: (i) both parties may predict that the relationship would be valuable and enter into it; (ii) the parties may realize that the relationship is not worth further investment; or (iii) the parties' assessment of the value of the relationship may diverge. For example, Firm A may believe that the probability of a successful relationship is high while Firm B believes it is low. The participation problem is to encourage parties to incur costs in exploring an opportunity and beginning the implementation stage.

Put a little more formally, the parties' contract-design problem at this stage, and the problem for the law, is how best to satisfy the parties' "participation constraints."⁹⁶ Extralegal remedies, such as reputation, are of limited help at the beginning. Likewise, switching costs likely are too low to erect a barrier to defection at this early stage. The state's concern thus should be to devise legal remedies that would minimize the possibility that parties may fail to enter into potentially profitable relationships, or that parties may prematurely terminate such relationships before they reach the implementation stage.

2. *The Interaction Problem.*—Suppose now that two firms have begun joint production under the relationship-management process set out in their framework agreement. The agreement provides that the higher-level personnel of Firm A (e.g., the engineering team) can monitor the lower-level personnel of Firm B (e.g., the factory workers) and provide instructions for the production process. Firm A thus may have contractual authority over Firm B personnel, though under agency law Firm B still retains formal authority over its organizational units. Now, let the engineers of Firm A seek access to Firm B's plant to verify some technological details of a prototype. Firm B, which retains legal authority over its property, refuses to grant access. Firm A's engineers thus cannot perform control tests on the

96. A participation constraint is satisfied when a contract would make a possible participant at least as well off as it would have been had the participant not taken an alternative opportunity. *See* SALANIÉ, *supra* note 31, at 122 (factoring in alternative opportunities to economic models). In the traditional economy, parties seldom risk incurring uncompensated costs when they attempt to choose the deal that is more valuable in expectation than their next best alternative. *See id.* at 126–28 (highlighting the desire to enter the contract with the highest expected utility). Because deals are short term and well understood, parties can form well-grounded predictions of success. *See id.* (offering an example of decisions based on predictions). In the new economy, by contrast, parties risk incurring substantial uncompensated costs because success is much harder to predict.

prototype. This, in turn, results in delayed production and threatens the parties' ability to meet a deadline for launch of the final product.

Firm A believes that Firm B refused to permit access because Firm B is engaging in violations of labor rights in order to meet production deadlines (see the Apple–Foxconn case)⁹⁷ or is secretly exploiting Firm A's intellectual property (see the *Eli Lilly* case).⁹⁸ Firm B, instead, believes that the request of the Firm A's engineers to enter B's factory is motivated by unjustified mistrust. Firm B has met all prior quality-control tests and its engineers doubt the need for further controls. Further, Firm B anticipates that it is too costly for Firm A to terminate the arrangement at this stage and switch to another service provider, so Firm B can insist on its rights. The type of dispute this scenario exhibits is an example of the interaction problem.⁹⁹

This problem has two facets. First, as introduced above, inconsistent beliefs can jeopardize the trust required for joint success. Lisa Bernstein and Brad Peterson are illuminating here. They explain that “there is an ever-present chance that a buyer might interpret a bad outcome as a defection, rather than as an inadvertent breach that can be remedied.”¹⁰⁰ The seller then “might . . . respond with a defection of [its] own.”¹⁰¹ Framework agreements contain provisions—some described here—to get the parties on track, but there also can be “a series of echoing defections when an undesirable outcome occurs,” which can lead to breakdown “due to misperception or mistaken classification of outcomes.”¹⁰²

Second, a likely but overlooked source of uncertainty for parties' is the interaction of within-firm and between-firm activities just described. Such internal conflicts may affect both parties because of a clash between formal and legal authority: each collaborator lacks formal authority to control its counterparty's employees working within another party's factory, but it also may have contractual authority to direct those employees. Tensions can arise when the firms themselves have different views about how they should harmonize the two forms of authority. Even though the provisions of framework arrangements often mimic actual, intrafirm managerial provisions, they can be of limited use in addressing such coordination issues.

97. See *supra* text accompanying notes 87–89.

98. See *supra* text accompanying notes 5–11.

99. A related dispute would occur if one firm substituted a new performance team for the original team. The counterparty may believe that the new team is inferior to the old while the first firm disagrees. Some framework agreements have personnel clauses regulating team changes.

100. Bernstein & Peterson, *supra* note 48 (manuscript at 40).

101. *Id.*

102. *Id.* (manuscript at 43).

3. *The Updating Problem.*—Let the parties' framework arrangement require each to have access to the other's property. During the implementation stage, however, the parties come to realize that property access is less important than intranet access. As a result, the framework arrangement does not suit the parties' current situation. The parties may voluntarily switch from property to intranet access. The ability to switch is why the literature recognizes framework arrangements to be flexible and to provide a playbook for parties' future interactions.

This example, however, raises coordination and contracting problems. For example, Firm B might think that Firm A wants to modify the initial arrangement to recapture benefits at its expense (e.g., intranet access might help Firm A to gather information on Firm B that Firm A could use to obtain more favorable terms). Even if the initial arrangement explicitly provides that the parties would approach disagreements fairly, Firm B may be intransigent if it believes that switching costs would deter Firm A from finding a different partner. On the other hand, if Firm B refuses to modify the initial arrangement, Firm A may infer that Firm B is hiding a serious problem; this belief could cause the parties to escalate their conflict.

Courts face a difficult interpretative problem when an arrangement breaks down over such disagreements. Framework agreements, just because they flexibly permit adjustments, may not provide clear answers to disagreements. Regarding terms that address disagreements, Bernstein and Peterson note: "*all are vague* about what happens when the [parties] cannot come to an agreement."¹⁰³ Courts therefore must *infer* efficient solutions to mid-stream disputes from an open agreement, the parties' behavior, and the context. Interpreting framework arrangements thus poses a challenge to current theories of contract interpretation.¹⁰⁴

A possible way to avoid interpretive disputes is for a party to apply to a court to reform the framework agreement so that it accurately reflects the parties' current situation. Unlike contract interpretation, which takes place after a relationship ends, interim reformation would offer parties a remedy that may prevent their arrangement from breaking down. In particular, reformation would give a party a credible threat to induce its counterparty to renegotiate the framework agreement. We pursue the possibility of using

103. *Id.* (manuscript at 41) (emphasis added).

104. Showing that reformation would be an efficient remedy for new-collaboration implementation-stage defections is a part of our more general project on contract interpretation. See Alan Schwartz & Simone M. Sepe, *Interim Contract Interpretation* 4–5 (August 2022) (unpublished manuscript) (on file with authors). In particular, new-economy collaborations would constitute a case of "unavoidable contextualism," where the nature of the exchange precludes a purely textualist approach and where, as a result, interpretive problems are likely very severe. See *id.* (manuscript at 5) (defining "unavoidable contextualism").

contract reformation as a remedy for new-economy disputes in section IV(A)(1) below, but we note here that asking a court to reform the agreement would require extending reformation doctrine. The court would not be correcting a mistake that a party made at the contracting stage but rather reforming a contract to govern an unanticipated situation.

4. *The Allocation Problem.*—If a collaboration succeeds, there will be a new, potentially profitable product. The parties’ task at this stage is to allocate rights and duties between them in order to market the product efficiently. For example, one party may agree to produce the product while the other may agree to market it.¹⁰⁵ Contracting at this stage may be challenging if residual asymmetric information persists. Thus, one party may have learned its partner’s development cost but not its production cost, while the partner may know little about concrete marketing opportunities. They will need to overcome these uncertainties in order to create a final contract.

II. Traditional Remedies for Traditional Transactions

A. *An Overview*

In the traditional economy, parties trade finished goods in developed markets and sellers sometimes specialize goods for buyers. Contract law functions well, this Part shows, for market trades but functions less well for specialized-goods trades. (We present the argument intuitively: the few technical analyses are in footnotes.)¹⁰⁶ Contract law, this Part also shows, functions not at all for the new-economy collaborations we study, because parties there develop specialized nonmarket goods. Part IV then sets out remedies that, we argue, would facilitate the new collaborations.

Contract law functions well when it (a) facilitates trades in which goods transfer from a party who values them less to a party who values them more; and (b) creates incentives for parties to invest efficiently in increasing transaction value. When parties are sophisticated and rational, asymmetric information is the obstacle to efficient trade and investment.¹⁰⁷ Asymmetric information exists in two forms. First, a party cannot *observe* relevant

105. Our analysis of COVID-19 production and marketing illustrates end-stage behavior. *See supra* text accompanying notes 1–4.

106. We begin these notes with trigger warnings for the non-technical reader.

107. We analyze transactions between firms. When these firms are symmetrically informed, they are generally expected to bargain to efficient outcomes without the law’s aid. *See generally* Alan Schwartz, *Relational Contracts in the Courts*, 21 J. LEGAL STUD. 271 (1992) (arguing that enforcing incomplete contracts “as written” may facilitate more efficient contracts). As we explain elsewhere, however, there might also be cases in which firms may fail to bargain or renegotiate efficiently even when symmetrically informed. *See* Schwartz & Sepe, *supra* note 104 (manuscript at 52) (discussing reasons bargaining might fail even without information asymmetry).

information about its counterparty or about the party's post-sale actions. For instance, a seller cannot observe the value a buyer would derive from the deal, or a buyer cannot observe the seller's costs.¹⁰⁸ Second, a party cannot *verify* information it observes to the court.¹⁰⁹ Asymmetric information exists in both of its forms because information about counterparties is costly for parties to acquire, and because facts are costly to establish in litigation.

Turning to remedies, the principal contract law remedy is the expectation interest.¹¹⁰ This remedy facilitates exchange efficiency—the efficient trade—because it requires a promisor to bear the expectation loss that breach would impose on the promisee. As a consequence, the promisor will breach only when performance of the contract would have been inefficient—that is, when the promisor's loss from performance would have exceeded the promisee's expected gain. A promisor, however, may breach inefficiently if the promisee could not verify its expectation to a court. The expectation remedy thus facilitates exchange efficiency when verification is convenient. This condition is satisfied, we show, when parties make market transactions. Markets produce information about values and costs that is inexpensive for parties to observe and to verify. In contrast, when a contract requires the seller to produce specialized goods for the buyer, the parties must be able to verify values or costs in order to establish the consequences of breach.—Three supplementary remedies—reliance damages, specific performance, and the liquidated-damage clause—are partial substitutes when the expectation remedy itself cannot yield exchange efficiency.

Turning to investment efficiency, parties transacting in markets expect that they will trade with their contract partner or will make essentially the same transaction with another firm if the promisor breaches. Because the parties know that the contract deal will occur, one way or the other, parties invest efficiently to maximize deal value. In the specialized-goods case, on the other hand, because parties may be unable to observe or verify a counterparty's investment actions, parties may choose privately efficient but socially inefficient investment levels. As an example, if it would be inefficient to trade a specialized good, the promisee would not make a similar

108. There are two problems: The first is “hidden information”: a party cannot observe its counterparty's “type.” See George A. Akerlof, *The Market for “Lemons”: Qualitative Uncertainty and the Market Mechanism*, 84 Q.J. ECON. 488, 489 (1970) (positing that a buyer cannot tell the difference between a good used car and a lemon). The second problem is “hidden action”: a party cannot observe its counterparty's post-contract actions (e.g., whether the counterparty invested efficiently in the transaction). See JEAN-JACQUES LAFFONT & DAVID MARTIMORT, *THE THEORY OF INCENTIVES: THE PRINCIPAL-AGENT MODEL 3* (2002).

109. This asymmetric information problem is also known as the incomplete-contract problem. See, e.g., BOLTON & DEWATRIPONT, *supra* note 31, at 490 (referring to this problem as “the incomplete-contracts approach”).

110. See *supra* note 23 and accompanying text.

deal elsewhere. Rather, the promisee would sue for its lost gain. Because the expectation-interest remedy insures that gain fully, the promisee may invest to maximize it rather than temper its investment to reflect the fact that, if the deal does not go through, its investment would have been wasted.¹¹¹

In the new economy, parties do not trade goods with each other in markets. Rather, framework collaborations exist to enable parties to produce a specialized product. Therefore, investment in the deal is required and, we show, asymmetric information is pervasive. That contract law performs inefficiently in the traditional economy when parties contract to produce specialized goods suggests that contract law also would perform inefficiently when parties collaborate to produce new products.

B. *The Market Context*

We initially show how the expectation-interest remedy functions when parties contract in developed markets. Price equals cost in these markets, which implies that parties contract at the market price: the seller will not price below market because it would incur losses, and the seller cannot price above market because it would lose business to rival firms. To facilitate our discussion of remedies, we use the following notation. The competitive market price when the parties contract—at t^0 —is the market price— m^0 . A party's investment in the transaction, if any, occurs at t^1 . The deal will conclude at t^2 . The t^2 market price, m^2 , can vary from the contract price, m^0 . If the seller breaches to sell the contract goods to a second buyer, it incurs an additional cost, c ; if the buyer breaches to purchase similar goods from a second seller, the buyer incurs the same transaction cost.¹¹²

We begin with exchange efficiency. The seller would prefer to breach and resell the contract goods at the t^2 market price if that price exceeds the contract price. The seller would realize the t^2 market price less its production cost (which equals the *ex ante* market price) and less the cost of reselling: seller's breach gain = $m^2 - m^0 - c$. The buyer, however, will sue for expectation-interest damages, which would be the difference between the market price and the contract price: $m^2 - m^0$.¹¹³ These damages would wipe out the seller's gain, leaving it to bear the uncompensated transaction cost, c . Anticipating having to pay expectation damages, however, the seller will

111. See Hermalin et al., *supra* note 31, at 106 (arguing that expectation damages are a “full insurance” remedy giving parties “the same net return in every state of the world”).

112. Resale or repurchase costs are “incidental damages.” See U.C.C. §§ 2-706, 2-708 (AM. L. INST. & NAT'L CONF. OF COMM'RS ON UNIF. STATE L. 2021) (providing that resale and repurchase costs can be recovered along with incidental damages).

113. These damages would permit the buyer to realize $v - m^0$, which is his expectation. See U.C.C. § 2-711 (AM. L. INST. & NAT'L CONF. OF COMM'RS ON UNIF. STATE L. 2021) (outlining buyer's damages).

tender the goods rather than breach. And because the t^2 market price, m^2 , we now assume, exceeds the contract price, m^0 , the buyer will accept the goods. The buyer will keep the goods if its value exceeds the later market price, or it will resell the goods to a higher-valuing buyer. Therefore, the parties will perform under their contract when the market price increases.

The buyer would prefer to breach and buy goods in the market if the t^2 market price is below the contract price. The buyer would realize its value less the market price and less the cost of transacting a second time: buyer's breach gain = $v - m^2 - c$. The seller, however, would sue for expectation damages, which would be the difference between the contract price and the lower market price: $m^0 - m^2$.¹¹⁴ These damages would wipe out the buyer's profit, leaving it with the uncompensated transaction cost, c .¹¹⁵ Therefore, the buyer accepts when the market price falls. Again, the buyer keeps the goods if their value exceeds m^2 , which is likely,¹¹⁶ or resells them to a higher-valuing buyer. To summarize, the expectation-interest remedy yields exchange efficiency in thick markets: the goods move from the seller to the buyer who values them most.

Turning to *investment* efficiency, the buyer may invest to increase its value from the deal or invest to reduce the seller's cost.¹¹⁷ Because the contract seller (or a similar seller) will complete the trade, the buyer always captures the value of either investment. The buyer thus invests efficiently to maximize value.¹¹⁸ Similarly, because the buyer (or a similar buyer) will perform, the seller always realizes the value of its investment. The seller thus invests efficiently to maximize its profit. In brief, because the parties know that they can conclude their deal, with their contract partner or with a similar firm, they will invest efficiently to maximize deal value.

We make two clarifying remarks. First, not every market transaction concludes at the contract price. A party may become liquidity constrained, more profitable opportunities may unexpectedly present themselves, macro

114. See U.C.C. § 2-708(1) (AM. L. INST. & NAT'L CONF. OF COMM'RS ON UNIF. STATE L. 2021) (“[T]he measure of damages for non-acceptance or repudiation by the buyer is the difference between the market price at the time and place for tender and the unpaid contract price together with any incidental damages . . . , but less expenses saved in consequence of the buyer's breach.”).

115. Under the seller's expectation damages, the buyer expects $v - m^2 - c - (m^0 - m^2) = v - m^0 - c$. Instead, if the buyer accepts, it receives $v - m^0$.

116. If the buyer's expected value exceeded the contract price when the parties contracted, the buyer's realized value probably would exceed the lower t^2 price.

117. If the buyer invests to reduce the seller's costs, competition will require the seller to charge a lower price. The seller also may invest “selfishly” to reduce its cost or “cooperatively” to increase the buyer's value. See Yeon-Koo Che & Donald B. Hausch, *Cooperative Investments and the Value of Contracting*, AM. ECON. REV., Mar. 1999, at 125, 126 (1999) (discussing the effects of selfish and cooperative investments).

118. In markets, investments are never wasted because trades always complete.

events such as a supply interruption may occur, and the like. The expectation-interest remedy, however, induces efficient exchange and investment behavior unless circumstances materially change. Second, and of particular importance, a court can protect each party's expectation *at minimal information cost*. When parties transact in a competitive market, the court only needs to know market prices because market prices equal contract prices equal costs. In economic terms, market prices are a "sufficient statistic" for the other relevant variables. Parties can inexpensively communicate market prices to courts.

C. *The Specialized-Goods Case*

As will appear, contract remedies perform less well than is commonly thought for the specialized-good case. Analysts usually assume that parties are symmetrically informed: they know the expected values of the relevant variables before they contract and their actual values thereafter.¹¹⁹ This assumption sometimes is unrealistic, and when it is relaxed, contracts sometimes can perform poorly. We stress here the difficulties that asymmetric information poses for traditional specialized-goods transactions as prelude to analyzing the new-economy collaborations. There, every collaboration attempts to create a tailored product, and the parties swim in a sea of uncertainty.

Again, we consider how contract remedies affect exchange and investment efficiency. Beginning with exchange efficiency, we consider three cases: (i) the seller produced the goods but the buyer wrongfully rejects them; (ii) the seller produced the goods but prefers to sell them to a later-appearing buyer; and (iii) the seller has not produced the goods but prefers breach because the seller recognizes that its realized cost would exceed the contract price. Alternatively, the buyer prefers breach because it recognizes that the price would exceed its realized value.¹²⁰

The expectation remedy yields exchange efficiency in case (i). The seller resells the goods and sues the contract buyer for the difference between the contract and resale prices.¹²¹ This sum would always exceed the contract buyer's gain from rejection because this buyer has the highest valuation. Anticipating a lawsuit, the buyer thus will accept regardless of the goods'

119. See Markovits & Schwartz, *supra* note 22, at 1972 (stating that "[c]ontract theory models commonly assume . . . that symmetric information exists" after contracting).

120. In cases (ii) and (iii), at contract time the seller predicts what its cost will turn out to be and the buyer predicts what its value will turn out to be. Later events may outmode these predictions.

121. See U.C.C. § 2-706(1) (AM. L. INST. & NAT'L CONF. OF COMM'RS ON UNIF. STATE L. 2021) (stating that the seller "may recover the difference between the resale price and the contract price" when "the resale is made in good faith and in a commercially reasonable manner").

value and, because that value is still the highest, exchange efficiency is realized.¹²²

In case (ii), the buyer can sue for specific performance because the goods are unique. Specific performance yields exchange efficiency if costs and values are observable. In this event, when the contract buyer has the highest valuation, it would compel the seller to deliver; but if the later-appearing buyer has a higher valuation, the parties would renegotiate to permit the seller to exit. The seller would pay the buyer's expectation plus a (bargained for) share of the gain that dealing with a higher-valuing buyer would create. If asymmetric information exists, however, the renegotiation bargain could fail.¹²³ If it does, the buyer would compel the seller to deliver the contract goods, though the buyer has the lower valuation.

In case (iii), a well-known result in contract theory is that parties will make efficient breach or performance decisions if the party that prefers exit must compensate the counterparty for its lost expectation. This result supposes, however, that values and costs are observable. For example, the seller would breach if its loss from performance¹²⁴ would exceed the damages it must pay.¹²⁵ But the seller cannot make this comparison if it cannot observe the buyer's realized valuation. More seriously, suppose the buyer itself cannot verify its value. If the seller announces that it will not produce the goods, the buyer could not credibly threaten to sue for its expectation.¹²⁶ As a result, in case (iii), the seller exits whenever it would incur a loss from performance, even when the buyer's value exceeds that loss. Similarly, the buyer would be free to exit inefficiently if the seller could not verify its cost.

To summarize, contract remedies yield exchange efficiency for specialized goods trades *only* when the buyer wrongfully rejects. In the other cases, which largely cover the field, contract remedies yield exchange

122. To clarify the point in text, the buyer has the highest valuation because the good was customized for it. Then let the contract price be p_k , and the resale price be p_s . The seller's damages would be $p_k - p_s$. The buyer's gain from breach would be the difference between the contract price and the buyer's realized valuation, v : $p_k - v$. This gain is always smaller than damages because $v > p_s$. That is, the second buyer values the goods less than the contract buyer does and so will pay a price that is lower than the buyer's valuation. As an example, let the contract price be 100, the buyer's realized value be 50, and the willingness of a second buyer to pay for goods customized to the first buyer be 30. The seller's damages would be $100 - 30 = 70$. The buyer's gain from breach would be the saving of $100 - 50 = 50$. Hence, the buyer accepts.

123. Asymmetric-information bargains fail when the seller's maximizing ask exceeds the buyer's valuation, or the buyer's maximizing bid is below the seller's cost. Such failures are common.

124. Using the same notation as in the text accompanying *supra* note 115 and in *supra* note 122, the seller's loss from performance would be $c - p_k$.

125. Using the same notation as in *supra* note 122, the damages the seller must pay would be $v - p_k$.

126. Using the same notation as in *supra* note 122, the buyer's expectation would be $v - p_k$.

efficiency only when the parties are symmetrically informed *ex post*. When they are not, goods may end up with the lower-valuing party because renegotiations can fail.

Turning to investment efficiency, contracts for specialized goods complicate remedy issues because there is no market for the completed goods. By assumption, the contract buyer has the highest valuation.¹²⁷ Without market discipline, the three major investment inefficiencies may occur: overinvestment, hold up, and underinvestment.

Beginning with *overinvestment*, parties have an incentive to overinvest because the expectation-interest remedy fully insures them against their counterparty's breach. Such a fully insured party will invest until the marginal investment cost equals the marginal gain. The inefficiency is that a party should temper its investment to reflect the possibility that the investment would have been wasted in a state of the world in which it would have been inefficient to complete the deal.¹²⁸

A deal would not be complete, however, in two ways: if the non-investing party breaches—say, the seller—or if the investing party—say, the buyer—itself breaches. The literature assumes away the latter possibility: there, the investing party always prefers performance. This premise is unrealistic. A sophisticated party recognizes that it may prefer not to perform in some *ex post* states.¹²⁹ The investing party in a specialized-goods deal thus

127. There may be a market *ex ante*: sellers compete for a contract to customize goods. But there is no market for the goods *ex post* because the goods have become specialized. Oliver Williamson characterized this difference as a fundamental transformation—from competition *ex ante* to bilateral monopoly *ex post*. See, e.g., Oliver E. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 J.L. & ECON. 233, 241 (1979) (describing idiosyncratic transactions in which the relationship between the buyer and seller transforms from competition before the transaction to bilateral monopoly afterwards because of transaction-specific costs).

128. See Steven Shavell, *Damage Measures for Breach of Contract*, 11 BELL J. ECON. 466, 472 (1980) (noting that a party does not recognize that reliance will not pay off in the event the other party breaches the contract).

129. This is a methodological note. There are two approaches to analyzing the parties' investment behavior. The buyer wants to complete a transaction with probability, p (not to be confounded with the p with subscript indicating the price in *supra* note 122), and the seller wants to complete the transaction with probability, q . We assume that p and q are independently realized. In practice, there may be some correlation between the parties' probability estimates, but if the probabilities were perfectly correlated, the parties could never disagree about whether to perform the contract or not. That probabilities are independent implies that they may differ: the seller and buyer could have different beliefs at the outset—different “priors”—about whether their deal will succeed. Now, under the first approach to the parties' investment behavior, a party's investment affects only the substantive variables: value, v , and cost, c . For example, the buyer's investment, r , increases its value (i.e., $v(r)$) but does not affect the probability that the buyer assigns to deal completion. Thus, we treat the parties' probability estimates as constants. Under the second approach, a party's investment affects the probability it assigns to deal completion but does not

will recognize that it no longer is fully insured. The expectation-interest remedy, that is, insures the party against its counterparty's breach *but not* its own. Investing parties will thus temper their investment behavior to reflect the possibility that investments would also be wasted if the investing party itself prefers not to complete. Parties to specialized-goods deals thus do overinvest but by less than the literature assumes.¹³⁰

The second investment pathology is *holdup*.¹³¹ Let a potential party to a contract invest in exploring whether a deal is possible with a particular counterparty *before* the parties contract. If a deal appears profitable, the parties will agree to one, but because the seller's investment is sunk, the price will not reimburse the seller for its investment costs. Anticipating this outcome, however, the seller will not invest initially.

In our third example, *underinvestment*, parties' investments are strategic substitutes: one party's investment could substitute for the other party's investment. The concern is that a party may shirk in the hope that the other party invests. For example, suppose that either Party A or Party B's investment would reveal whether a profitable deal exists. Because investment is costly, Party A has an incentive not to invest but to wait and see what Party B discovers. Party B, however, has the same incentive to wait and see. As a result, neither party may explore the possibly profitable opportunity: there is underinvestment.

Regarding the practical relevance of the three investment pathologies for the traditional economy, holdup seldom is a problem because parties can contract before they invest in their deal. Similarly, underinvestment seldom is a problem because parties can conveniently contract before exploring. Overinvestment (though in its moderated form), however, remains a concern.

affect the value of the substantive variables (e.g., $p(r)$ and $q(s)$ for the buyer and seller respectively where s is the seller's specific investment). Here, we treat the variables v and c as constants. The two approaches yield similar qualitative results because both parameters are concave in investment. This means that, under the first approach, the buyer's value is increasing in its investment but at a decreasing rate, and that, under the second approach, the probability of completing the deal is increasing in the buyer's investment but at a decreasing rate, and similarly for the seller. Concavity implies that there is an interior solution at the optimum for a party's investment program.

130. This note establishes the conclusion in text using the same notation as in *supra* note 129. The naïve buyer maximizes $v(r) - k - r$, where k is the contract price, so it invests until $v'(r) = 1$. The sophisticated buyer recognizes that it will perform with probability $p < 1$, so it maximizes $p(v(r) - k) - r$, where p is the probability of the buyer's own performance. Thus, the buyer will invest until $p(v'(r)) = 1$, which is less than the naïve buyer. It would be socially efficient, however, for the buyer to consider the actual likelihood of the deal going through, which is the joint probability— pq —that both parties will prefer performance, where q is the probability the seller will want to perform. The efficient buyer thus maximizes $pq(v(r) - k) - r$. The efficient level of investment, r^* , therefore solves $pq(v'(r)) = 1$. Because pq is less than p , the sophisticated buyer invests more than the efficient buyer would invest.

131. See sources cited *supra* note 31.

All three investment pathologies are a serious concern for new-economy collaborations. There, as Part I showed, parties make exploratory investments in order to see whether a collaboration is possible and to prepare to perform, and they make substantive investments to implement the collaboration.¹³² Parties must make both investments *before* the parties have a legally enforceable contract. Thus, the risks of holdup and underinvestment commonly attend new-economy collaborations. Overinvestment is a concern at the last stage if parties have made a contract to exploit a product they have developed. The expectation remedy may be apt here, so the overinvestment result it induces can occur. Before seeing how new remedies could efficiently respond to these pathologies, we consider two current remedies that can outperform the expectation in information-poor environments: reliance and liquidated damages.

D. *Supplemental Remedies*

1. *Reliance*.—It is particularly important for us to understand the reliance remedy. The remedy is only a supplement to the expectation in the traditional economy because an expectation often is possible for a disappointed promisee to establish. In contrast, reliance is a large part of the game for new-economy collaborations because, at their early stages, it commonly is impossible for the promisee to establish its expectation.

We begin by establishing two novel propositions. First, the reliance remedy can be more efficient than the expectation because a promisee's incentive to overinvest is *lower* under reliance. Second and relatedly, parties sometimes prefer a reliance remedy to the expectation remedy.

Regarding investment, there is a standard story. Reliance damages are lower than expectation damages because reliance reimburses costs while the expectation reimburses gains. Rationality implies that expected gains exceed expected costs. The promisor thus has a greater incentive to breach when the promisee's remedy is reliance: the damage costs are lower. The promisee's apparent best response to this incentive is perversely to increase its reliance in order to raise the promisor's breach cost.¹³³ In a new-economy collaboration, this result would imply that a party could spend excessively on exploring a deal's possibilities in order to prevent a counterparty's early defection.

This standard result does not hold under more realistic assumptions, however. When a buyer itself does not perform, its (negative) return is not a

132. See *supra* text accompanying notes 94–95.

133. This result appeared in William P. Rogerson, *Efficient Reliance and Damage Measures for Breach of Contract*, 15 RAND J. ECON. 39, 49 (1984).

function of its reliance, but rather is a function of the damages the buyer must pay to the seller. Thus, the buyer, when making its reliance decision, focuses on the future states in which it will prefer performance. Under the expectation remedy, the buyer who prefers performance receives his value, which is a function of his investment, whether the seller performs or pays damages. Under the reliance remedy, the buyer receives his value when the seller performs but *only* receives lower reliance damages when the seller breaches. The return to a reliance investment thus pays off fully either as the counterparty's performance or as damages under the expectation remedy, but only pays off partially under the reliance remedy. Hence, the buyer will rely more—that is, invest more—when the remedy is the expectation. A similar argument applies to the seller's reliance decision.¹³⁴

Our second proposition is that a party to a new-economy collaboration sometimes may prefer the reliance remedy to the expectation remedy. To see why, recall that parties seldom can make an enforceable contract until the execution stage—that is, until the collaboration has developed a product. If there is substantial uncertainty at a collaboration's start, the probability of making an enforceable contract often is low. On the other hand, the parties would certainly incur exploratory and startup costs. A reliance contract would make these costs recoverable. Therefore, though the expectation remedy generates a higher sum when there is an enforceable contract, the reliance remedy may yield a higher expected return because incurring exploratory costs is more probable than realizing collaboration success. The reliance remedy thus may encourage more participation in a new-economy venture than the expectation remedy.¹³⁵

134. This technical note establishes the conclusion in text. Recall that we are considering relation-specific investment with bilateral uncertainty. *See supra* note 129. Hence, both the buyer and the seller have incentives to take the possibility of their own defection into account. The buyer's uncertainty implies that his value is $v(r)$ with probability $p < 1$ and zero otherwise. The seller's uncertainty implies that her cost is $c(s) < v(r)$ with probability $q < 1$, which implies that its cost is $c > v(r)$ with probability $1 - q$. The buyer's investment program, which is identical to the social planner's program, should solve $pq(v(r) - k) - r$. The socially optimal relation-specific investment, r^* , is then determined by the first-order condition (FOC): $v'(r) = 1/pq$. Under expectation damages, the buyer maximizes $pq(v(r) - k) + p(1 - q)(v(r) - k) - (1 - p)q(k - c) - r$ so the equilibrium investment, r_{ed} , is determined by the FOC: $v'(r) = 1/p$, from which we have $r_{ed} > r^*$ by the concavity of $v(r)$. Under reliance damages, by contrast, the buyer maximizes $pq(v(r) - k) + p(1 - q)(r) - (1 - p)q(s) - r$, where s is the seller's specific investment. The equilibrium investment, r_{rd} , is determined by the FOC: $v'(r) = (1 - p + pq)/pq$. Because $1/pq > (1 - p + pq)/pq$, by the concavity of $v(r)$, we have $r_{rd} > r^*$. Under the reliance remedy, there is still overinvestment. But because $(1 - p + pq)/pq > 1/p$, also by the concavity of $v(r)$, we have $r_{ed} > r_{rd}$, which means that overinvestment is lower under the reliance remedy than under the expectation remedy. A similar argument applies for the seller.

135. Section IV(A)(1) formalizes this argument.

2. *Liquidated Damages*.—A liquidated-damage clause (LDC) is a contractual transfer the promisor must make to the promisee if the promisor breaches.¹³⁶ The LDC induces exchange efficiency when the transfer approximates the buyer's expectation because then the seller will make the transfer only if its loss from performance would exceed the promisee's loss from breach. An LDC that turns out to vary widely from the promisee's expectation, however, can induce an inefficient trade—the transfer it requires is too high—or an inefficient breach—the transfer is too low.

The LDC can improve investment efficiency relative to a contract that awards the promisee's expectation or a right to specific performance, however.¹³⁷ Under the LDC, the buyer captures the benefit of its investment only when the seller performs, but is relegated to a contractual fixed sum unrelated to his investment when the seller breaches. The buyer thus invests less than it would under the expectation-interest or specific-performance remedies because these remedies permit the buyer to capture the value of its investment whenever the buyer wants to perform.

Applying these results to new-economy collaborations, specific performance in its current incarnation would not be apt, except perhaps at the execution (last) stage, because there are no finished goods for a court to order transferred in the earlier stages. An LDC that attempts to replicate the buyer's expectation is impractical because parties seldom can predict values and costs for goods yet to be developed. And an LDC that attempts to replicate a party's reliance is unenforceable.¹³⁸

In sum, while the supplemental remedies are partial fixes for the exchange and investment inefficiencies that attend traditional transactions, they are not fixes *in their current form* for similar inefficiencies that attend new collaborations. The transformations of these remedies that would be productive, we later suggest, sometimes would require courts to play a more active facilitative role than they do in connection with traditional-economy contracts. To better understand that role we briefly describe how courts enforce contracts today.

136. See Aaron S. Edlin & Alan Schwartz, *Optimal Penalties in Contract*, 78 CHI.-KENT L. REV. 33, 34 (2003) (explaining in technical detail the functioning of liquidated damages).

137. See Hermalin et al., *supra* note 31, at 84 (discussing how LDCs (drafted by the parties) are likely to be superior to general default rules (selected by courts or legislatures) in many cases because the contracting parties are better suited than courts to choose the particular trade-off that is best for their own transaction).

138. Courts permit parties to acquisition agreements to specify a transfer—the breakup fee—that the target company must pay to the disappointed acquirer if the target sells itself to another firm. The breakup fee is partly intended to reimburse the acquirer for incurred costs, but contracting over breakup fees is not free. Courts review the reasonableness of these fees and today cap them at, at most, 4% of deal value. Other than this, contractual transfers intended to reimburse for costs would be classified as penalties under current law.

III. Traditional Enforcement of Traditional Transactions

There is, in effect, one traditional-economy remedy—specific performance. To understand this descriptive claim, we begin with a familiar definition: a contract is “obligationally complete” when a court can supply a remedy for its breach.¹³⁹ Three terms are required for obligational completeness: a price, quantity, and description of what the parties intended to trade.¹⁴⁰

Contract remedies are mandatory, but the remedies that Part II showed are efficient would be good defaults if parties could contract freely. Parties would accept a default rule that required the promisor to pay market damages and would accept the standard expectation-interest remedy when values and costs are observable.¹⁴¹ When the efficiency conditions for the reliance remedy, traditional specific performance, or liquidated damages are satisfied, parties would make reliance, specific performance, or liquidated damages contracts as well. Therefore, when a court orders a reluctant promisor to transfer the difference between contract and market prices, the promisee’s value, the goods themselves, or a contractually specified sum, the court is specifically enforcing the contract that parties prefer. The interpretation and gap-filling functions of courts complete this promissory scheme. A court’s interpretation clarifies the description of the contract’s subject. A court fills a gap with a term that the court believes would advance the parties’ goal.¹⁴² The court then enforces the clarified or supplemented contract with remedies, it believes, most parties would choose.

We stress a particular feature of the court’s role. A court enforces a traditional-economy contract by requiring a breaching promisor to take the transaction’s last step: the action the promisor agreed to take in order to conclude performance. For example, the promisor in a specialized-goods transaction, at the end, should have transferred the goods if it would have

139. See Ian Ayres & Robert Gertner, *Strategic Contractual Inefficiency and the Optimal Choice of Legal Rules*, 101 YALE L.J. 729, 730 (1992) (developing this definition).

140. *Id.* In some industries, parties use open-price long-term contracts, which require the buyer to purchase goods and authorize the seller to set prices. Courts can enforce these contracts because the seller’s behavior is regulated for good faith and reasonableness under U.C.C. § 2-305 (AM. L. INST. & NAT’L CONF. OF COMM’RS ON UNIF. STATE L. 2021). Sellers price primarily to reduce volatility, thereby helping the buyers to plan. Michael D. Noel & Honjie Qiang, *Open Price Contracts, Locked-In Buyers, and Opportunism* 5 (July 25, 2020) (unpublished manuscript) (on file with authors).

141. See Markovits & Schwartz, *supra* note 22, at 1952 & n.29, 2006 (arguing that the expectation remedy is the correct default in contract law).

142. See Schwartz & Scott, *supra* note 18, at 1586–87 (noting that “commercial contracts . . . combine standards with specific rules or instructions so as to define the constraints or delimit the space within which the standard is meant to function,” and “[c]ourts can infer the parties’ goals from these rules and instructions”).

been efficient to trade or transferred the promisee's value if not.¹⁴³ A court enforces this traditional contract when it orders the promisor to transfer value if the promisor has not transferred goods. And after a court interprets a contract or fills a gap, the court acts as if the contract had always been clear or obligatorily complete. That is, the court, retroactively as it were, orders the promisor to take the last step that the interpreted or the completed contract requires. This step commonly is tender of goods or payment. In short, courts specifically enforce traditional-economy contracts by requiring the promisor to conclude the contract as it promised.

In contrast, when a party to a collaborative contract defects at the beginning or middle stages, the framework agreement cannot specify a concluding step. Rather, defection prevents the parties from moving to the next stage. Therefore, a court necessarily must play a different role as regards new-economy collaborations. As we show, the court's choice is either to withdraw or to become part of the parties' mechanism. The court's role, that is, should shift from enforcing a final contract to coordinating the parties' behavior.¹⁴⁴ Coordination can have an epistemic function—to align parties' beliefs in light of their current information—or a control function—to require parties to comply with their framework agreement's procedures. The goal of both strategies should be to facilitate parties' ability to continue efficient projects that asymmetric information would otherwise have caused them to end.

IV. New Remedies for New-Economy Collaborations

Courts would efficiently facilitate new-economy collaborations by expanding four current remedies:

- (i) The reliance remedy at the pivot stage: Courts today award a disappointed promisee costs it incurred in preparing to perform a contract if its counterparty made an enforceable promise.

143. See Markovits & Schwartz, *supra* note 22, at 1962 (explaining that the “dual performance hypothesis” holds that a contract imposes on the promisor either the obligation of transferring the goods or transferring the gain the promisee would have made on those goods).

144. In game theoretic terms, this court function implements a “correlated equilibrium.” See generally Robert J. Aumann, *Subjectivity and Correlation in Randomized Strategies*, 1 J. MATHEMATICAL ECON. 67 (1974) (exploring how the use of correlated strategies in a noncooperative game can achieve equilibrium). A technical discussion would be out of place, but the basic intuition is simple. Players' choices of strategies (e.g., to cooperate or not cooperate) may be correlated when the players condition on the same random events to decide which strategy to play. Now consider a game that includes an “observer” (e.g., a court) whose task is to recommend a strategy to each player. The observer will recommend a subset of strategies according to a probability distribution over the set of possible strategies, which the players commonly know. This probability distribution is called a correlated equilibrium if the strategy vector in which all players follow the observer's recommendations is a Nash equilibrium—that is, if following the recommendations is the best response (the most efficient action) each player can take.

Courts also should award a disappointed party new collaboration costs incurred in exploring whether the collaboration would be profitable, if the counterparty made a similar commitment to explore but reneged.

- (ii) A liquidated-damage clause at the pivot stage: Courts today enforce an LDC if the clause reflects a reasonable estimate of the promisee's expectation. Courts also should enforce an LDC that reflects a reasonable estimate of the costs a party could incur in exploring and beginning a new-economy collaboration.
- (iii) Reformation at the implementation stage: Courts today reform contracts when a party entered into a contract partly in consequence of a factual mistake. The reformed contract reflects the deal both parties believed they were making.¹⁴⁵ Courts also should reform a collaborative framework agreement to reflect the optimal path forward in light of information developed after the parties' relationship began.
- (iv) Specific performance at the implementation (and possibly the execution) stage: Courts today sometimes order a promisor to transfer the contract goods to the promisee. Courts also should order a promisor to comply with the framework agreement it agreed to implement.

A. *Encouraging Participation*

The state's goal should be to encourage parties to participate in potentially efficient collaborations. At the pivot stage, parties often make preliminary agreements that govern their investigation of whether a profitable transaction is possible. For example, Firm A's task could be to explore marketing and financing opportunities; Firm B's task could be to explore technical feasibility. The concerns at this stage are holdup and underinvestment because the parties' exploratory investments often are partial strategic substitutes. As an illustration, let Firm A perform but Firm B shirk. If Firm A's investigation reveals a promising deal, the parties likely would bargain to a framework agreement; the bargain, however, would not compensate Firm A for its sunk exploratory costs. Suppose instead that Firm A's investigation shows that a deal would be unsuccessful. The parties will part, but Firm B will not compensate Firm A for saving Firm B money. Anticipating exploitation, Firm A may not begin. And because Firm B's investigation could also be illuminating, a shirking Firm A may exploit

145. See STEVEN J. BURTON, *ELEMENTS OF CONTRACT INTERPRETATION* 102 (2009) (explaining that the reformation exception to the parol evidence rule "is based mainly on the premise that the parties' intend to replace their subjective agreement with an accurate written contract").

Firm B. Anticipating exploitation, neither party may invest and the collaboration would not occur.

The question we take up is whether a court's best response to holdup should protect the compliant party's expectation interest or its reliance interest. To be sure, this seldom would be a real choice. Doctrinally, the expectation interest is awarded for breach of a complete contract, but at the initial stage there isn't a complete contract. And as a practical matter, the compliant party seldom could prove the gain it would have realized under a framework agreement that the parties had not implemented. Nevertheless, a comparison of the two remedies has heuristic value because an important implication follows from the result. Contract law, "in the light of . . . the difficulties of proof of loss," enforces a liquidated-damage clause that plausibly estimates the promisee's expectation.¹⁴⁶ Because the expectation is the remedy the law permits, a contractually required transfer that approximates the expectation is enforceable. Because reliance is not the remedy the law permits—there must be an enforceable promise—a contractually required transfer that approximates reliance is not enforceable.¹⁴⁷ Suppose, however, that the expectation usually is too difficult to prove at the initial stage and that reliance damages sometimes are efficient. It should then follow that a contractually required transfer that approximates reliance should also be enforceable.

To support this implication, we next show that reliance could be an efficient remedy—that is, reliance would be more likely to satisfy the typical parties' participation constraints than the expectation.¹⁴⁸ Our method is to solve the remedy-choice problem for each party separately, and then use the results to see which preferred remedy is more likely to satisfy both parties' participation constraints jointly. As we will see, reliance damages would best

146. RESTATEMENT (SECOND) OF CONTRACTS § 356(1) (AM. L. INST. 1981).

147. Several scholars have argued that the liquidated-damage rules should be repealed; courts should not review contractually required transfers at all, subject to the constraints of fraud, unconscionability, and other forms of overreaching. See, e.g., Alan Schwartz, *The Myth that Promisees Prefer Supracompensatory Remedies: An Analysis of Contracting for Damage Measures*, 100 YALE L.J. 369, 370–71 (1990) (arguing for the abandonment of the *ex ante* as well as *ex post* branches of the liquidated-damage rule and allowing parties to contract for specific relief); Charles J. Goetz & Robert E. Scott, *Liquidated Damages, Penalties and the Just Compensation Principle: Some Notes on an Enforcement Model and a Theory of Efficient Breach*, 77 COLUM. L. REV. 554, 557 (1977) (hypothesizing that "absent evidence of process unfairness in bargaining, efficiency will be enhanced by the enforcement of an agreed allocation of risks embodied in a liquidated damage clause"). Because the practice of judicial review is likely to remain, we argue here that courts should enforce contractual transfers that reflect a reasonable estimate of exploratory and startup costs.

148. Recall that a participation constraint is satisfied when a party's expected return from participating in a transaction is higher than the expected return from its next-best alternative. See SALANIÉ, *supra* note 31, at 122 (illustrating the application of the participation constraint via an example of a principal inducing an agent to work).

induce participation in more cases. This result, together with the difficulty most parties would face estimating an expectation, supports making a contractual transfer in the amount of expected reliance enforceable.

1. Reliance at the Pivot Stage.—We begin with the buyer's problem.¹⁴⁹ Using the notation in the footnotes above concerning bilateral uncertainty¹⁵⁰ and letting the buyer's next best opportunity equal zero, the reliance remedy is more likely to satisfy the buyer's participation constraint when the following inequality holds¹⁵¹: $p/(1-p)(\Pi_B - r^F) \leq q/(1-q)(\Pi_S - s^F)$. This complex expression captures a simple intuition. The probability that the buyer will want to collaborate is p , and the adjacent term in parenthesis is the buyer's expected gain from collaborating: its profit (Π_B) less exploratory costs (r^F). Thus, the left-hand side of the inequality represents the insurance value the expectation remedy creates for the buyer: the value to the buyer of the seller insuring it if the seller breaches. The probability that the seller will want to collaborate is q , and the term in parenthesis is the seller's expected gain from collaborating: its profit (Π_S) less exploratory costs (s^F). Thus, the right-hand side is the insurance value the expectation remedy creates for the seller: the value to the seller of the buyer insuring it if the buyer breaches. The inequality thus says that the buyer prefers reliance when the expected value of the seller insuring the buyer is lower than the expected cost of the buyer insuring the seller.

149. The next few paragraphs and the accompanying notes are unavoidably technical, but we stress the intuition throughout.

150. See *supra* notes 129, 130, 134. We assume now for convenience that parties have equal bargaining power. We relax this assumption below. See *infra* section IV(A)(2). Parties divide the contract surplus by choosing the price, k ; hence, $v - k$ is the buyer's surplus and $k - c$ is the seller's surplus. The contract surplus thus is $v - c$: value less cost. When the parties' bargaining power is equal, they split the surplus equally: $\Pi_B = \Pi_S = (v - c)/2$.

151. This technical note explains how we derived the inequality in the text. When the buyer's outside option is set to zero, the buyer's expected return—which determines his willingness to participate in the transaction—under expectation damages is $pq(v - k) + p(1 - q)(v - k) - (1 - p)q(k - c) - r^F$. The buyer's expected return under reliance is $pq(v - k) + p(1 - q)r^F - (1 - p)q(s^F) - r^F$. Reliance damages provide a greater incentive to participate than expectation damages when $p(1 - q)r^F - (1 - p)q(s^F) > p(1 - q)(v - k) - (1 - p)q(k - c)$. Rearranging this expression yields the inequality in the text. The reader can also check that the seller's condition that makes it prefer reliance is satisfied when $q/(1 - q)(\Pi_B - s^F) \leq p(1 - p)(\Pi_B - r^F)$ holds. Exploratory-specific investments for new collaborations are both fixed and continuous. One can define a fixed investment as the lower bound of a continuous investment, but it is more illuminating to regard fixed investments as necessary for the buyer (Firm A) and the seller (Firm B) to make in order to begin operations. A continuous investment increases the contract surplus once the relationship has begun. Note, however, that because damages are a zero-sum game—increasing one party's damage payoff reduces the other party's payoff—the buyer's and seller's conditions for preferring reliance over expectation damages sometimes cannot be satisfied simultaneously.

The left-hand side of the inequality becomes smaller as the probability that the buyer will prefer to collaborate— p —is smaller;¹⁵² and as the buyer’s exploratory costs— r^E —increase. Thus, the buyer is more likely to prefer a reliance remedy when it believes that success is a long shot but it will cost the buyer a lot to find out. The result that “reliance insurance” can create a stronger incentive for a party to make exploratory investments than “expectation insurance” is prelude to the determinative question: can the reliance remedy satisfy both parties’ participation constraints simultaneously? We consider two common cases when both parties would prefer reliance: if one party is risk-averse and if the parties’ bargaining power is unequal.

2. Allocative and Distributive Effects.—A firm is risk-averse when it considers risk when deciding whether to make a contract.¹⁵³ Firms act as if they are risk-averse when the firms are undiversified—that is, when a firm is committing a non-negligible share of capital to a particular venture.¹⁵⁴ Risk-averse parties prefer full insurance, which would imply that undiversified parties prefer the expectation remedy. On the other hand, and as the inequality above showed, even a risk-averse party may prefer not to insure its counterparty fully: the benefit the risk-averse party receives from the higher insurance that expectation damages provide could be lower than the cost the expectation remedy would impose on the risk-averse party if it defects. The less risk-averse a party is, the more likely it will be that the cost of fully insuring the counterparty would outweigh the gain from the counterparty insuring it. To see what follows, let the seller be mildly risk-averse and the buyer be risk-neutral. Then, if the buyer prefers reliance, the reliance remedy would satisfy both parties’ participation constraints jointly because a mildly risk-averse seller would prefer low-cost reliance insurance.

To illustrate this insight, consider a common new-economy collaboration. A large drug company—the buyer—and a small startup—the seller—are exploring a venture to develop a user-friendly way for patients to self-administer injections. The drug company is likely to be risk-neutral because it invests in a number of ventures. The startup is likely to be risk-averse because its founders invested much of their capital in the venture at

152. The left-hand side expression— $p/(1-p)$ —is the buyer’s odds ratio: the ratio of the number of events that produce an outcome to the number of events that do not (i.e., if p is 50%, the odds ratio is 1; if p is 20%, the odds ratio is 1/4). Hence, the smaller p is, the smaller the left-hand side of the inequality is.

153. See Alan Schwartz & Robert E. Scott, *Contract Interpretation Redux*, 119 YALE L.J. 926, 947–48 (2010) (offering circumstances in which a firm may act as if it is risk-averse).

154. See KENNETH J. ARROW, *ESSAYS IN THE THEORY OF RISK-BEARING* 91 (1971) (observing that risk-aversion is common when large amounts are at stake).

hand. Hence, the reliance remedy is more likely to encourage both of these parties to collaborate than the expectation remedy.

Turning to our bargaining power example, the small startup likely has less bargaining power than the drug company has; hence, the company would capture a substantial fraction of the surplus a successful development would create. We illustrate the remedy implications as follows: the parameters are $p = q = 0.5$ (the joint probability of success is 0.25); v (expected) = 120 and $c = 80$ (so that the contract surplus is 40); the contract price $k = 90$,¹⁵⁵ implying that the buyer realizes 3/4 of the surplus; the seller realizes 1/4 of the surplus; and the parties' exploratory costs are equal— $r^F = s^F = 2$. The assumed transaction would create an expected surplus of 6 (i.e., $0.25(40) - 2 - 2 = 6$).

Though this venture is *ex ante* profitable, both parties would not participate if the remedy were expectation damages. The buyer's expected value from the contract would be 10.5,¹⁵⁶ but the startup's expected value would be -4.5.¹⁵⁷ As a result, the startup seller will prefer its outside option (i.e., 0) and refuse to make a framework agreement. Were reliance the remedy, in contrast, the buyer's expected value from the contract would fall to 5.5,¹⁵⁸ but the seller's expected value would increase to 0.5.¹⁵⁹ Because the weak seller's outside option is (assumed to be) 0, the seller now would participate in the venture.

Though we have illustrated the value of the reliance remedy with two examples, the intuition that underlies the examples is general. Reliance reduces the downside risk for the risk-averse party or the party with less bargaining power because reliance does not force this party (in the examples,

155. This example assumes that k is partly exogenously determined. For example, one party has more market power than the other. On the other hand, if the parties are in a bilateral monopoly situation at the bargaining stage, they will endogenously choose k in order to satisfy the seller's participation constraint. This illustrates Williamson's "fundamental transformation" in which an *ex ante* competitive relationship between two parties turns into an *ex post* bilateral monopoly. See Williamson, *supra* note 127, at 241 (describing buyer-seller relationships that are transformed into bilateral monopolies); Klein et al., *supra* note 31, at 299 (illustrating situations where investment in a specialized asset leads to monopoly power).

156. The buyer's expected payoff under the expectation remedy is: $pq(v - k) + p(1 - q)(v - k) - (1 - p)q(k - c) - r^F$. Substituting for the value of the parameters in the example, we obtain: $0.25(30) + 0.25(30) - 0.25(10) - 2 = 10.5$.

157. The seller's expected payoff under the expectation remedy is: $pq(k - c) + q(1 - p)(k - c) - (1 - q)p(v - k) - s^F$. Substituting for the value of the parameters in the example, we obtain: $0.25(10) + 0.25(10) - 0.25(30) - 2 = -4.5$.

158. The buyer's expected payoff under the reliance remedy is: $pq(v - k) + p(1 - q)(r^F) - (1 - p)q(s^F) - r^F$. Substituting for the value of the parameters in the example, we obtain: $0.25(30) + 0.25(2) - 0.25(2) - 2 = 5.5$.

159. The seller's expected payoff under the reliance remedy is: $pq(k - c) + q(1 - p)(s^F) - (1 - q)p(r^F) - s^F$. Substituting for the value of the parameters in the example, we obtain: $0.25(10) + 0.25(2) - 0.25(2) - 2 = 0.5$.

the seller) to insure the stronger party's larger gain. Making a reliance default available therefore could have positive distributional as well as efficiency effects; reliance would increase the opportunity of weak parties to enter potentially profitable collaborations.

To summarize, reliance should be the default at the pivot stage because (i) it often will be the only possible remedy; (ii) the remedy is more likely to encourage parties to enter into collaborations; and (iii) reliance encourages participation by young, relatively weak firms. Also, if reliance is the pivot-stage default, courts should enforce contractual transfers meant to compensate a party for reliance costs. Stating the transfer argument fully: (a) exploratory costs may be difficult to verify; (b) parties could design a reliance contract to satisfy the parties' participation constraints; (c) such a contract could reflect parties' different probability estimates or circumstances;¹⁶⁰ and (d) parties would not require transfers that would exceed or be below a party's best estimate of its reliance costs. An excessive demand could deter a possible counterparty from entering into a potentially profitable deal; an inadequate demand could leave the party with uncompensated expenses.

Implementing a reliance default, however, requires a court to know which acts should trigger liability. To pursue this question, suppose that parties agree at the outset that each of them should invest to see if a profitable transaction exists. One party invests but the other party waits and then, better informed, exits without investing. As indicated above, the compliant party should be able to use the reliance default or a contractually required reliance transfer to recover its costs.¹⁶¹

B. *Encouraging Efficient Continuance*

1. *Defection.*—Parties face two problems at this stage: inefficient defections and unjustified refusals to cooperate. We first examine defection. Next we turn to noncooperation.

Permitting the party who prefers continuance to obtain an interim reformation of the parties' framework agreement would be a helpful legal response to the inefficient-defection concern. The availability of a

160. Parties aware of the need to encourage entry at the pivot stage likely would agree that the more optimistic party or the party whose investments are likely to be made later should compensate the more pessimistic party or the party whose investments are largest at the start for incurred costs if the pessimist exits.

161. See Schwartz & Scott, *supra* note 16, at 666–67 (offering an earlier preliminary suggestion along these lines and arguing in a different context that a party that breached a promise in a preliminary agreement to make an exploratory investment should compensate its counterparty for that party's verifiable costs).

reformation action would also induce the reluctant party to disclose more information than it otherwise would. Increased disclosure, in turn, increases the likelihood that parties will voluntarily renegotiate to the efficient path forward.

a. The Law of Reformation.—Reformation is an equitable remedy that lies for a mistake of fact, but “[a]n erroneous belief must relate to the facts existing at the time of the making of the contract. A party’s prediction . . . as to events to occur in the future, even if erroneous, is not the type of mistake that summons the court of equity into action.”¹⁶² Put more simply, a “mutual mistake of fact cannot lie with respect to a future event.”¹⁶³ As an example, suppose that parties agreed to trade quantity Q on the assumption that demand for the seller’s product would be high. A court will not reform the contract to permit the seller to tender the lower quantity R if demand turned out to be low.

It is efficient not to reform a traditional sales contract because the parties made an erroneous prediction. Sales contracts allocate the risk of market declines to the buyer and market increases to the seller. A court would vitiate this risk-allocation if it changed terms to reflect the deal the parties would have made had they perfectly anticipated the future.

The rule that a court should not upset a contractual risk allocation is inapplicable to the new-economy collaborations we study. The framework agreements that govern these collaborations do not allocate the risk of future events. Rather, collaboration parties partially create the future through their actions.¹⁶⁴ Therefore, a court that reforms a framework agreement better to reflect the *ex post* state would not frustrate the parties’ purposes. The questions we take up here are why parties need an interim reformation when the parties can modify a framework agreement on their own, and what effect the remedy’s availability would have on the parties’ incentives to cooperate. We answer that the reluctance of parties to reveal private information, or uncertainty regarding the parties’ legal rights, can cause renegotiations to fail. The availability of an action in which the reluctant party can be compelled to respond to an interpretation request by its counterparty would facilitate voluntary disclosures and thus increase the number of efficient,

162. RICHARD A. LORD, 27 WILLISTON ON CONTRACTS § 70:3 (4th ed. 2022).

163. *Id.* § 70:4. See also BURTON, *supra* note 145, at 102 (“To get reformation, the party seeking it must prove that, unknown to either party, their true agreement differed materially from the written agreement. Examples are typographical and transcription errors, or the parties’ inattention to the writing.” (footnotes omitted)).

164. See Gilson et al., *Text and Context*, *supra* note 38, at 44 (observing that “[c]ontext . . . [is] endogenous: the contract process is designed to create context rather than respond to it”).

voluntary modifications. The interpretation action would also clarify uncertainty regarding the parties' legal rights.

b. Midstream Reformation at the Implementation Stage.—A collaboration should end when it is unlikely to produce anything valuable. Thus, we analyze premature or inefficient breakups: those in which an informed observer would think that continuing the collaboration would probably eventuate in success. Part I showed that such collaboration breakups may occur when parties come to hold inconsistent beliefs about the prospects for success, or when a party interprets an imperfectly observed counterparty's action negatively. We summarize these reasons under the heading "asymmetric information" because commercial parties commonly reason to the same result when they observe the same data. In this subsection, we make the asymmetric-information explanation for inefficient breakups more precise and argue that a modified reformation remedy would reduce them.

We support this claim with an example that begins at the pivot stage. The parties are attempting to develop a new machine. The buyer produces intermediate goods: products that the buyer sells to end users. The buyer believes that a potential seller-maker could produce a machine that would be compatible with the buyer's existing factory setup and would increase output efficiently. Because such a machine is yet to exist, the buyer recognizes that it could come in various versions, each of which would affect the buyer's return differently. We denote the buyer's use of possible versions as buyer "types." The set of such types is X_i , where i can take on any value from one to infinity. For example, we write a buyer's use of a possible type three machine as type X_3 . Importantly, each type is multidimensional. Thus, an X_3 machine would run at a certain rate, require servicing at particular intervals, need particular safety devices, and so on. An X_4 machine also might contribute to the buyer's return but would differ along some or all of these dimensions.

In this illustration, the set of machine types— X_i —is common knowledge (i.e., both potential parties know it). The attributes a buyer would find desirable for a particular machine type to have, however, is partly the buyer's private information. The buyer is not only interested in a machine's physical characteristics—e.g., the run rate—but also in how the machine would fit with the buyer's other machines, the ability of the buyer's employees to operate the machine, and other factors. The buyer will communicate to a possible seller-maker only a subset of these potentially valuable attributes. This is partly because the buyer does not know which attributes would be helpful for the seller to know given the buyer's limited information about sellers and novel machines, but also because the seller

could exploit some attribute information. For example, information about the attributes the contract buyer would find attractive could be partly generic: that is, the seller might use the information to make a more favorable deal with another industry buyer.

To represent what the parties know about the buyer at the start, we let $n > 1$ attributes in total fully characterize a possible type—in our illustration, the uses a buyer would make of an X_3 machine. The buyer will communicate $m < n$ attractive attributes to the seller. The seller thus knows m ; the buyer knows the full set n ; and $\Delta_3 = n - m$ is the buyer's private information regarding an X_3 type machine.¹⁶⁵

Turning to the seller-maker, at t^0 the seller believes that it would be technically feasible to produce a machine that could perform various useful functions for firms in the buyer's industry. We denote the set of functions a new machine could perform as F_j where again j could take any value from one or greater, and F_j (the set of possible functions) is common knowledge. Each possible machine function also is multidimensional. Thus, a particular machine version— F_3 —could cut steel to certain thicknesses, configure the steel in various shapes, take two employees to operate, require particular safety devices, and so on. An F_4 machine also could perform useful functions, but these would not perfectly overlap with F_3 functions.

The seller will communicate to a possible buyer only a subset of the possibly relevant functions a new machine could perform. The seller may not know just which functions would fit best with possible buyer types and how much it would be useful for the seller to disclose about each of these functions. Importantly, the seller would be reluctant to disclose information that a potential buyer could exploit. For example, the seller's production costs would vary with the number and type of functions a particular machine could perform. The seller may be reluctant to disclose production costs because a buyer could use the information to bargain for a low price.

To represent what the parties know about the seller at *the start*, let y functions in total fully characterize an M_3 machine. The seller will communicate $z < y$ functions to a potential buyer. The buyer thus knows z ; the seller knows the full set y ; and $\beta = y - z$ is the seller's private information about the functions the M_3 machine could perform.¹⁶⁶ And to summarize, we characterize the "information structure" at t^0 in our illustration as follows: the

165. Technically, the buyer's information takes the form of a matrix with $I + 1$ columns and n rows, where the columns are the numbers of possible setups and the rows are the numbers of attributes of the setups. It is unnecessary to set out the full matrix to understand the points the text makes.

166. Technically, the seller's information takes the form a matrix with $J + 1$ columns and y rows, where the columns are the number of the possible set of functions for each kind of software and y is the number of specific functions for each kind of software.

sets of buyer types and seller functions, X_i and F_j , are common knowledge; the buyer's private information about the attributes it prefers is Δ ; and the seller's private information about the machine functions it could produce is β .

To see how a midstream-reformation remedy would work, we assume that both parties believe at t^0 that their project is sufficiently promising to go forward. The buyer thus explores use types further, investigates marketing opportunities, and so on; and the seller explores production functions further and investigates input costs, and so on. Importantly, as described in Part II, the parties learn more about each other through explicit communication and in the course of working together. Parties also may be willing to disclose more as trust builds between them.

This brings us to the implementation stage, t^1 . The parties must make another go or no-go decision. The production sets X_i and F_j probably change because parties learn more about what each member of them can do; but, we assume, the sets remain common knowledge. Thus, we focus on the parties' private information about type attributes and machine functions.

We consider three cases. In case (i) the seller has learned more about the machine functions it could produce and, importantly, learned more about buyer attribute types. In our illustration, Δ —the measure of the buyer's private information—has materially shrunk.¹⁶⁷ The now well-informed seller believes that there is at least one machine version it could produce that the buyer would want to purchase. We let this be an F_3 machine.¹⁶⁸ Similarly, the buyer has learned more about the attribute types it values and, importantly, learned more about machine functions. Thus, β —the measure of the seller's private information—has materially shrunk.¹⁶⁹ The now well-informed buyer believes that the seller could produce a machine with functions that would suit the buyer's preferred attributes. Thus, in case (i) both parties think that the prospects for success justify continuing the collaboration through to the final execution stage.¹⁷⁰ In case (ii), both parties have become better-informed but believe they can make no further progress.¹⁷¹

The policy-relevant case thus is case (iii). To characterize it, we assume that it would be efficient to continue the collaboration. We now suppose that

167. Recall that $\Delta = n - m$, so when m increases—the seller learns more about buyer attributes— Δ falls.

168. To represent the seller's view formally, we remind that because the parties are in a collaboration their gains are comonotonic—that is, each party makes money when the other makes money. The seller's expected profit function thus can be written $E_S\pi(F_3/X_3) > 0$. The seller's gain is conditioned on its gain and the buyer's gain.

169. Recall that $\beta = y - z$. Thus, when z increases—the buyer learns more— β falls.

170. Using our earlier notation, the parties go forward with probability pq ; here, pq is high. See *supra* note 129.

171. Again using our earlier notation, the parties voluntarily part with probability $(1 - p)(1 - q)$.

β has fallen materially but Δ has not. As in case (i), the buyer has learned enough about machine functions—the seller retains less private information—to believe that collaboration would be profitable for it. The buyer, however, remains reluctant to disclose attribute information fully, both because some attribute information remains proprietary and because the buyer believes the seller's ability to use attribute information against it has increased in the t^1 state of the world. Because the seller remains poorly informed, it is reluctant to continue the collaboration.¹⁷² In today's legal world, this collaboration would inefficiently break up because only one party wants to go forward.

An interim-reformation remedy could prevent this breakup. To see how, suppose that the buyer asks the court to reform the parties' framework agreement to reflect the buyer's view: that there is a particular efficient path forward. The buyer will be required to disclose additional private information in this action because the seller will demand discovery, and because the court itself would also ask questions in a hearing. The reformation action thus would materially shrink Δ : the buyer's private information. Because we have assumed that continuance is efficient in our illustration, the now-informed seller also would realize that continuance would be in its best interest. The reformation action thus would move the parties from case (iii) (one of them incorrectly believes a breakup would be best) to case (i) (both correctly believe that continuation would be efficient).

Now see how midstream reformation functions. Recall that in case (i) the parties could voluntarily renegotiate their framework agreement because both parties' private information had materially shrunk. The parties thus could see the efficient path forward. Now consider a set of cases in which continuation would be inefficient and a complementary set in which continuation would be efficient. Reformation would have no effect on the first set: if a relatively uninformed party would defect when it should, the more informed version of that party also would defect. But now consider the complementary efficient set: reformation would increase the portion of case (i)s and reduce the portion of case (iii)s because reformation would materially shrink the parties' private information. Put more simply, under interim reformation, efficient collaborations would be more likely to continue to the next stage.

Note that in this case legal reformation would be an off-the-equilibrium-path remedy—that is, parties would seldom seek it. To see why, consider a

172. Put a little more basically, the seller faces an adverse-selection problem. The buyer wants the seller to make a machine not only in jointly maximizing cases, but also in cases that would benefit the buyer but not generate enough surplus to compensate the seller fully for costs incurred. When the buyer requests continuance, the seller cannot distinguish between the jointly maximizing and the privately buyer-maximizing cases when the buyer has been reluctant to disclose.

case (iii) buyer who believes that continuation would be efficient. This buyer has three choices: to let the seller defect from an efficient collaboration; to bring a reformation action in which the buyer would have to disclose information—shrink Δ —involuntarily and at positive litigation cost; or to disclose voluntarily the information a lawsuit would require. This third choice dominates the first two. Therefore, interim reformation functions *as an information-forcing device*: when it is available, both parties would voluntarily disclose more private information than they would otherwise have disclosed.

c. Midstream Reformation and Asymmetric Information about Court Types.—Parties sometimes will have different beliefs about how a court would interpret their framework agreement. These beliefs could cause a renegotiation to fail even when the parties have little private information about each other.¹⁷³ Midstream reformation permits the court to propose a forward-looking assessment of the parties’ arrangement that removes uncertainty about the parties’ legal rights and about the court’s type, and therefore also facilitates Coasean bargaining.¹⁷⁴ For example, the court could construe the framework agreement to reassure the buyer that the seller will not be able opportunistically to exploit disclosed information (e.g., inserting an implied noncompetition duty), thereby inducing the buyer to truthfully reveal information. Further, such reformation would occur on the equilibrium path.

173. We consider this cause of bargaining failure in greater detail elsewhere. *See* Schwartz & Sepe, *supra* note 104 (manuscript at 18–23) (discussing how bargaining failure arises). Indeed, when the parties have different beliefs on the court’s “type”—(i) the evidence a court will admit (and the weight the court will give to the evidence); (ii) the inferences a court will draw from the evidence; and (iii) how a court will apply contract law to the evidence—we show they might end up litigating an agreement, although they are symmetrically informed about payoff of relevant variables and there are gains to share from renegotiation. *Id.* (manuscript at 20–22). To solve this problem, we suggest a novel interpretive procedure that applies to a wide variety of legal areas, including new collaborations. Parties should be able to obtain an “interim contract interpretation”—that is, a judicial interpretation of their contract at the renegotiation stage rather than after a breach occurs. *Id.* (manuscript at 26). A midstream interpretation, in the form of a declaratory judgment or a new reformation remedy, would permit parties to align their beliefs on the expected litigation payoffs and therefore to continue an arrangement they would otherwise inefficiently terminate, or efficiently terminate a relationship without bearing unnecessary performance or litigation costs. *See id.* (manuscript at 26–28) (discussing interim contract interpretation and providing an illustration to show the effects of having interim interpretation as a remedy).

174. *Id.* (manuscript at 46). In this situation, “the court’s function switches from an information-forcing device to a mediation device that can induce truthful revelations.” *Id.* Normally, a mediator “makes a proposition to the parties” that the parties may or may not accept, but “a mediator’s interpretation is not conclusive.” *Id.* (manuscript at 46 n.153). But because the “mediation” in this case is by the court, residual uncertainty about the parties’ legal rights is reduced. *Id.*

Finally, we note that there is evidence consistent with our argument that parties would value the presence of a reformation option. Framework agreements sometimes create consensus committees staffed by both parties that permit each party to veto significant actions of the other.¹⁷⁵ Suppose that the buyer in our example proposes to take actions that would be productive if the seller made an F_3 machine. The seller believes, to the contrary, that an F_4 machine would be better for both parties and thus vetoes the buyer's proposed actions. Rather than give up, a buyer today may reveal additional private information showing why F_3 would maximize expected surplus. This possibility suggests that parties create consensus committees to serve as information-forcing or mediation devices to induce a party to disclose the basis for a proposed deviation, rather than abandon the deviation or breach. The availability of a reformation action would usefully supplement the consensus committee.

We briefly consider an objection to our claim that midstream reformation would be an efficient remedy: reformation would permit a court to make a contract for the parties. This objection is unpersuasive for two reasons. Initially, the parties would settle—i.e., renegotiate—after the disclosure or mediation phase of a case ends. A trial would be pointless when parties know what is efficient for them to do. Further, as said, parties would often disclose rather than sue. Thus, unlike the standard interpretation-after-breach case, a court would seldom have occasion to rule on what the contract means. In addition, parties concerned about over-reaching courts could contract out of the interim interpretation remedy.

2. *Noncooperation.*—Part I showed that misunderstandings can arise during the course of a collaboration that may cause a party to withhold cooperation. This behavior can take various forms: shading performance, working to rule or delay, not making employees available to the counterparty as agreed, not sending employees to the counterparty's plant, withholding access to one's own plant, and the like. Such deviations can become sufficiently serious as to endanger a project. Today, a party's best response to a counterparty's lack of cooperation is to withhold cooperation itself. We argue that the law should supplement self-help by permitting the compliant party to obtain a specific-performance order requiring the uncooperative counterparty to adhere to the framework process. Thus, a court could order the reluctant party to make its plant available to its counterparty's employees if the framework agreement directs.

175. See Jennejohn, *supra* note 38, at 309 (noting that “many alliances allocate” veto rights “to both firms either in the form of no-cause termination provisions or committees bound by unanimity rules”).

Such orders apparently would conflict with the courts' traditional reluctance to supervise complex performances. This conflict is only apparent. The court would not be regulating how a reluctant seller creates a product or how a reluctant contractor erects a building. Rather, the court would be ordering a party to play the contract mechanism—that is, to comply with the verifiable duties the parties' framework arrangement requires.¹⁷⁶ For example, a framework agreement may require a party to issue progress reports. Because a failure to report is verifiable, a court could order the recalcitrant party to comply.¹⁷⁷

To see a little more clearly what we intend, we reprise a previous example.¹⁷⁸ Let Firm B refuse to grant the personnel of Firm A access to its plant, though Firm A has a contractual right of access. Firm B believes that Firm A would use the information it would obtain to get a contractual advantage. But Firm A's request to access Firm's B plant actually is meant to check how a delegated production stage is proceeding. Firm A, however, may infer from Firm's B refusal to grant access that Firm B has a production problem, although production is proceeding efficiently. These divergent beliefs could lead the parties to initiate a deal-breaking conflict. If specific performance were available, however, Firm A could obtain an order requiring Firm B to grant access. The parties then could observe the true state of the world—here, the progress of the project—and come to hold consistent beliefs about the prospects for their relationship.

The availability of an injunction therefore also would have an information-forcing effect. Firm B likely would ask Firm A for a reason before rejecting its request for access. Firm A would have to establish the basis for an injunction—i.e., give a reason why access should be permitted—in its action for specific performance. Anticipating that it would have to make

176. See Schwartz & Sepe, *supra* note 35, at 691–92 (discussing how, from a mechanism-design perspective, courts can facilitate more efficient strategic interactions by the parties and how courts can administer contract mechanisms).

177. Gilson, Sabel, and Scott show that framework agreements become less specific as the level of uncertainty that parties face about the correct path forward increases. See Gilson et al., *Text and Context*, *supra* note 38, at 55 (“All else equal, the higher the level of uncertainty, the more difficult it is for parties to write, and courts to interpret, state-contingent contracts.”); Ronald J. Gilson, Charles F. Sabel & Robert E. Scott, *Contract and Innovation: The Limited Role of Generalist Courts in the Evolution of Novel Contractual Forms*, 88 N.Y.U. L. REV. 170, 177 (2013) (“When uncertainty is low . . . attention will be focused on elaborating specialized terms and industry codes. When uncertainty is high . . . attention will focus on the creation of a joint framework for exploring and defining new opportunities and mitigating hazards in their realization.”). The probability that a court will issue a specific-performance order increases with the specificity of the relevant framework agreement. Hence, Gilson, Sabel, and Scott's result implies that courts under the reform proposed here would require parties to adhere only to clear procedures that parties created when relatively well-informed.

178. See *supra* note 90 and accompanying text.

a costly, compelled disclosure in a lawsuit, Firm A would make the same disclosure in a private meeting. Hence, a request for specific performance would be an off-the-equilibrium-path move. That the remedy is available would induce parties to behave more cooperatively.¹⁷⁹

Finally, we note that courts today are willing to issue injunctions that require adherence to pre-specified procedures in more complex environments than the typical new-economy collaboration. Courts now supervise schools, prisons, hospitals, probate and bankruptcy estates, and elections to ensure the protection of public and private rights.¹⁸⁰ The literature on equitable remedies thus observes that an equity court's "first-order policy problem" is to identify the relevant right.¹⁸¹ Then, using its "equitable managerial devices," the court attempts to solve the "second-order policy problem[] . . . to manage compliance and constrain abuse."¹⁸² A more recent description of this process—courts using injunctions to vindicate rights—shows that courts "focus[] largely on governance and accountability structures rather than mandat[ing] specific practices. . . . [Courts] typically issue decrees that focus on broad issues of governance and accountability reflected in frameworks negotiated by the parties."¹⁸³ In sum, a midstream specific-performance remedy would increase the parties' ability to implement framework agreements and would be consistent with widely accepted views of the judicial function.¹⁸⁴

179. In game theoretic terms, a party's ability to obtain an injunction is equivalent to the party having a credible threat. Such threats, under a proper design of the game, can induce parties to reach a cooperative equilibrium—an equilibrium that could have not been reached without such threats. On the concept of such "subgame perfect equilibri[a]," see MASCHLER ET AL., *supra* note 90, at 251–53.

180. The seminal article on this point is Theodore Eisenberg & Stephen C. Yeazell, *The Ordinary and the Extraordinary in Institutional Litigation*, 93 HARV. L. REV. 465 (1980). Eisenberg and Yeazell document and conceptualize the phenomenon of judicial supervision of complex institutions. *Id.* at 481–86.

181. See Samuel L. Bray, *The System of Equitable Remedies*, 63 UCLA L. REV. 530, 534 (2016) ("[S]ome parts of the system solve first-order policy problems: i.e., the circumstances that demand a remedy compelling action or inaction in flexible and open-ended ways.").

182. *Id.* See also JOHN H. LANGBEIN, RENÉE LETTOW LERNER & BRUCE P. SMITH, *HISTORY OF THE COMMON LAW: THE DEVELOPMENT OF ANGLO-AMERICAN LEGAL INSTITUTIONS* 267–412 (2009) (offering an overview of the history of equitable remedies).

183. Kathleen G. Noonan, Jonathan C. Lipson & William H. Simon, *Reforming Institutions: The Judicial Function in Bankruptcy and Public Law Litigation*, 94 IND. L.J. 545, 547 (2019).

184. Reformation and injunctions are equitable remedies. Recent scholarship argues that equity should, and does, supplement the common law by supplying remedies for complex, party-specific problems. See, e.g., Henry E. Smith, *Equity as Meta-Law*, 130 YALE L.J. 1050, 1055 (2021) (arguing that equity can handle complex problems involving "interconnected" elements, unlike "regular law," which "cannot handle situations in which intense interactions . . . lead to unforeseen and undesired results"). The remedies we advocate for parties' implementation-stage disputes would function in this way.

C. Encouraging Performance

The execution stage of framework arrangements resembles the traditional economy because to reach this stage, the parties must have created a product. The parties' problem thus changes from facilitating cooperation to facilitating efficient marketing. Because the parties have already invested, the expectation-interest remedy would create efficient incentives for them to perform under a marketing contract, if the parties could create one.

The parties may have difficulty agreeing if they remain asymmetrically informed about important parameters. The seller may not know the buyer's value—its expected profit—from marketing the new product, and the buyer may not know the seller's expected marketing cost. The problem of inducing agreement when a contract would be efficient but the parties are asymmetrically informed is difficult to solve when potential parties meet for the first time. In contrast, a framework agreement could create an allocation mechanism for the last stage.

A promising method would require the parties to play a revelation game at this stage.¹⁸⁵ Under the game, each party announces a value for the right to market the product: v_A for Firm A; v_B for Firm B. The party whose announced value is highest gets the right but must pay the losing party its announced value. Because information is private, a party could not verify the truth of its counterparty's announcement. Now consider Firm A's strategy. If Firm A exaggerates its value, it may win but it would have to pay v_B to Firm B. The value v_B may exceed Firm A's true value, however. On the other hand, if Firm A underreports its true value, it may lose and receive its announced value v_A , but its true value may have been higher than the value Firm B announced. Hence, Firm A will make a truthful announcement. Because Firm B has the same incentives, it will report truthfully as well.¹⁸⁶ As a consequence, the party with the highest value gets the right to market. Note that the winner receives all of the surplus—its value less marketing cost—and so will market the product efficiently.

This solution to the last-stage asymmetric-information problem raises two concerns. First, a party may refuse to participate. An expanded specific-performance remedy here also would be apt. A court should order the recalcitrant party to play the revelation game. The second concern is that the parties' mechanism requires a subsidy in the amount of the losing party's

185. For a formal analysis of such a game, see Lewis & Schwartz, *supra* note 38, at 474–76.

186. In game theoretic terms, revealing the true evaluation is the equilibrium strategy for the party because the mechanism we propose actually is a form of a second-price auction. See MAS-COLELL ET AL., *supra* note 24, at 866–67 (providing an example of a second-price sealed-bid auction); PAUL MILGROM, PUTTING AUCTION THEORY TO WORK 111 (2004) (stating that “each bidder always finds it best to bid his value for the item”).

value. A framework arrangement could create an effective endogenous financing method; however, that would require parties at each stage to make a financial commitment to fund the mechanism. Specific performance here too would be apt: a court should order a reluctant party to make its promised contribution.¹⁸⁷ And to summarize, an expanded right to specific performance together with traditional remedies could yield an efficient execution-stage outcome.

D. Defaults, Addressees, and Procedure

The remedies we recommend—reliance, reformation, and injunction—should be defaults. There are two reasons. First, framework agreements differ materially from traditional contracts. The traditional-economy contract permits parties to specify their obligations precisely. Precise specifications necessarily constrain the judicial role largely to requiring a promisor to complete the contract. In contrast, collaborative framework agreements preclude precise specifications—except for process—because a collaboration is a work in progress at the early and middle stages. Parties at these stages seldom know which substantive obligations would later facilitate marketing the finished product. The looseness of framework agreements, in turn, creates opportunities for courts to become part of the parties' mechanism—that is, to enhance the parties' ability to continue efficient collaborations. But parties know best how much help they need. Hence, parties should be able to accept or reject a court's help by accepting or contracting out of the remedies we propose.

We also recommend defaults because we do not consider an important question: how would parties respond contractually to the remedies we suggest? As an example: how, if at all, would parties change framework agreements if they anticipated that courts would specifically enforce framework procedures? Right now, there is no answer. Too little is known about new-economy collaborations to support a case for mandatory rules.

This Article has several addressees. Initially, our proposals are addressed to state court judges, who can implement the proposals by changing contract doctrine.¹⁸⁸ Our proposals also are directed to state courts indirectly through their enforcement power over arbitration awards. Parties can create framework agreements that direct arbitrators to enforce the agreements specifically or to enforce fines. State courts should uphold

187. See Lewis & Schwartz, *supra* note 38, at 465–66 (devising such an endogenous-payment scheme).

188. Federal courts are supposed to apply state law in diversity contract actions, so it may be inappropriate for a federal court to modify contract law to the extent we suggest.

arbitration awards that impose these remedies.¹⁸⁹ Finally, one of us has argued that the federal government should create an administrative agency to create defaults for new-economy transactions.¹⁹⁰ Such an agency should enact the default remedies we propose. Ideally, the American Law Institute (ALI) would also amend the current Restatement of Contracts to add sections that facilitate new-economy collaborations. However, we are skeptical of the ALI's ability to modernize contract law.¹⁹¹

Finally, the remedies we propose may be difficult to implement given the usual time frame of commercial litigation. For example, reformation may be needed now, but a court's commercial docket could be a year or more behind. Delay may not be a problem when parties can access a court accustomed to quick work, such as the Commercial Division of the New York Supreme Court or the Delaware Court of Chancery. But delay could adversely affect the reforms we support in more general-purpose trial courts. Thus, the reforms we propose have procedural implications that, reluctantly, we do not pursue in this Article.¹⁹²

189. Arbitration clauses in commercial contracts generally incorporate by reference the Commercial Arbitration Rules of the American Arbitration Association, which expressly allow the arbitrator to grant specific performance of a contract, but are silent with regard to penalties, fines, or punitive damages. *See* AM. ARB. ASS'N, COMMERCIAL ARBITRATION RULES AND MEDIATION PROCEDURES R-47(a) (2013) ("The arbitrator may grant any remedy or relief that the arbitrator deems just and equitable and within the scope of the agreement of the parties, *including, but not limited to, specific performance of a contract.*" (emphasis added)). Whether an arbitrator's award of equitable remedies or punitive damages will be judicially enforceable, however, may depend on whether the arbitration is governed by state law or by the Federal Arbitration Act. Arbitrators currently do not have the power to award punitive damages under New York law. *Avoiding a Punitive Damage Award in Arbitration*, NORTON ROSE FULBRIGHT (April 2015), <https://www.nortonrosefulbright.com/en/knowledge/publications/19c69c28/avoiding-a-punitive-damage-award-in-arbitration> [<https://perma.cc/4BHM-3HAL>]. Judicial review of an arbitral award of a penalty can be thought of as an attempt by the judiciary to "extend to arbitration agreements the penalty-liquidated damages distinction of traditional contract law." Note, *The Enforceability of an Arbitrator's Award of a Penalty*, 52 COLUM. L. REV. 943, 945 (1952). For a discussion of the history of judicial review of arbitral awards of equitable remedies and punitive damages, see generally Stephen P. Bedell & Louis K. Ebling, *Equitable Relief in Arbitration: A Survey of American Case Law*, 20 LOY. U. L.J. 39 (1988) and Stephen P. Bedell, *Punitive Damages in Arbitration*, 21 J. MARSHALL L. REV. 21 (1987).

190. *See* Schwartz & Scott, *supra* note 44, at 1728 (arguing that administrative agencies are better suited than legislative enactments to fix the production problem in contract law).

191. *See id.* at 1728 ("[The ALI and Uniform Law Commission] have been unable, after over five decades of trying, to create a current, efficient contract law. And because the reasons for failure are the necessary product of the groups' membership and structure, there is little hope for change."). Because framework arrangements are not sales, there would be no need to amend the Uniform Commercial Code.

192. Delay is unlikely to be serious when parties use arbitration because then parties can control the time frame of the litigation.

Conclusion

Contract law creates efficient incentives for parties to trade standardized market goods and to invest efficiently in increasing the goods' value. The law is less successful in creating efficient incentives for trade and investment when a seller agrees to specialize goods for a particular buyer.¹⁹³ The existence of asymmetric information is the barrier to efficiency in what we call the traditional economy.

We study collaborations between firms to create complex specialized goods in what we call the new economy. The agreements that govern these collaborations are not contracts in the traditional sense. Rather, they are framework arrangements that do not regulate trade, but structure joint economic production.¹⁹⁴ As such, they neither contain prices, an identification of what the parties ultimately may trade, nor quantities. Rather, the agreements specify procedures that govern the collaboration. Production that once occurred entirely within a firm therefore is conducted by two or more firms in accordance with these contractually created processes.

Current, though atypical, examples of the new collaborations are the arrangements that produced the COVID-19 vaccines.¹⁹⁵ The arrangements exploited the expertise and comparative advantages of the involved firms to solve the difficult problems that creating a new vaccine posed. Collaborations today also exploit party expertise and their comparative advantages, but important factors that contributed to the success of vaccine creation are absent in the normal case. Those factors include: (i) an assured demand for the final product regardless of its cost (the government would buy the vaccines);¹⁹⁶ (ii) the existence of a mass distribution channel (the government would distribute the vaccines);¹⁹⁷ (iii) a reputational gain that firms generally value but which is especially valuable for regulated firms such as the drug companies; and (iv) public scrutiny that raised the cost to collaborators of behaving strategically. Without these facilitating factors, we show that potentially valuable collaborations may fail to form, and actual collaborations often fail. The factor contributing to failure on which we focus is the inability of contract law to solve the asymmetric-information problems that hinder the new collaborations. As a result, an important section of the economy today functions without contract law. We attempt here to explain

193. *See supra* subpart II(C).

194. *See supra* Part I.

195. *See supra* text accompanying notes 1–4.

196. *See* Frank et al., *supra* note 1 (celebrating the U.S. government's "extensive use of advance purchase commitment contracts," which eliminated market risks by ensuring demand for the vaccines).

197. *Id.*

this phenomenon and to create a set of remedies that would facilitate the new collaborations.

In the traditional economy, production preceded trade, and trade commonly occurred at one stage: the seller tendered, and the buyer paid. The key to developing new-economy remedies, we argue, is for courts to recognize that production proceeds in stages, and trade occurs, if at all, at the end. Remedies for the new contracts thus should be stage-relevant—that is, the remedies should be facilitate the objectives and take into account the parties' incentives to defect at each stage.¹⁹⁸

At the beginning, the law should encourage parties to participate in the new collaborations. The expectation remedy cannot play the facilitative role it plays in the traditional economy for two reasons. Initially, the remedy conditions on prices, costs, and values, but these variables seldom have content early on. In addition, the reliance remedy can create greater incentives for parties to participate than the expectation remedy, even if parties could prove an expectation. A prospective party to a new-economy collaboration knows that success is uncertain, but it must incur sunk exploratory and startup costs. The insurance against a counterparty's breach that the expectation remedy provides thus could have a lower expected payoff than the reliance remedy, although an expectation payoff likely would exceed costs. Today, however, contract law only protects reliance on a counterparty's enforceable promise. Because there is no such promise at the start, the prospect of incurring large, uncompensated costs probably deters participation. Thus, reliance should be the default remedy at the initial stage. Further, courts should enforce a liquidated damage that is not intended to replicate the expectation, but rather to replicate reliance costs.¹⁹⁹

At what we call the implementation stage, the goal is to induce parties to continue with the arrangement. Framework agreements attempt to achieve this goal by making a party's continuation payoff exceed its defection payoff at each stage. These attempts succeed in equilibrium, but off-the-equilibrium-path behavior, though occurring only in a fraction of cases, does occur in noticeable numbers in a large economy. A party thus may withhold cooperation by barring entry to its premises, attempting to exert too much control over a counterparty's employees, refusing to report relevant information, exiting too early, and the like.

Here we suggest three novel extensions of current remedies. Initially, a court should grant specific performance—not to order a party to deliver goods, but rather to order the party to continue to play the contractual mechanism. Such an order would be feasible when the framework

198. *See supra* subpart I(D).

199. *See supra* subpart IV(A).

arrangement clearly specifies mechanism tasks. Second, courts should enforce contractual penalties the parties intend to deter strategic behavior. Third, courts should reform a framework agreement when a party could show that efficiency required the transaction to take a different turn. Courts today reform contracts to cure mistakes that affected a party's decision to make a contract. We suggest that reformation also should be granted when parties would have preferred the reformed contract at the beginning had they known what later performance revealed. Its availability, we show, would also induce parties to reveal more private information, and thus facilitate efficient renegotiations.²⁰⁰

Finally, we argue that the current remedies may have a role to play at the final—execution—stage because parties may be able to write a traditional-economy contract then. Such a contract would govern how parties market the new product. One more remedy extension may be apt, however. Parties may design a mechanism to induce them to reveal the values and costs that they believe would attend exploiting the framework-arrangement product. Again, we argue that courts should grant specific performance to require a reluctant party to play such an end-stage mechanism. All of the remedies we suggest should be defaults. Too little is known about new-economy collaborations to support mandatory rules.²⁰¹

We attempt to make three contributions. First, we show that new-economy collaborations require new-economy remedies. Second, those remedies should be stage-relevant—that is, new-economy transactions occur in stages, and the parties to them have different goals and incentives to defect at each stage, so facilitative remedies should differ with the stage. Third, we develop stage-relevant remedies. Each of them would require a major extension of current contract doctrine. We understand that once courts begin to implement these remedies, they will undergo a common law development, so that settled new-economy doctrine likely would come to differ from our proposals here. This is the fate of successful generative efforts.

200. *See supra* subpart IV(B).

201. *See supra* subpart IV(C).