THE USE OF OPEN TERMS IN CONTRACT

Mark P. Gergen *

INTRODUCTION

This Article offers a general account of contracts that give a party substantial discretion in performance through open terms. Open terms often are used when the owner of an asset of uncertain value employs an agent to develop the asset or when two parties work together under uncertain conditions. Many contracts use open terms, and these contracts represent a disproportionate share of litigated contracts. This Article uses an oil and gas lease and a long-term requirements contract between a buyer and seller with interdependent operations to illustrate some basic features of many open term contracts.

People enter into these contracts because of the benefits they derive from open-ended sharing relationships. These contracts give one party discretion in performance while attempting to induce him to exercise that discretion to maximize the parties' joint return. Often, the necessary inducement is provided by requiring that the party having discretion share the return on his performance and perform under a negligence-like term. In practice, however, these contracts are not likely to induce optimal performance, since costs and returns are divided and because of defects in the terms regulating performance.

Yet contracts with open terms are attractive despite their defects, because they aligu individual risk and joint risk at the time of contracting better than do contracts with fixed performance terms. That is, the terms better aligu individual outcome with joint outcome, so one party may not suffer a loss in excess of the parties' joint loss. This alignment of risks may greatly reduce the cost of entering into a contract under conditions of uncertainty. The use of open terms reduces the parties' incentive to test to determine more accurately the probability or value, or to haggle over contingencies that might result in a loss to one party under a fixed term, but that do not make the contract jointly less attractive than alternative investments.

There is much scholarly work on open term contracts, especially in the field of economics, but previous commentators have not given a complete account of these contracts or provided guidelines for their enforcement. Part I of this Article gives an overview of my argument

and places it within the context of the existing scholarly literature and other relevant work in economics. This Part also defends the claim that the goal of contract should be to maximize the parties' joint expected return.

Parts II through IV explain the characteristics and reasons for the use of sharing arrangements and negligence-like terms in contracts under which a principal employs an agent to develop an asset of uncertain value. Part II shows how an agent may be induced to develop an asset for a principal through a gain-sharing arrangement and a negligence-like performance term. The Part demonstrates, however, that an agent's performance under such a contract is not likely to maximize the parties' joint return. Part III suggests that despite this performance defect, gain-sharing and negligence-like performance terms are used because they reduce the parties' incentive to test or to haggle over the division of an uncertain expected gain[1] when contracting. Part IV discusses several additional defects in a contract with a sharing arrangement and a negligence-like performance term, defects that arise when a principal relies on an agent's performance by investing in contract resources that might be used in better ways.

Part V shows that a requirements contract in which price is adjusted to equal the seller's cost has properties similar to an agency contract with a sharing arrangement and a negligence term. It suggests that parties may accept the defects inherent in such a contract because it provides an inexpensive way to deal with risks that are expected to have an offsetting impact on them.

Part VI proposes some basic guidelines for enforcing contracts with open terms. It suggests that a rule of joint maximization, which is similar to Learned Hand's standard of negligence, ought to be the benchmark in reviewing performance under open terms.[2] Further, courts ought to look for structural factors that align or divide one party's interest in performing and the parties' joint interest, and ought to impose a higher standard of scrutiny when those interests diverge significantly. Part VI proposes important incremental reforms in the rules governing output and requirements contracts, best efforts contracts, and mineral leases.

I. A Transaction-Cost Theory of Open Terms

A. *Open Terms*

Open terms are contractual provisions that expressly grant a party

---

1. A contract offers an uncertain expected gain when the parties' joint expected return on the contract is better than their return on other uses of the same resources, but the parties do not know how much better.

2. For an argument that best efforts ought to require this, see Charles J. Goetz & Robert E. Scott, Principles of Relational Contracts, 67 Va. L. Rev. 1089, 1119–26 (1981).

substantial, but not completely unfettered, discretion in performance—
for example, a promise to use best efforts. Alternatively, performance
may be regulated by a definite term that is subject to a contingency
under a party's control. A promise to take requirements is an example
of such a term. In the latter case, there usually is a backup indefinite
term—such as a rule of good faith—regulating discretion. Often these
contracts have an open payment term, such as a royalty accompanying
an open production term, or a price adjustment term in a requirements
contract. However, not all contracts with open performance terms have
open payment terms—for example, a physician performs under a negli-
gence standard but is paid a fixed fee without regard to success.

"Open-term contract" better describes the subject of this Article
than does "incomplete contract" or "relational contract."[3] In eco-
nomic parlance, the term "incomplete contract" describes any contract
short of the ideal of a complete contingent contract, which has been
drafted with all contingencies in mind and provides for optimal perfor-
mance on every contingency. For example, a fixed price, fixed quantity
contract is incomplete if the parties did not provide for events that
might alter the optimal quantity of production.[4] This contract may be
incomplete, but is not open: since the seller is obliged to sell and the
buyer to buy a specified quantity or pay damages, the contract gives
them no express discretion in performance.

The term "relational contract" describes the web of legal and non-
legal forces (mostly the latter) that induce parties to work together in
mutually advantageous relationships. Usually these are long-term rela-
tionships that depend on the parties' continued cooperation.[5] Many
such contracts have open terms, but not all do.[6] Furthermore, many
contracts with open terms do not involve reciprocal, ongoing relation-
ships. Professional service contracts with open performance terms typi-
cally do not entail reciprocal performance and tend to be one-time

---

3. It probably would not do much violence to either concept to describe the subject
of this Article as incomplete contracts or relational contracts. For example, Goetz and
Scott use the term "relational contract" to describe incomplete contracts and define as
incomplete any contract where the performance obligation is not well-defined. See id. at
1091.

4. See Ian Ayres & Robert Gertner, Strategic Contractual Inefficiency and the
Optimal Choice of Legal Rules, 101 Yale L.J. 729, 730 (1992) [hereinafter Strategic
Contractual Inefficiency]; Ian Ayres & Robert Gertner, Filling Gaps in Incomplete
Contracts: An Economic Theory of Default Rules, 99 Yale L.J. 87, 92 n.29 (1989)
[hereinafter Filling Gaps] ("A contract may also be incomplete in that it is insensitive to
relevant future contingencies."); cf. John A. Stuckey, Vertical Integration and Joint
Ventures in the Aluminum Industry 103 (1983).

5. The term "relational contract" was coined in Ian R. Macneil, Contracts:
Adjustment of Long-Term Economic Relations Under Classical, Neoclassical, and
Relational Contract Law, 72 Nw. U. L. Rev. 854, 886 (1978).

6. For example, a financing agreement between a bank and major commercial
borrower may have definite terms on repayment and security, but the relationship
between the parties will have many of the qualities of a relational contract.

events. Similarly, mineral leases do not involve reciprocal perfor-
mance, as the lessor has no power to punish the lessee's default by
withholding performance.

Many open terms are similar in form or function to a negligence
rule. Best efforts clauses and other terms that require a party to use
reasonable prudence in performance are obviously like a negligence
rule. A requirements contract that adjusts the price to equal the seller's
cost of production is also similar in effect to a negligence rule: such a
contract induces the buyer to set quantity at the level that maximizes
the short-run joint return to him and the seller, much as the Hand stan-
dard induces an injurer to set care at the level that minimizes the ex-
pected joint cost to him and the victim of an accident and prevention.

The economic analysis of negligence in tort teaches a fundamental
lesson about open terms. It is commonplace that there is no allocative
difference between negligence and strict liability with contributory neg-
ligence if all relevant parties (injurers, victims, and courts) are equally
able to ascertain the proper level of care.[7] One liability rule can have
an allocative advantage over the other only because of what may
broadly be described as problems of knowledge. Such problems arise
either if injurers, victims, and courts are differently informed about the
costs and benefits of care, or if these actors incur different costs in ac-
cumulating and analyzing such information. In contract, this observa-
tion leads to the obvious but important conclusion that a fixed term
often is better than an open term because parties can determine appro-
priate performance together better and more cheaply than can courts.
Open terms are used when it is too costly to plan performance ex ante
in the contract and vulnerability to opportunism makes a party unwill-
ing to submit to unconstrained ex post bargaining over performance.

B. *Maximizing Joint Expected Return and the Problem of Opportunism*

This Article assumes that the goal in any contract should be to
maximize the parties' joint expected return. A contract should ensure
that the parties proceed on the course that has the highest net present
value at the outset to both of them together after they have taken ac-
count of all risks as best they can. This course, by definition, is in the
parties' joint economic interest. It is likely to be in their individual eco-
nomic interests as well, at least if we consider their interest ex ante
when the contract is made. Such a contract discourages destructive in-
fighting—that is, efforts to win a larger share of the pie that also shrink
the size of the pie. The assumption that the goal is to maximize the
parties' joint expected return does not imply that parties are indifferent
to their share of the return. Among parties of equal sophistication and
ability, strategies that maximize their joint expected return also are

---

7. See William M. Landes & Richard A. Posner, The Economic Structure of Tort
Law 64–80 (1987); Steven Shavell, Economic Analysis of Accident Law 5–46 (1987).

likely to maximize their individual expected returns, for each party may expect the other to retaliate if he seeks outcomes or terms biased in his favor.

The goal is to maximize the parties' joint expected return upon entering into a contract, not their actual return ex post. The difference is important. 1 propose as a default enforcement standard for open terms a joint maximization rule that requires parties to maximize ex post return. This standard is proposed only as a default rule, however, because various problems with the rule mean that it will not necessarily maximize expected returns.

The goals of maximizing expected return or expected utility[8] are conventional in economic analysis of the law, but are nonetheless problematic.[9] Because it is difficult to predict the effects of cost and of error in enforcing a rule or term, we often cannot know what rule or contract term will maximize the parties' joint expected return under a contract. We cannot assume that maximizing the parties' expected returns under a contract maximizes expected utility or social welfare, because of concerns such as externalities, wealth effects, and the problem of the second best.[10] Finally, some will question the disregard of noneconomic values, such as the moral value of keeping one's word. An analysis that ignores these broader economic and noneconomic concerns will seem, to many, stylized and sterile.

Nevertheless, the assumption is defensible. First, much of this Article considers why parties use open performance terms. In this context, limiting the inquiry to what set of rules maximizes the parties' joint expected return is not too misleading, because parties to a contract generally want to improve their own wealth and do not care about broader economic or moral concerns. Second, the imposition in con-

---

8. In conventional usage, the term "return" refers to objectively measurable wealth, while the term "utility" refers to subjective gratification. Economic analysis of tort law typically regards expected utility as the appropriate maximand, but this Article assumes expected return is the maximand in contract. Nothing in the analysis turns on the distinction between objectively measurable wealth and subjective satisfaction.

9. See Shavell, supra note 7, at 2.

10. The disregard of externalities is the most glaring gap in my analysis. For instance, I advocate toughening performance standards in an oil and gas lease to induce lessees to maximize the joint return of lessor and lessee, but tougher performance standards may cause a loss to others because minerals are drawn from a common pool. It is clear that a joint maximization rnle may impose a social loss when the rnle forces a lessee to drill a well to protect a field from drainage, for a protective well diminishes the return on competing wells.

For a discussion of how wealth effects influence social welfare, see Mark Kelman, A Guide to Critical Legal Studies 141–45 (1987). On the problem of the second best, see R.G. Lipsey & Kelvin Lancaster, The General Theory of the Second Best, 24 Rev. Econ. Stud. 11 *passim* (1956); Richard S. Markovits, A Basic Structure for Microeconomic Policy Analysis in Our Worse-than-Second-Best-World: A Proposal and Related Critique of the Chicago Approach to the Study of Law and Economics, 1975 Wis. L. Rev. 950, 967–77.

tract of rules that do not maximize party wealth, for social, distribu-
tional, or moral reasons, is often ineffective and may be costly: people
will resist such efforts, as usually they may in a voluntary exchange.

In particular, some may think it odd that I consider opportunism to
be a problem only because it reduces the joint expected return on a
contract, and not because of its moral or distributive implications.[11]
Contractual opportunism generally involves a party's attempt to cap-
ture a greater share of the return on a contract. Sometimes this self-
aggrandizement is condemned because it reduces the joint return on a
contract; other times, it is condemned because it violates contract-
based expectations.[12] The first strand of the concept of opportunism
closely relates to the economic concept of negligence: acquisitive be-
havior is condemned as opportunistic if the victim's loss exceeds the
actor's gain. While likewise concerned with maximizing joint return,
the second strand also may be concerned with the distributive or moral
consequences of opportunism: self-aggrandizing behavior may be con-

---

11. Opportunism often is said to raise both economic and moral concerns. See,
e.g., Subha Narasimhan, Relationship or Boundary? Handling Successive Contracts, 77
Cal. L. Rev. 1077, 1101 (1989). Some think it a uniquely moral problem that ought not
to concern people who care only about allocative efficiency. Thus, Shell finds it curious
that Judge Frank Easterbrook would care about opportunism. See G. Richard Shell,
Substituting Ethical Standards for Common Law Rules in Commercial Cases: An
Emerging Statutory Trend, 82 Nw. U. L. Rev. 1198, 1199 n.5 (1988).

12. These two aspects are clearest in Joskow's definition of opportunism as
"behavior that does not maximize joint profits (and is inefficient) when a particular
contingency arises and also behavior that involves the appropriation of wealth of one
party by the other in some states of nature without necessarily inducing distortions in
supply or demand." Paul L. Joskow, Vertical Integration and Long-Term Contracts:
The Case of Coal-burning Electric Generating Plants, 1 J.L. Econ. & Organization 33, 37
(1985) [hereinafter Vertical Integration].

Some definitions of opportunism emphasize the element of misrepresentation.
Williamson states that opportunism refers to "incomplete or distorted disclosure of
information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or
otherwise confuse," Oliver E. Williamson, The Economic Institutions of Capitalism 47
(1985) [hereinafter Economic Institutions], or, more simply, that opportunism is "self-
interest seeking with guile," Oliver E. Williamson, Markets and Hierarchies 26 (1975)
[hereinafter Markets and Hierarchies]. This view has moralistic overtones, though
misrepresentation also may be costly. Misrepresentation is not at the heart of many
forms of opportunism. For example, when an employee shirks, any misrepresentation
is implicit and lies in his hope that he will not be found out.

Often opportunism is analyzed in the context of bilateral monopoly—i.e., situations
in which parties make investments in a relationship whose value depends on
continuation of the relationship. See, e.g., Benjamin Klein & Kevin M. Murphy, Vertical
Restraints as Contract Enforcement Mechanisms, 31 J.L. & Econ. 265, 297–98 (1988).
Such investments are sometimes described as transaction-specific. Bilateral monopoly is
important to opportunism because it deprives a party of recourse to the market when
the other party underperforms or threatens to underperform. However, opportunism
may occur without bilateral monopoly. For example, the failure of an insured to protect
against loss borne by the insurer is a form of opportunism. Yet there need not be
anything tying the insured and the insurer together in this situation other than their
contract.

demned, though it has no demonstrable social cost, because it deprives a party of an entitlement.

Consider, for example, a jobber's manipulation of quantity under a fixed-price requirements contract, in order to take advantage of price fluctuations. Such manipulation could not be condemned under the first strand of the concept of opportunism unless such manipulation reduced the parties' joint return on the sale of the good, or the threat of such manipulation increased the cost of contracting. Such manipulation could be condemned under the second strand, nevertheless, if we found that the seller had the right to expect the jobber to buy consistent quantities.[13]

There are two reasons to focus on the economic implications of opportunism. First, performance of a contract can be said to violate expectations only once we determine what is expected of a party. We generally are concerned with antecedent questions: for instance, what commitment should an agent make when he undertakes to develop an asset of uncertain value for another? Or how should a vague commitment be interpreted? When these are the questions, claims of entitlement or right presuppose the conclusion.

Second, asking how opportunism affects joint expected return may save us from harming those we want to help. Some scholars suggest, for example, that employers tend to pay employees less than they are worth in early years and more than they are worth in later years.[14] Some of these scholars condemn as opportunistic the firing of older workers to capture this premium.[15] If we focus exclusively on the fired worker and his expectation of a premium salary in his senior years, the argument for protecting senior workers from opportunistic firings seems compelling.

However, protecting individual workers may harm workers as a class. This wage structure may respond to the difficulty of monitoring workers. Even though monitoring is imperfect, workers are less likely

---

13. The second strand would collapse into the first if protecting expectations always produced secondary economic benefits—such as a reduction in the cost of contracting or an improvement in reliance—that offset the cost of administering a rule to protect expectations. However, often this will not be the case. It is difficult to justify regulating opportunistic behavior on the basis of such secondary economic benefits when the behavior violates no express term of a contract, the implied term regulating opportunism is indeterminate, and the parties could and often do regulate such behavior through a definite express term. Under these circumstances, parties who realize the danger of opportunism are likely to seek express protection. Parties who do not realize the danger will not alter their behavior because of the protection of the implied term. In these cases, the justification for regulating opportunism must be primarily on moral and not on economic grounds.

14. See, e.g., Samuel Issacharoff, Reconstructing Employment, 104 Harv. L. Rev. 607, 621–22 (1990) (reviewing Paul C. Weiler, Governing the Workplace: The Future of Labor and Employment Law (1990)).

15. See id. at 622–23.

to neglect their responsibilities if the penalty for shirking is great.[16] Impairing this sanction may harm workers as a class if employers respond by adopting more intrusive forms of monitoring work or by reducing wages. It is not clear, ultimately, how this problem should be resolved.[17] Still, we probably do better for workers if we focus on the interests of the many rather than the supposed rights of the few.

C. *The Role of Uncertainty and Bounded Rationality*

My explanation of why parties use open terms depends on the principle of uncertainty. I define a contract as involving "uncertainty" when the probability or value of contingent outcomes is sufficiently doubtful that people with the same information and preferences value the contract or the contingency significantly differently, and there is no market to price the contingency.[18] Uncertainty is different from risk,

---

16. The point that fear of loss of a future surplus from a relationship may deter cheating often is made in the context of franchise and similar relationships. See, e.g., Williamson, Markets and Hierachies, supra note 12, at 169–75; Klein & Murphy, supra note 12, at 268–69, 304–06.

17. Employer opportunism may be constrained sufficiently by reputational or other concerns. More generally, employer and employee opportunism is most likely to be constrained when the relationship is expected to provide a future surplus that the parties divide between themselves. In this situation, both parties are better off not shirking or cheating if doing so might imperil the relationship. See H. Lorne Carmichael, Self-Enforcing Contracts, Shirking, and Life Cycle Incentives, J. Econ. Persp., Fall 1989, at 65, 66–70.

18. It has been said that uncertainty exists when "there is no scientific basis on which to form any calculable probability whatever." John M. Keynes, The General Theory of Employment, 51 Q.J. Econ. 209, 214 (1937). Uncertainty is also said to exist when outcomes have no known probability. See Paul Davidson, Is Probability Theory Relevant for Uncertainty? A Post Keynesian Perspective, 5 J. Econ. Persp., Winter 1991, at 129, 130–31.

Some models for how decisions are made under uncertainty do not distinguish between uncertainty and risk. See, e.g., Hans-Werner Sinn, Economic Decisions Under Uncertainty 18–40 (1983). One such rule of decision is the principle of insufficient reason, which states that if a person faces outcomes of unknown probability he should assume they are of equal probability. For example, if you are given an urn with 100 balls which are either black or white, but you are not told how many of each, you ought to assume that there are 50 of each in betting on the color of the first chosen. This strategy makes sense in this artificial case if you have no way of obtaining more information. However, if you may buy a look at 10 balls chosen at random before betting on the color of the next ball chosen, you may rationally pay for that information before you bet. You ought not pay to look at 10 balls before betting if you know from the start there are 50 of each. If you know the mixture of balls at the start, the information obtained by looking at 10 balls is of no value. The principle of insufficient reason is objectionable as a rule of decision on other grounds. See R. Duncan Luce & Howard Raiffa, Games and Decisions 284–85 (1989).

A bleaker view is that uncertainty defeats conventional economic analysis because expected utilities cannot be calculated when outcomes are uncertain. See, e.g., Richard M. Cyert, The Economic Theory of Organization and the Firm 233–36 (1988). Thus, my claim that the use of an open term increases the expected return under a mineral lease when the value of the minerals is uncertain could be challenged as internally

which involves contingent outcomes of known probability and value. Under uncertainty, the variance in the parties' valuations of a contingency and the absence of a market to price the contingency induce the parties to test to reduce this variance, or to haggle over price. Open terms are used to reduce such costs.

The concept of uncertainty relates to the concept of bounded rationality.[19] I assume that people rationally try to maximize their individual welfare in a world where information and analysis are severely constrained.[20] This assumption, however, is disputable. An alternative view of bounded rationality is that people satisfice rather than maximize. That is, they strive for satisfactory outcomes rather than the best outcome for themselves. Under this view, decisions are less rational, at least at a conscious level.[21] Another view is that much behavior is irrational. This view emphasizes the impact of irrational biases on decisions, particularly decisions made under uncertainty.[22] Yet another view is that people's desires are not entirely self-regarding, and that either people want others to do well or they do not want to do worse than others.[23]

---

contradictory, since the uncertainty means that an expected return cannot be assigned to the lease. The answer to this objection, of course, is that while the return may be uncertain, it will certainly be greater than it would be if more were spent testing or haggling.

19. The concepts of bounded rationality and satisficing were introduced by Herbert A. Simon. See Herbert A. Simon, Rational Choice and the Structure of the Environment, 63 Psychol. Rev. 129, 266 (1956); Herbert A. Simon, A Behavioral Model of Rational Choice, 69 Q.J. Econ. 99, 112–13 (1955) (characterizing model as one of "limited rationality"). These essays are reprinted in Herbert A. Simon, Models of Bounded Rationality (1982), (chapters 7.2 and 7.3). For brief explanations of the concepts authored by Simon, see 1 The New Palsgrave: A Dictionary of Economics 266–67 (1987); 2 id. at 243–44 (1987).

20. See Williamson, Economic Institutions, supra note 12, at 46 & n.6.

21. See Richard R. Nelson & Sidney G. Winter, An Evolutionary Theory of Economic Change 67–68 (1982). The two models may merge if we consider that people may rationally choose not to think about some aspects of a choice to save the effort. Satisficing, for example, may be a rational lifetime strategy; certainly folk wisdom would suggest that it is (e.g., a bird in the hand is worth two in the bush). But the factors that go into the choice of such a strategy are so varied and complex that it hardly seems a matter of rational choice.

22. See Amos Tversky & Daniel Kahneman, Judgment Under Uncertainty: Heuristics and Biases, 185 Sci. 1124, 1130-31 (1974), reprinted in Daniel Kahneman et al., Judgment Under Uncertainty: Heuristics and Biases 3–20 (1982); Roger G. Noll & James E. Krier, Some Implications of Cognitive Psychology for Risk Regulation, 19 J. Legal Stud. 747, 749-60 (1990); Mark J. Machina, Choice Under Uncertainty: Problems Solved and Unsolved, 1 J. Econ. Persp., Summer 1987, at 121, 128.

23. Altruism may play a significant part in the provision of public goods. See David Collard, Altruism and Economy: A Study in Non-Selfish Economics 67–69 (1978); Robert Sugden, Consistent Conjectures and Voluntary Contributions to Public Goods: Why the Conventional Theory Does Not Work, 27 J. Pub. Econ. 117, 123 (1985). Some scholars try to explain altruism as a form of self-enrichment, see, e.g., Gary S. Becker, A Theory of Social Interactions, 82 J. Pol. Econ. 1063, 1090 (1974), but these theories are highly circular. The assumption that people pursue their own interests drives often

Much of the behavior that is the subject of this Article is consistent with these other theories, but I show that they may not be needed to explain the behavior. For example, people may use sharing arrangements in contracts because they dislike doing worse than their partners,[24] but I show that people also may use sharing arrangements because the resultant reduction in the cost of contracting and improvement in performance enhances their own expected return.

D. *An Overview of the Argument and of Other Explanations of Open Terms*

There are two explanations other than uncertainty for the use of open terms. One explanation is based on transaction costs: open terms are used because of the difficulty of writing and enforcing contracts that precisely specify performance subject to finely drawn conditions to deal with many known risks.[25] The other is based on risk preferences: open terms are used because a party is risk averse. Open price terms are explained on this basis,[26] as are sharing arrangements

---

tortured arguments to find self-interest in all behavior. See Amartya K. Sen, Rational Fools: A Critique of the Behavioral Foundations of Economic Theory, 6 Phil. & Pub. Aff. 317, 322–24 (1977). Altruism plays a smaller part in explanations of behavior in contract, though the view that people strongly care about reputation and the regard of others underpins some relational theories of contract, see supra note 5; infra note 34, and simple experiments involving bargaining suggest that in judging outcomes people are influenced by the outcome of their partner, see infra note 24.

24. There is some evidence from experiments on bargaining that when people bargain over the division of a gain, they split the pie rather than try to maximize their individual gain. See, e.g., Gary E. Bolton, A Comparative Model of Bargaining: Theory and Evidence, 81 Am. Econ. Rev. 1096, 1128 (1991) (finding that bargainers desire "fair" share of pie and suggesting that they value fair share for themselves); Jack Ochs & Alvin E. Roth, An Experimental Study of Sequential Bargaining, 79 Am. Econ. Rev. 355, 357–59, 378–80 (1989)(summarizing earlier studies and reporting own findings in test involving sequential bargaining); Alvin E. Roth et al., Bargaining and Market Behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: An Experimental Study, 81 Am. Econ. Rev. 1068, 1091–94 (1991) (finding that with some cultural differences subjects in different cultures strive for a "fair" split). These studies involve one-play or multi-play games in which subjects bargain over the division of a preset reward by making an offer that is accepted or rejected. In a one-play game (i.e., there is one offer that may be accepted or rejected and the game ends), game theory predicts that the offeror will capture almost the entire reward because he will realize that the offeree will be better off accepting an offer that gives him even a small part of the reward. If the offeree rejects, he gets nothing. In fact, offerors tend not to make such aggressive offers and offerees tend to reject such aggressive offers. This work does not directly apply to the contracts with which I am concerned. It involves bargaining over fixed rewards with no risk or uncertainty (other than uncertainty about how the other party will behave); the contracts examined here involve bargaining over risky or uncertain rewards. Further, open-ended sharing arrangements are different because they equalize outcomes as well as expected returns. Parties could equalize expected return by settling on a fixed price that divides the expected gain equally.

25. See Oliver Hart & Bengt Holmstrom, The Theory of Contracts, in Advances in Economic Theory, Fifth World Congress 71, 134–35 (1987).

26. See A. Mitchell Polinsky, Fixed Price Versus Spot Price Contracts: A Study in Risk Allocation, 3 J.L. Econ. & Organization 27, 28–29, 41–43 (1987).

in agency contracts.[27]

While open terms may be used for these reasons, there are significant problems with these other explanations. If parties know the risks they face and are risk neutral, they often may ensure optimal performance through a simple contract. For example, an oil and gas lessee may pay a fixed price for a lease.[28] Risk preferences likewise do not explain the many uses of open terms that are inconsistent with the parties' likely risk preferences.[29]

Many scholars have suggested that open terms are used when uncertainty makes it costly to negotiate fixed-performance terms.[30] I agree and add that, when a contract is made, open terms often are used because they align individual risk and joint risk when a contract is made better than do fixed terms. It is this alignment of risks that reduces the cost of contracting.[31] This additional element is important. It is not clear why a rational person would enter into a transaction, in conscious ignorance of the magnitude of risks that might affect his return, when there are ways more accurately to determine those risks. Nor is it clear why, if a person is willing to proceed on such a basis, he would not also be willing to bear the additional risk of entering into a fixed-term contract. Open terms may be used so that parties do not have to bear the cost of testing or haggling over price where there are contingencies that might diminish one party's share of the gain or result in a loss to that party under a fixed-term contract, but that do not make the contract jointly less attractive than alternative investments.[32]

---

27. See Steven Shavell, Risk Sharing and Incentives in the Principal and Agent Relationship, 10 Bell J. Econ. 55, 56, 66 (1979).

28. See infra note 39 and accompanying text.

29. See infra notes 97–99 and accompanying text.

30. See Keith J. Crocker & Scott E. Masten, Pretia ex Machina? Prices and Process in Long-Term Contracts, 34 J.L. & Econ. 69, 72–73 (1991); Goetz & Scott, supra note 2, at 1092; Victor P. Goldberg, Price Adjustment in Long-Term Contracts, 1985 Wis. L. Rev. 527, 531–33; Victor P. Goldberg & John R. Erickson, Quantity and Price Adjustment in Long-Term Contracts: A Case Study of Petroleum Coke, 30 J.L. & Econ. 369, 370 (1987); Paul L. Joskow, Asset Specificity and the Structure of Vertical Relationships: Empirical Evidence, 4 J.L. Econ. & Organization 95, 101 (1988); Paul L. Joskow, Commercial Impossibility, the Uranium Market and the Westinghouse Case, 6 J. Legal Stud. 119, 154–55 (1977); Joskow, Vertical Integration, supra note 12, at 37; Williamson, Economic Institutions, supra note 12, at 56–59.

31. Goldberg may allude to this effect. See infra note 180.

32. This point relates to two other theories not directly concerned with open term contracts. One is the theory that activities may be integrated within a single firm because they involve offsetting risks. See Harold Demsetz, Ownership, Control and the Firm 172 (1988). Usually integration is thought to be desirable because of risk preferences. I show that open term contracts may offer benefits similar to integration and that a significant benefit is the reduction of transaction costs. Also relevant is recent work by Richard Craswell and David Friedman which shows that the traditional rule of damages in contract—strict liability for expectation damages—may make parties too cautious about entering into a contract even when the expected return on the contract is positive. See Richard Craswell, Precontractual Investigation as an Optimal Precaution

Another factor promoting the use of open terms is the existence of extra-legal or structural constraints on performance that help overcome the difficulties of enforcing an open term. There is an extensive literature on how contracts self-enforce.[33] Reputation is an important constraint,[34] though it is one that I largely ignore. Performance may be encouraged by imposing a threat of large sanctions on breach: for example, in a relationship where an agent's relationship-specific investment creates large quasi-rents, a principal may deprive the agent of large expected future gains by terminating the agency relationship if the principal finds the agent cheating.[35] Alternatively, a contract may deny an agent opportunities to act contrary to his principal's interest— for example by requiring the agent to work exclusively for the princi-

---

Problem, 17 J. Legal Stud. 401, 410 (1988); David D. Friedman, An Economic Analysis of Alternative Damages Rules for Breach of Contract, 32 J.L. & Econ. 281, 284 (1989). They consider, but ultimately reject as impractical, substituting reliance damages for expectation in such cases. I show that the problem they identify often is addressed by using open terms. See infra notes 102–103 and accompanying text.

33. See Benjamin Klein & Keith B. Leffler, The Role of Market Forces in Assuring Contractual Performance, 89 J. Pol. Econ. 615, 617 (1981); Klein & Murphy, supra note 12, at 268–69; L.G. Telser, A Theory of Self-Enforcing Agreements, 53 J. Bus. 27 (1980); Williamson, Markets and Hierarchies, supra note 12, at 167–69; Oliver E. Williamson, Assessing Contract, 1 J.L. Econ. & Organization 177, 201–02 (1985); cf. Sanford J. Grossman & Oliver D. Hart, The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration, 94 J. Pol. Econ. 691, 710–16 (1986) (arguing that assignment of residual ownership rights may temper opportunism by decreasing attractiveness or increasing cost of exit, using as an example ownership of client lists in insurance).

34. See Jack Carr & Frank Mathewson, The Economics of Law Firms: A Study of the Legal Organization of the Firm, 33 J.L. & Econ. 307, 314 (1990) (explaining how law firms develop to ensure self-monitoring to preserve firm reputation); Thomas M. Palay, Comparative Institutional Economics: The Governance of Freight Contracting, 13 J. Legal Stud. 265, 275 (1984) (finding that preserving relationship and reputation is the most cited constraint on opportunism in situations where contracts are not legally enforceable and there is a significant relation-specific investment); S. Macaulay, Non-Contractual Relations in Business: A Preliminary Study, 28 Am. Soc. Rev. 58, 63–65. (1963).

35. See Williamson, Markets and Hieracbies, supra note 12, at 169–75; Benjamin Klein et al., Vertical Integration, Appropriable Rents, and the Competitive Contracting Process, 21 J.L. & Econ. 297, 304–06 (1978); Klein & Murphy, supra note 12, at 274–76. A similar effect can be achieved if a principal can impose on an agent a penalty in excess of the actual damages of nonperformance. A straightforward penalty clause would probably be unenforceable because of the rule that liquidated damages must be proportionate to actual or expected damages. See U.C.C. § 2-718(1) (1977). Alan Schwartz, The Myth that Promisees Prefer Supracompensatory Remedies: An Analysis of Contracting for Damage Measures, 100 Yale L.J. 369 (1990), criticizes this rule on the ground that promisees will not intentionally choose supracompensatory damage measures ex ante (since such damages reduce joint expected return under a contract, and almost inevitably reduce a promisee's individual expected return). Schwartz does not consider whether penal damages might be justified to deter promisors who think underperformance will not be penalized because it will be undiscovered. See id. at 373 n.11, 402 n.67. He does argue that penal damages would not be the preferred solution to enforcement problems caused by the cost of litigation. See id. at 396–98.

pal.[36] These constraints do not figure significantly in the contracts that are cenntral to my analysis.[37]

Two other constraints figure importantly in the analysis. In requirements contracts, one well-known constraint is an adjustable price term that induces the buyer to take the optimal quantity. Adjusting price also may ensure that each party shares in the gain from performance and thus has an incentive to perform.[38] A less well-known constraint results from the lumpiness of some goods, a characteristic that may improve performance under some agency contracts with sharing arrangements and negligence terms.

II. CHARACTERISTICS OF AGENCY CONTRACTS WITH SHARING ARRANGEMENTS AND NEGLIGENCE TERMS

Agency contracts illustrate many of the problems of uncertainty and opportunism that open-term contracts must address. When a principal employs an agent to develop an asset, he could pay the agent a fixed fee for the agent's services while retaining the right to all returns. But this arrangement would give the agent a strong incentive to shirk and so would require costly monitoring of the agent by the principal. The simplest way for the principal to ensure that the agent makes the optimal effort is to sell the asset to the agent for a fixed price. Such a sale ensures optimal effort because all costs and returns on developing the asset inure to the agent once the price is paid.[39] In Part III, we will

36. See Howard P. Marvel, Exclusive Dealing, 25 J.L. & Econ. 1, 7 (1986) (arguing that exclusive-dealing terms prevent dealers from undermining a manufacturer's promotional efforts by switching customers brought into the store to other goods on which the dealer earns a higher margin); Tim R. Sass & Micha Gisser, Agency Cost, Firm Size, and Exclusive Dealing, 32 J.L. & Econ. 381, 383–84 (1989) (arguing that exclusive-dealing terms deprive dealer of other outlets for resources that may have a higher return to the dealer than services demanded by manufacturer).

37. Reputation is an exception: concerns about reputation have an important but ill-defined impact on incentives to perform in these contracts.

38. This follows Goldberg, supra note 30, at 531–33; Goldberg & Erickson, supra note 30, at 387–88; see also Crocker & Masten, supra note 30, at 74 n.14 (summarizing argument); cf. Paul L. Joskow, Price Adjustment in Long-Term Contracts: The Case of Coal, 31 J.L. & Econ. 47, 52 (1988) [hereinafter Price Adjustment] (arguing that fixed price contract is unattractive because it creates incentive for breach).

39. This point is well-established in the literature on agency. See David E.H. Sappington, Incentives in Principal-Agent Relationships, 5 J. Econ. Persp., Spring 1991, at 45, 47–48. It is also well-established in the literature on mineral development. See W. Mead, Cash Bonus Bidding for Mineral Resources, Society of Petroleum Engineers, Hydrocarbon Economics and Evaluation Symposium 46 (1981). To improve production, some scholars propose that Outer Continental Shelf (OCS) leases be auctioned for fixed payments rather than royalties. See Kenneth W. Dam, Oil Resources: Who Gets What How? 148–55 (1976). Under the existing program, the lessee makes a sizeable bonus payment, pays a nominal rent until the lease is in production, and pays a siguificant share of production to the government in the form of a royalty. See id. at 129–30.

see why such contracts are not used when the value of the asset is uncertain.

An alternative way to induce an agent to perform is to enter into an arrangement under which the principal and the agent share the return from the agent's efforts. An agent might pay the principal a royalty on his production, or the principal might pay the agent a contingent fee. Often such sharing arrangements are accompanied by a negligence-like term, which makes the agent liable for the principal's forgone gain if the agent fails to perform up to a vague standard, such as reasonable prndence or best efforts. This Part describes the basic characteristics of such contracts, paying particular attention to the case of lumpy goods.

I use an oil and gas lease as an example, though much of the analysis could as well apply to other familiar contracts,[40] including exclusive-listing contracts with real estate brokers to sell homes, contingent-fee contracts for legal services, and book-publishing contracts. Under a typical oil and gas lease, the lessee makes a small bonus payment to the lessor upon execution of the lease and has no obligation to explore or develop the property. However, if the lessee does not begin production during the primary term (often five years), he forfeits the lease.[41] Once a lease is in production, the lessee may hold it through a secondary term so long as production is in paying quantities.[42] The lessee's primary obligation is to pay the lessor a share of production revenues, often one-eighth, as a royalty. Also, the lessee is obligated by several implied covenants to use reasonable prudence in operating the lease.[43] These covenants are similar to a negligence term.[44] Thus, a mineral

---

40. I consider the case where an agent demands an exclusive right to the asset for at least a temporary period, a demand the agent makes to prevent the principal from trying to exploit his effort without compensation. Obviously, a negligence term may be used when an agent is paid a fixed fee—for example in a contract with a physician for medical services—and a sharing arrangement may be used without any further performance obligation—for example in a licensing agreement where the licensee disclaims any performance obligation other than the obligation to pay a royalty.

41. See Richard W. Hemingway, The Law of Oil and Gas, § 6.2, at 263–64 (3d ed. 1991). Often the lessee pays a nominal rent to hold a lease without production during the primary term. See id. § 6.3, at 267. The delay rental usually is nominal, and its function is to avoid a possible argument that the lessee is under an implied obligation to begin development before the end of the primary term.

42. See id. § 6.4, at 293. Production is in paying quantities if revenues exceed the lessee's operating costs. See Reese Enters., Inc. v. Lawson, 553 P.2d 885, 895–96 (Kan. 1976); Garcia v. King, 164 S.W.2d 509, 511–12 (Tex. 1942). The rationale for this test is that if production is not in paying quantities, it can only be assumed that the lessee is holding the lease for speculative purposes (which is the evil to be averted). Given this rationale, the test properly applies to the lessee's operating costs (e.g., his lifting costs) and not his fixed costs (e.g., his drilling costs), because the lessee considers only the former in deciding whether it is profitable to continue production.

43. See Hemingway, supra note 41, §§ 8.1–8.9, at 445–85.

44. The standard applied under these implied covenants seems to be less than joint maximization. Many cases state that the lessee is under no duty to take actions that would be unprofitable to him though they would be profitable to the lessor. See, e.g.,

lease contains a sharing arrangement and a negligence-like term, along with an additional requirement that production be maintained at a minimum level to preserve the lease.

A. *The Problem of Under-Performance Under Sharing Arrangements with Lumpy Goods*

A sharing arrangement by itself is not likely to induce an agent to perform at the level that maximizes the parties' joint return, since the agent bears the entire cost of performance but reaps only part of the return. This problem besets all agency contracts with sharing arrangements;[45] for example, it is the most significant problem with contingent-fee contracts for legal services.[46] One manifestation of this

---

Adolph v. Stearns, 684 P.2d 372, 376 (Kan. 1984); Rush v. King Oil Co., 556 P.2d 431, 435 (Kan. 1976); Clifton v. Koontz, 325 S.W.2d 684, 695 (Tex. 1959) (lessee is under no duty to perform "unless there is a reasonable expectation of profit, not only to the lessor, but also to the lessee"); see also Hemingway, supra note 41, §§ 8.3(A), 8.5, 8.9(B). Under a joint-maximization rule, a lessee would be required to operate at a loss if it provided a greater gain to the lessor. Some formulations of the standard may be read to require joint maximization, for example the statement that "[a] lessee must conduct its operations to promote the mutual advantage and profit of both lessor and lessee." Id. § 8.3 (quoting Fontenot v. Austral Oil Exploration Co., 168 F. Supp. 36, 40 (W.D. La. 1958), modified sub nom. Fontenot v. Texas Co., 266 F.2d 956 (5th Cir. 1959)); accord Kleppner v. Lemon, 35 A. 109, 110 (Pa. 1896).

The one situation where it is clear a lessee must incur a loss for the sake of the lessor is in drilling protective wells, which are wells drilled in response to a threat of drainage of a field from wells on adjacent land. The interesting situation is where the lessee also operates the well on the adjacent land and so has no interest in protecting against drainage. In this situation, the lessee must drill a protective well though the additional expense is of no value to him. See 2 W.L. Summers, Summers Oil & Gas 651–52 (1959). However, this is a unique situation which may tell us little about the general principle.

In most cases, the facts will be too uncertain to raise clearly the issue of whether a lessee must incur a loss to provide a greater gain to the lessor. See 5 Howard R. Williams & Charles J. Meyers, Oil and Gas Law § 832.1, at 225–28 (1991), which discusses several cases where cost and return are sufficiently certain to pose the issue. They involve the question whether it is prudent to add a well to increase the rate production on a lease already under production. The central issue is how rapid "payout" on the new well will be; that is, how long it will take the operator to recover his investment (a return on the investment should also be included in payout). In these situations, one could compare an investment in an additional well to an investment in an annuity, and require the operator to make the investment if it has positive net present value in the aggregate (subtracting for the depreciation of the reservoir). Courts do not do this. Instead, they look to expert testimony on what a reasonably prudent operator would do.

45. See Sappington, supra note 39, at 49–52. Related issues in the literature on agency include devising schemes to monitor agents when their performance cannot be directly observed but the product can, see Hart & Holmstrom, supra note 25, at 75–107, and preventing adverse selection by agents (i.e., ensuring that the best agent is hired), see R. Preston McAfee & John McMillan, Competition for Agency Contracts, 18 Rand J. Econ. 296, 302 (1987).

46. See Kevin M. Clermont & John D. Currivan, Improving on the Contingent Fee, 63 Cornell L. Rev. 529, 543–46 (1978); Michael A. Dover, Contingent Percentage Fees:

problem is that an agent who maximizes his own return will stop work when his share of the increase in return from extra effort exceeds the cost of that extra effort. For example, an oil and gas lessee may abandon a well even though the overall return on production exceeds the cost of production, if that cost exceeds his share of production.[47]

Another manifestation of this problem is that an agent who has an exclusive right to develop an asset may delay work, even though it is in the parties' joint interest for him to begin, in order to speculate on an increase in the asset's value. In essence, the agent will treat the contract as an option.[48] This problem is of particular significance in oil and gas leasing.[49] The divergence between a lessee's interest in beginning development and the parties' joint interest is clearest when the lessee's expected return on development equals his expected cost at the current market price of the minerals. Because the lessee pays a royalty to the lessor, the joint expected return is greater than the lessee's expected return, and thus greater than the expected cost. It is thus in the parties' joint interest for the lessee to begin development at that point. But because of the option quality of the arrangement, it is not in the lessee's interest. Delay allows him to capture most (typically 7/8) of the gain if the market goes up, yet suffer no loss if the market goes down.[50] In this situation, a profit-maximizing lessee will under-per-

---

An Economic Analysis, 51 J. Air L. & Com. 531, 551 (1980); Murray L. Schwartz & Daniel J.B. Mitchell, An Economic Analysis of the Contingent Fee in Personal-Injury Litigation, 22 Stan. L. Rev. 1125, 1133–36 (1970). Patricia M. Danzon, Contingent Fees for Personal Injury Litigation, 14 Bell J. Econ. 213, 216–17 (1983), argues that attorneys will not under-perform under contingency fees if bidding for work by attorneys is competitive and attorneys bid the probability of winning and the expected gross recovery as well as their percentage interest in the recovery. This conclusion depends on holding attorneys to the implicitly promised level of effort. See id. at 216. Danzon suggests that monitoring may ensure the proper level of effort, as monitoring may be done by other attorneys if cases are provided through referrals and referral fees are paid. See id. at 217.

47. This problem is dealt with in practice by assigning a lease to a producer with lower overhead. Generally, a lessee may abandon a lease at any time without further liability. See Hemingway, supra note 41, § 7.9. However, a lessee may be liable if he removes fixtures in a way that damages the lease. See Gallaspy v. Warner, 324 P.2d 848, 851 (Okla. 1958).

48. This is similar to the behavior of an insurer who rejects a good settlement of a claim (i.e., a settlement that equals or is less than the expected damage award plus the expected cost of going to trial) when the amount of the settlement equals the policy limits, in the hope of doing better in litigation. The insurer is speculating at the claimant's expense. See Kent D. Syverud, The Duty to Settle, 76 Va. L. Rev. 1113, 1127–31 (1990).

49. That a lessee may hold a lease for speculative purposes is a well-recognized problem in oil and gas law. See Maurice H. Merrill, The Law Relating to Covenants Implied in Oil and Gas Leases § 2, at 17 (2d ed. 1940); C. Meyers, The Covenant of Further Exploration: Thirty Years Later, 32 Rocky Mtn. Min. L. Inst. § 1.05, at 25 (1986).

50. Delay entails no opportunity cost to the lessee because the capital required to develop the lease will earn the same expected return on alternative investments.

form by delaying.[51]

The problem of under-performance by agents under sharing arrangements may be somewhat mitigated by the lumpiness of the good the agent produces. "Lumpy" or "step" goods are goods that come in indivisible increments.[52] The lumpiness of a good may affect the risk of under-performance under a sharing arrangement in two ways. First, the size of an agent's share may give him sufficient incentive to take all steps that are in the parties' joint interest.[53] Diagram One illustrates this case. "Return" refers to the joint return and "cost" refers to the agent's investment. The lines show the steps in return at various levels of cost. It is in the parties' joint interest to take a step if the slope of the upper line (i.e., lines ab', $b'c'$, and $c'd'$) is greater than one, in which case the marginal return from taking that step exceeds the marginal cost. It is in the agent's interest to take a step if the slope of the lower line (lines ab, bc, and cd) is greater than one. The lower line represents the increase in the agent's share of the return. In this case, the agent has

---

51. If a lessee bears a risk of loss on some outcomes, he may not develop a lease even though the expected return on his investment is positive. The following example illustrates the risk that price will drop between the time that the investment to develop the lease is made and the time that production begins. Assume that A may invest $100 to produce 114 units of a mineral one year later. The 114 units of minerals are the only return on the investment and the quantity is certain. A receives 7/8 of this return, or 100 units. The current market price of the minerals is $1.10 per unit. There is a 30% chance that the price will rise $0.10 in any year and a 30% chance that it will drop $0.10. The prevailing interest rate (and A's next best return) is 8% at all times. The production of the minerals has a positive expected return to A. The expected rate of return to A is 10%, compared with his other return of 8%. But A is better off if he delays. If A begins production at the beginning of year zero, his expected return at the end of year two is $118.80 (his expected return at time one is $110, which earns $8.80 in year two). If A waits one year, his expected return at the end of year two is $120.31 (if price stays the same or drops, he ends up with $116.74; if the price rises, he expects to end up with $128.64, which is $120 in minerals and $8 cost plus interest earned in year one; the expected return discounts for the probability of each outcome). A's gain is less than the principal's loss. If A begins production at time zero, the principal expects to end up with $16.63 at time two. If A waits, the principal's expected return at time two is $5.04.

52. For example, if there is a fire, calling in an alarm is a lumpy good—either someone calls or they do not. Calls are not finely graded in quality. The concept is from the literature on public goods. See, e.g., Russell Hardin, Collective Action 20, 55–61 (1982); Mancur Olson, The Logic of Collective Action 23, 49–50 (1965). Lumpiness is important in public goods because it means that underprovision of a good may not be a problem though many benefit from it. It is sufficient that one beneficiary (or a subset of beneficiaries) has sufficient incentive to provide the good at the level all deem satisfactory, as is certainly the case with calling in a fire alarm.

53. This assumes a sharing arrangement without a negligence term. Lumpiness also is relevant to the effect of a negligence term with an uncertain standard of care because an agent is less likely to have an incentive to under-perform if his performance is lumpy. See infra text following note 77. The addition of a negligence term may induce an agent to perform, though the expected return to him independent of his potential liability is negative.

Diagram One
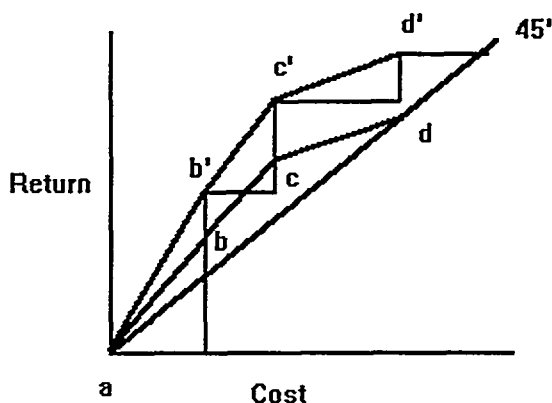
an incentive to perform to maximize the parties' joint return. It is in their joint interest and his individual interest to move to c' but not to d'.

Some common agency contracts, such as real-estate brokerage contracts, may exhibit this pattern of cost and return.[54] Much of what a broker does (for example, listing a home on the Multiple Listing Service or holding an open house) is lumpy in nature. Some basic steps, such as listing a home, have a high expected return, while others have a very low expected return. It is possible in this situation that the broker's commission gives him sufficient incentive to do all that he efficiently can do to produce a buyer.[55]

---

54. Bruce Owens suggests that the odd structure of the brokerage industry—prices are fixed by a custom of paying a 6% commission but entry is effectively unlimited—encourages brokers to make too great an effort in selling homes. See Bruce M. Owens, Kickbacks, Specialization, Price Fixing, and Efficiency in Residential Real Estate Markets, 29 Stan. L. Rev. 931, 947–49, 952–53 (1977). He does not convincingly explain why a fixed price with unlimited entry results in excessive effort. The lack of price competition and unlimited entry ought to increase the importance of reputation, which ought in turn to improve performance by brokers, but it is not clear whether the result will be over- or under-performance. Michael Knoll analyzes brokerage contracts on the assumption that increasing effort by a broker provides a gradually decreasing marginal increase in the chance of finding a willing buyer. See Michael S. Knoll, Uncertainty, Efficiency, and the Brokerage Industry, 31 J.L. & Econ. 249, 250–51 (1988). Given this assumption, he finds that it is sensible to pay brokers more for selling more expensive homes; more effort is warranted in the sale of such homes, which impose higher carrying costs on the owner (or builder). Thus, Knoll concludes that it may make sense for brokers to charge a flat percentage fee without regard to the value of the home. See id. at 262–63. That conclusion is questionable if the level of services a broker provides is relatively constant, because some lumpy actions always are cost-effective and other actions never are cost-effective.

55. For example, assume a home has an expected sale price of $100,000. The selling agent's share of the commission is 3%, and the cost to the owner of carrying the home empty is $1000 per month. There are three possible levels of effort. First, the agent may do nothing other than put a sign in the yard, which would cost $0 and create a 1% chance of selling a home in a given month. Second, the home may be listed on a

The lumpiness of a good may reduce the risk of under-performance in a second way. If an agent can be compelled to begin performance, the step character of a good may give him sufficient incentive to complete performance though it was not in his interest to begin.[56] Diagram Two illustrates this case. It is in the parties' joint interest to get to c' (the slope of $ac' > 1$), but not in the agent's individual interest (the slope of $ac < 1$). Once the agent gets to point b, however, it is in his interest to finish (the slope of $bc > 1$). The lines continue beyond c to illustrate that once cost and return appear incrementally, the agent may halt though it is in the parties' joint interest for him to continue.

This pattern may appear whenever an agent must reach a certain stage of performance to realize a jump in the return from an asset. For example, an investment in drilling an oil and gas well fits this pattern. The probability of striking oil and gas, and thus the expected return from drilling, do not increase gradually with drilling. Instead, this probability is near zero until the potential mineral-bearing formation is reached. Thus as a potential mineral-bearing formation is neared, an investment in drilling may have an extraordinarily high rate of return.

In this situation, the trick for the principal is to get the agent started so that the agent's self-interest will take over. In an oil and gas lease, this is done by requiring the lessee to begin development during the primary term to preserve the lease.[57] Even if the lessee does not expect a positive return from beginning development at current prices, he may begin in order to preserve his interest in the lease. He would view the price of development as the price of preserving an option on the entire lease.

Other factors may induce an agent to begin work against his own interest. A negligence rule may have this effect even if monitoring and

---

multiple listing service, which would cost $100 per month and create a 15% chance of selling the home in a given month. Third, an open house may be held, which would cost $250 and would increase the chance of selling the home to 20%. (I assume expenditures have no value after the current month.) The optimal level of expenditure is $100, and this is what the agent will spend. If $0 is spent, the joint expected return for the month is −$990 (the expected cost of interest if the home is not sold) and the agent's expected return is $30. If $100 is spent, the joint expected return is −$950 ($850 expected interest plus the agent's expense) and the agent's expected return is $350. And if $350 is spent, the joint expected return is −$1150 and the agent's expected return is $250.

Real estate brokerage contracts may have a feature that distinguishes them from many agency contracts. The proceeds from which the agent is paid—the sale price of the home—may not be correlated with the seller's "gain" in selling the home, which may be a function of the seller's cost of carrying the home if effort by an agent affects the time of sale and not the price. The agent's reward and the seller's gain would be correlated to the extent effort by the agent affects sale price.

56. Hardin discusses situations like this involving public goods with vertical or steeply sloping cost/benefit "risers" where the good is partly provided by others. See Hardin, supra note 52, at 57–58.

57. See supra note 41 and accompanying text.

Diagram Two
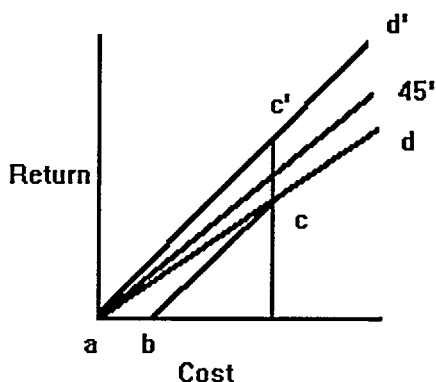
enforcement are imperfect.[58] An agent may think that he bears a much greater risk of being found negligent if he makes no effort at all in a particular area. This fear may induce him to begin work on a lumpy interval of performance; once he has begun, the positive return on completion may induce him to finish that interval. Alternatively, an agent may have to begin work to determine an asset's value. He may have sufficient incentive to finish what he has begun, even though had he known the return from the start, he would not have begun.

A recent study by Herbert Kritzer suggests that attorneys perform fairly well under contingency fees and attributes this result to the lumpiness of their tasks.[59] The standard critique of contingent fees assumes that attorneys trade off time for returns that gradually diminish with effort.[60] Under this model, attorneys are not likely to maximize the parties' joint return. Instead, attorneys will work until their share of the marginal return from extra effort equals the alternative value of their time. Kritzer found that plaintiffs do better under contingent fees than under hourly fees if a claim is small, even though attorneys spend less time on low-stake cases under contingent fees than they do under

---

58. This point is different from the point to be made later that error in determining negligence is less likely to give an agent an incentive to under-perform when his performance is lumpy. The later point turns on the hypothesis that an agent has an incentive to under-perform when the cost to him of an increment of effort (discounted by the probability of an error in his favor exculpating him from liability from not making such effort) exceeds the net return from such effort, and the fact that these conditions are most likely to be met when performance is finely graded since the net return on effort must approach zero at the margin when performance is finely graded. See infra notes 74–78 and accompanying text. The point here is that once an agent begins a lumpy interval of performance (as, for example, by beginning to drill a well), at some point self-interest will give him sufficient incentive to finish even without a negligence rule, and a negligence rule may induce an agent to begin.

59. See Herbert Kritzer, The Justice Broker 150–51 (1990).

60. See Clermont & Currivan, supra note 46, at 539–40.

hourly fees.[61] Effort seems not to be perfectly sensitive to differences in reward between the two fee structures. Of course, this inelasticity could exist for many reasons, including attorneys' concern for their reputations. However, Kritzer's findings on how fee structure affects attorneys' handling of claims suggest that the lumpiness of an attorney's tasks is an important factor. Kritzer finds that fee structure has a trivial effect on such aspects of effort as the number of pleadings, motions, discovery "events," and briefs filed.[62] The most significant effect is in craft-oriented variables, in particular time spent drafting reply briefs.[63] Pleadings, motions, and the like are lumpy goods. They are essential and must have certain minimal characteristics to be of value. As one would expect, fee structure seems not to affect the performance of these tasks. What fee structure seems to affect is the effort spent in "polishing" performance—for example, drafting reply briefs—where expected returu and cost appear in small increments.

The lumpiness of the good produced by an agent may mitigate the problem of under-performance in some situations, but rarely will it eliminate the problem. Often cost and return appear in finer increments after a certain stage of performance, making under-performance a risk. For example, an oil and gas lessee may have too little incentive to make marginal investments that enhance production on a working well, though there has been little litigation involving such issues.[64] Likewise, a real estate broker's interests may conflict with his and the owner's joint interest once an offer is made for a home. The cost of carrying the home and the expected return (the possibility of obtaining

---

61. See Kritzer, supra note 59, at 119. That is, plaintiffs recover a greater share of the maximum expected value of their claim after the fee is subtracted. Kritzer measures a plaintiff's success by dividing the actual outcome minus the attorney's fee by the highest estimated possible recovery on a case. He finds that plaintiffs generally do somewhat better with hourly fees (a success ratio of .60 to .49). However, plaintiffs do worse with hourly fees under low-value cases (a success ratio of .38 to .44). See id. at 149–51; cf. Terry Thomason, Are Attorneys Paid What They're Worth? Contingent Fees and the Settlement Process, 20 J. Legal Stud. 187, 221 (1991). Thomason finds that workers compensation claimants in New York who employ attorneys under fee arrangements with a significant contingent element obtain significantly lower recoveries net of attorneys' fees than claimants who handle their own claims. Kritzer compares how plaintiffs fare under hourly fees and contingent fees. Kritzer's study is not directly responsive to Thomason's point, since attorneys may under-perform in either case, or attorneys on hourly fees may over-bill.

62. See Kritzer, supra note 59, at 112.

63. See id. at 117.

64. See Hemingway, supra note 41, at 441, 481–84 (collecting several cases involving such claims). Claims involving a failure to enhance recovery may be unlikely because of crushing problems of proof. See 5 Williams & Meyers, supra note 44, § 861.3, at 431. A leading case concerning the covenant to market, Amoco Prod. Co. v. First Baptist Church of Pyote, 579 S.W.2d 280, 282–83 (Tex. Civ. App. 1979), appeal denied, 611 S.W.2d 610 (Tex. 1980), involves more straightforward opportunism: the lessee sold gas below market price to a buyer who agreed to increase the price that it paid the lessee for gas under other existing contracts.

a better offer) appear in finer increments once an offer is made.[65] The broker may be too hasty in selling, either because he has a higher cost in carrying a home than the owner has or because he gets a small share of any increase in price.[66] On the other hand, the broker may be too slow to sell if his cost of carrying the home is lower than the owner's.[67]

Alternatively, a principal may have difficulty in getting an agent started on performing lumpy tasks. This is a significant problem in oil and gas leasing. If the area covered by a lease is large, a lessee may retain the entire lease with production on part, so long as the production satisfies the paying quantity test.[68] A lessee might not extend production to new areas or depths though it is in the parties' joint interest to do so.[69] What protects the lessor in this situation are the covenants

---

65. Similar problems may arise under contingent fee contracts for legal services when there is a settlement offer. In particular, an attorney may be too quick to settle if the additional expected return from going to trial exceeds his cost of going to trial. Arguments that an attorney may be too slow to settle generally assume the client is more risk averse than the attorney. An attorney may gamble on a trial when a risk averse client would not.

66. Claims of underselling by brokers generally are not successful. See Musselman v. Southwinds Realty, Inc., 704 P.2d 814, 816 (Ariz. Ct. App. 1985) (denying claim as a matter of law where owner alleged that broker failed to disclose that price was 25% below market price); Edwards v. Pennino, 635 S.W.2d 246, 248–49 (Ark. 1982) (finding no breach of duty where owner alleged that broker underlisted home by $16,500); Perkins v. Thorpe, 676 P.2d 52, 55 (Idaho Ct. App. 1984) (holding that broker is not liable for mistake not involving lack of diligence or lack of honesty); cf. Jaquitb v. Ferris, 669 P.2d 334, 337 (Or. Ct. App. 1983) (holding claim of undervaluation barred by statute of limitations), aff'd, 687 P.2d 1083 (Or. 1984). However, a claim of 40% undervaluation succeeded in Auxier v. Kraisel, 466 A.2d 416, 417–18 (D.C. 1983), and a broker will be liable if he fails to communicate a second, higher offer to an owner, see Jeffrey Allen Indus. v. Sheldon F. Good & Co., 505 N.E.2d 1104, 1106–07 (Ill. App. Ct. 1987) (broker would have split the commission if the second offer was accepted).

67. I could find only one claim of overvaluation of a home. See Duhl v. Nash Realty Inc., 429 N.E.2d 1267, 1271 (Ill. Ct. App. 1981) (by overvaluing the home the broker induced the owner to buy a second home whose price was higher than could be financed given the proceeds from the sale of the first home).

68. See Hemingway, supra note 41, § 6.4, at 299. In some situations, the paying quantity test does not adequately protect a lessee's interests either. A lessee's concern is that he be able to recover as much as he can from his investment in production or exploration. The paying quantity test may not protect this interest if a lessee must forfeit a right to a lease because a well is temporarily unprofitable. An extreme example of such forfeiture is where gas found cannot be sold currently because a pipeline is unavailable and the gas cannot otherwise be marketed. This problem is dealt with contractually by allowing a lessee to extend a lease by paying shut-in royalties. See id. at 323 n.250, for an example of such a clause. In less extreme cases, a lessee's interest in continuing production with a currently unprofitable well is sometimes protected hy a standard that permits a lessee to continue so long as a reasonably prudent operator in his position would do so. See Clifton v. Koontz, 325 S.W.2d 684, 695 (Tex. 1959). In addition, various standardized lease terms permit a lessee to continue if there is a dry hole or a temporary cessation of production, so long as he continuously works a lease.

69. See supra notes 49–51 and accompanying text.

of development and further exploration, which are negligence-like terms.

B. *Negligence Terms and the Effect of Error in Their Enforcement*

A negligence term may be used in addition to or in lieu of a sharing arrangement to induce an agent to work diligently. Under a negligence term, an agent is liable to his principal for failing to perform in the manner a court deems appropriate. The agent is liable for the gain that the principal forgoes because of the agent's defective performance. If the standard of performance under a negligence term is joint-maximization, and if this standard could be costlessly and perfectly enforced, it ought by definition to induce the agent to perform in a manner that maximizes the parties' joint return.[70] In effect, the term requires the agent to internalize losses to the principal caused by the agent's suboptimal performance.

In the real world, a negligence term will not optimize performance because enforcement is costly and subject to error.[71] Obviously, it is costly to monitor performance and to make claims or settle disputes under a negligence term. In addition, a principal may err in evaluating performance, or a court may err by setting the standard of performance too low or too high or by misjudging the quality of performance.[72]

It is difficult to predict the effect of enforcement cost on an agent's incentives to perform under a negligence term.[73] The effect of error is

---

70. Optimal production occurs at the point where the marginal joint cost (MC) equals the marginal joint return (MR). If the agent's share of the return is $MR*(1-SH)$—with SH being the principal's share—the agent will pay the principal damages equal to $MR*SH$ for each unit below the optimal level of production that the agent fails to produce. Thus, the joint-maximization rule will induce a profit-maximizing agent to produce the optimal quantity, since the agent's marginal profit $MR*(1-SH) - MC$ is greater than the agent's potential liability, $MR*SH$ if $MR>MC$.

71. Of course, enforcement cost and error are not unique to contracts with negligence terms. Similar problems arise when a promise is indefinite, when it is difficult to evaluate the quality of performance under a definite promise, and when it is difficult to evaluate damages resulting from breach of a definite promise. These problems are not important when we compare an open term mineral lease with a contract in which the lessee pays the lessor a fixed sum for all mineral rights, since the latter promise is definite and easy to enforce. These problems become more important later on, however, when we compare an open term contract with a fixed term contract in which performance by both parties is complex and breach may involve consequential damages. See infra notes 173–178 and accompanying text.

72. Several types of error are possible in determining negligence. A judge may err in evaluating what level of performance ought to be demanded of an agent by misjudging the cost of performance. He may make a similar error by misjudging the benefit of performance. And he may err in evaluating the agent's compliance with the standard, misjudging the effort the agent actually expended. Errors of the first and third type have similar effects. See Shavell, supra note 27, at 79, 82. Error of the second type is somewhat different in its effect because it also affects the amount of damages under a rule of expectation damages. See infra note 78.

73. Enforcement costs increase the agent's cost of nonperformance by the cost of

easier to predict. Generally, unbiased error in determining an agent's negligence is likely to induce the agent to under-perform if the cost and return on his performance are finely graded, unless the return on the agent's investment is risky and the damages to the principal are assessed without discounting for the riskiness of the return.

In tort, it has been shown that error in determining negligence is likely to induce injurers to take too much care, unless the negligence determination is so wild that it is essentially random.[74] This result de-

---

resolving a dispute, which will tend to make agents work harder to satisfy principals. However, enforcement costs also may discourage principals from pressing claims for breach, or may induce them to accept settlements at less than full value of the claim. These effects will make agents work less hard to the extent their concern is monetary expense and not loss in reputation. Which effect predominates depends on such factors as the relative optimism of the two parties about the strength of their claims, the cost to each of pressing a claim, their relative wealth, and their skill at bluffing. Prediction is complicated further by the fact that disputes do not involve simple choices whether to litigate or to settle, with a definite cost ascribed to each choice. Rather, disputes involve a series of choices with sequential options to push ahead, settle, or fold. See Bradford Cornell, The Incentive to Sue: An Option-Pricing Approach, 19 J. Legal Stud. 173, 174–75 (1990). The option-like character of investments in pursuing a dispute considerably complicates matters. It may mean, to take an extreme example, that before a dispute is resolved both parties may end up spending resources in excess of the claim's value because this is the sum effect of incremental decisions that seemed reasonable at the time. Further, the effect of enforcement costs on performance does not depend on how disputes are actually handled, but on how the agent expects they will be handled when he performs.

Formal analysis of the effect of litigation cost on the desirability of liability rules includes Keith N. Hylton, Litigation Costs and the Economic Theory of Tort Law, 46 U. Miami L. Rev. 111 (1991); Janusz A. Ordover, On the Consequences of Costly Litigation in the Model of Single Activity Accidents: Some New Results, 10 J. Legal Stud. 269 (1981) [hereinafter New Results]; Janusz A. Ordover, Costly Litigation in the Model of Single Activity Accidents, 7 J. Legal Stud. 243 (1978); A. Mitchell Polinsky & Daniel L. Rubinfeld, The Welfare Implications of Costly Litigation for the Level of Liability, 17 J. Legal Stud. 151 (1988). Hylton concludes that injurers take too little care under a negligence rule if litigation costs are considered because such costs are not imposed on them as accident costs. See Hylton, supra, at 129, 139. However, this conclusion ignores the effect of litigation costs on an injurer's decision to settle. The expectation of litigation costs may induce an injurer to pay a claim without those costs ever being incurred. Polinsky and Rubinfeld conclude that litigation costs may lead injurers to take too little care under a negligence standard, but that these costs will never induce them to take too much care. See Polinsky & Rubinfeld, supra, at 161–62. However, this conclusion depends on their assumption that victims and courts always know whether injurers take adequate care. See id. at 161 n.20. Thus, injurers will never be concerned with the cost of defending baseless suits should they injure victims nonnegligently. Ordover considers a different issue—namely, how the standard of care should be adjusted if litigation costs are included in accident costs—and concludes that upward adjustment is appropriate because litigation costs increase accident costs. See Ordover, New Results, supra, at 276.

74. See John E. Calfee & Richard Craswell, Some Effects of Uncertainty on Compliance with Legal Standards, 70 Va. L. Rev. 965, 974–81 (1984); Robert D. Cooter & Thomas S. Ulen, An Economic Case for Comparative Negligence, 61 N.Y.U. L. Rev. 1067, 1087–90 (1986); Richard Craswell & John E. Calfee, Deterrence and Uncertain Legal Standards, 2 J.L. Econ. & Organization 279, 281–83 (1986); Shavell, supra note

pends on the assumptions that injury is probabilistic and that if injury occurs, an injurer who is found negligent will be held liable for the entire loss and not just for the value of the increased risk of harm that resulted from his negligence. For example, if a physician negligently performs an operation in a way that reduces a patient's chance of survival from 50% to 10%, and the patient dies, the physician will be held liable for the value of the patient's life and not just for the value of the 40% chance of life denied the patient.[75] This failure to compensate for background risk of loss by discounting damage awards creates a sharp discontinuity in an injurer's incentives to take care. Because this background risk is fixed (and thus does not affect the marginal cost of risk created by the potential injurer), the resulting discontinuity in incentives would not matter if courts could accurately identify the optimal standard of care, and injurers knew this standard. But a risk of error (or the perception of a risk of error) in the determination of negligence creates a problem of false positives—that is, erroneous determinations that an injurer is negligent. Because the expected cost of false positives is increased by holding injurers liable for background risk, the failure to discount damages creates strong incentives for injurers to be too cautious.

The effect of error in evaluating performance under a negligence

---

27, at 79–83; cf. Robert Cooter & Bradley J. Freedman, The Fiduciary Relationship: Its Economic Character and Legal Consequences, 66 N.Y.U. L. Rev. 1045, 1049–51 (1991) (making the same point about the performance of an agent under a contract with a negligence standard). However, an injurer may take too little care if the determination of negligence is very error-prone. See Craswell & Calfee, supra, at 285–86. Intuitively, if sanctions are imposed randomly in a way that is entirely independent of how a person behaves, he will invest no resources in trying to comply with the law.

Typically, analyses of error in administering a negligence rule characterize the problem as involving an "uncertain" standard and "uncertain" injuries. I use the terms "risk of error" and "risky returns" to be consistent with my other usage of "risk" and "uncertainty." Most analyses assume risk and not uncertainty—as I define those terms—because they assume that the probability and direction of error and the impact of care on the probability of injury are known. True uncertainty about the standard of negligence or about returns from care probably would not alter the conclusion that injurers will take too much care under a negligence rule in tort: the effect of not discounting uncertain damages is so pronounced that it will predominate even if definite probabilities cannot be assigned to error or returns from care. It is not clear how the level of care is affected by uncertainty about the standard of performance when returns are certain or when damages are discounted for the uncertainty of returns. Under these circumstances, the effect that creates an incentive to under-perform is fairly subtle and can be swamped by the effect of rules of decision for uncertainty. However, the effect would be the same if an agent responds to uncertainty about the standard of performance by assuming that the median outcome will be accurate and that there is a roughly equal chance of a lower or higher standard.

75. Sometimes damages are discounted in tort. See Falcon v. Memorial Hosp., 462 N.W.2d 44, 52–56 (Mich. 1990). See generally Glen D. Robinson, Probabilistic Causation and Compensation for Tortious Risk, 14 J. Legal Stud. 779, 792–93 (1985) (discussing so-called "lost chance" cases in which courts "allow recovery for negligent destruction of a chance of some future benefit").

standard is quite different if performance has a certain return[76] or if risky returns are discounted when damages are assessed.[77] In such a case, unbiased error in determining negligence will give an agent an incentive to under-perform if performance is in fine increments. If there is an unbiased risk of error in assessing the cost of performance or the quality of the agent's performance, an agent will have an incentive to under-perform if the return to the principal on an increment of effort, discounted by the probability that the agent will not be held liable for providing that increment, exceeds the joint net return on that increment.[78] This incentive will always exist when performance is

---

76. See Calfee & Craswell, supra note 74, at 981.

77. Cf. Craswell & Calfee, supra note 74, at 295–97 (arguing that under an incremental damage rule, which holds an injurer liable only for the increased social loss that results from his negligence, the injurer will always have an incentive to undercomply with the law if the chance of punishment is less than one); Shavell, supra note 7, at 108 (noting that restricting liability for uncertain losses may relieve problems that result from uncertainty in enforcing negligence rule).

78. The following diagram illustrates the case where the error is in the evaluation of the quality of an agent's performance. It assumes a constant return at a gradually increasing cost per increment of effort, with four possible increments of effort—*a* to *d*. The optimal level of effort is represented by *c*.
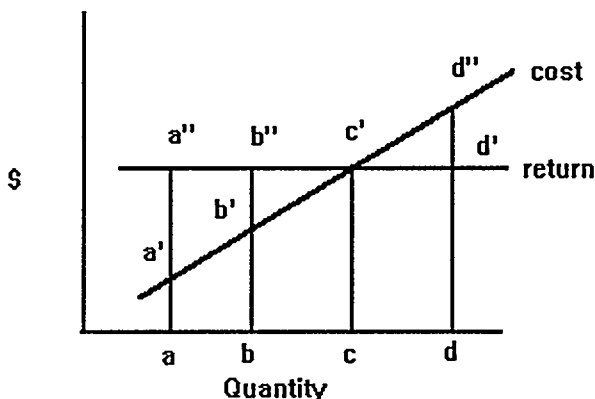

Assume there is an equal probability that a court will evaluate the agent's level of performance as being one level higher or lower than it actually is. If the agent performs at level *c* there is a chance that he will be found to perform at level *b* and held liable for principal's return at level *c*. Further assume all returns go to the principal. (Nothing turns on this assumption since a contract where returns are shared could be depicted as above by defining the agent's cost as his cost net of his return. However, the point only holds if the principal's share is out of gross return, since only then can the principal's share exceed net.)

Consider the case in which the agent's effort is *e*, and the court's evaluation of the agent's effort is *x*. The court may judge effort accurately, $PR(x = e)$, or undervalue the agent's effort, $PR(x < e)$, or overvalue the agent's effort, $PR(x > e)$. If the agent performs at *c*, his expected cost is the areas $aa'c'c + PR(x < e)(bb''c'c)$. If he performs at *b*, his expected cost is $aa'b'b + PR(x < e)(aa''c'c) + PR(x = e)(bb''c'c)$. The agent will have an incentive to perform at *b* if $aa'c'c + PR(x < e)(bb''c'c) > aa'b'b + PR(x < e)(aa''c'c) + PR(x = e)(bb''c'c)$, or if $bb'c'c > PR(x < e)(aa''b''b) + PR(x = e)(bb''c'c)$. Assuming cost is in equal increments, this expression reduces to $bb'c'c$

finely graded since the joint net return on an increment of effort will approach zero at the margin, and so at any positive cost of performance and any positive risk of error, it will be in an agent's interest not to provide some increments of effort with a positive joint return. This effect may lead a profit-maximizing agent to under-perform by a signifi-

---

$> (bb''c'c)(1-PR(x > e))$, which equals $(bb''c'c)PR(x > e) > b'b''c'$. Thus the agent has an incentive to under-perform if the return to the principal on the increment of performance $(bb''c'c)$, multiplied by the probability of an error in the agent's favor excusing him from liability $(PR(x > e))$ exceeds the joint net return on that increment $(b'b''c')$. The analysis of error in evaluating the cost of performance is similar. (If the return line is not horizontal, the illustration is somewhat more complex because $(bb''c'c)(1-PR(x > e))$ cannot be substituted for $PR(x < e)(aa''b''b) + PR(x = e)(bb''c'c)$. For example, if return descends so that $aa''b''b > bb''c'c$, the difference in the two would appear as a factor weighing against under-performance discounted by $PR(x < e)$. If performance is finely graded, this effect will be infinitesimal at the margin.)

An unbiased error in evaluating the return on performance also may create an incentive to under-perform, but the effect is mitigated because damages are inflated if the return is over-estimated. The following diagram assumes three possible increments of effort—a to c—with a constant actual return. Lines $a'''c'''$ and $a'c'$ represent possible misvaluations of return.
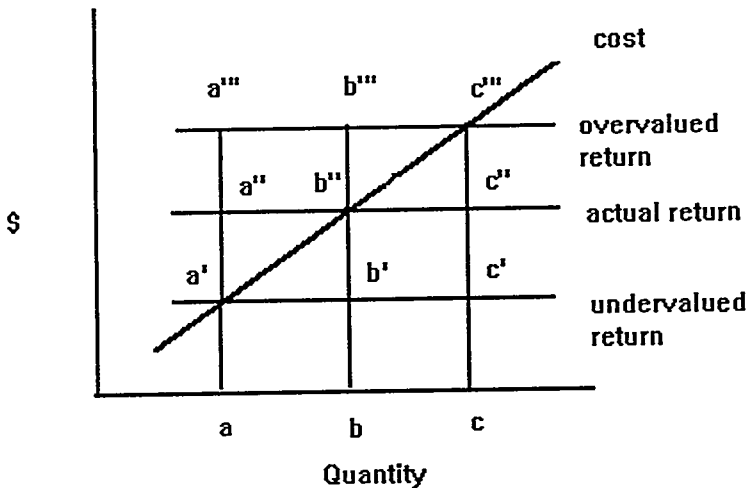
The probability that the return will be overvalued, undervalued, and accurately valued are $PR(x > r)$, $PR(x < r)$, and $PR(x = r)$ respectively, where x is the court's valuation of the return and r is the actual return. The agent will have an incentive to perform at level a if $aa'b''b + PR(x > r)(bb''c''c) > PR(x = r)(aa''b''b) + PR(x > r)(aa''c'''c)$, or if $aa'b''b > PR(x = r)(aa''b''b) + PR(x > r)(aa''b'''b)$. This equals $aa'b''b > PR(x = r)(aa''b''b) + PR(x > r)(aa''b''b) + PR(x > r)(a'a''b''b'')$, which if cost and return are in equal increments equals $aa'b''b > (1-PR(x < r))(aa''b''b) + PR(x > r)(a'a''b''b'')$, or if $PR(x < r)(aa''b''b) - PR(x > r)(a'a''b''b'') > a'a''b''$. That is, an agent will have an incentive to under-perform if the return to the principal on the last increment of performance $(aa''b''b)$, discounted by the probability of an error in the agent's favor $(PR(x < r))$ and less the extra damages he will pay at that level of effort if the return is over-estimated $(PR(x < r)(a'a''b'''b''))$, exceeds the joint net return from that increment of performance $(a'a''b'')$.

cant margin if the risk of error and the return to the principal are large, since the principal's return discounted by the probability of error may exceed a significant joint net return.

On the other hand, if an agent's performance is sufficiently lumpy there may be no incentive to under-perform. Particularly if the probability of error is small, the joint net return on the last efficient increment of performance may exceed the principal's return discounted by the probability of an error exculpating an agent from liability for not providing that return. In addition, the lumpiness of performance also may make it easier to monitor and evaluate performance, thus reducing the risk of error.

In many contracts, returns on investment are not very risky, or else damages are discounted for risk; we would thus expect there to be an incentive to under-perform. Often the return to the principal on an agent's investment is fairly certain. For example, adding a well to increase the rate of production in an existing field may have a fairly certain return, since the depth the well must be drilled and its rate of production can be calculated from wells already in production. Expending more on labor or equipment to increase the rate of production also may have a fairly certain return.[79]

When the return on performance is subject to risks independent of the agent's performance, damages for breach often are assessed in a way that discounts for risk. Thus, if an agent performs negligently and denies a principal a chance at a bet, the principal is likely to be paid in damages the value of the bet discounted for its risk, not the amount of the payoff had he won.[80] Courts may be more likely to discount losses on this basis in contract than in tort, because contract typically involves lost opportunity while tort typically involves a tangible reduction in a plaintiff's well-being. A court is more likely to regard a lost opportunity as a forgone bet, and to value it as such.

Some remedies for breach of contract have an effect similar to discounting for risk. In the area of legal malpractice, for instance, a client who claims that an attorney's negligence denied him the chance to

----

79. Cf. 5 Williams & Meyers, supra note 44, § 832.1, at 225–28(PAREN).

80. A classic case involves a claim by a beauty pageant contestant that she was improperly denied an opportunity to compete. As damages she was given the prize minus an allowance for the fact that she had no guarantee of winning. See Chaplin v. Hicks, 2 K.B. 786, 793–97 (1911); cf. McDonald v. John P. Scripps Newspaper, 257 Cal. Rptr. 473, 475–76 (Ct. App. 1989) (denying claim by spelling contest competitor because of inability to show alleged breach by contest organizer caused loss). Contemporary Mission, Inc. v. Famous Music Corp., 557 F.2d 918 (2d Cir. 1977), offers a less colorful example of discounting. Plaintiffs produced a record that quickly rose to around number sixty on the *Billboard* charts. They claimed that defendants failed to use best efforts in promoting the record. The appellate court remanded the case and instructed the district court to determine whether track records of other records that had reached the 60th spot in similar fashion would be relevant to calculating damages in this case. See id. at 926–28.

press a risky legal claim must retry the underlying claim.[81] Viewed ex ante, retrying the underlying claim (in effect, replaying the bet) has the same effect as discounting for risk. The remedy for breach of the implied covenant of further exploration in oil and gas law—release of unexplored areas from the lease[82]—also has an effect similar to discounting in that the lessee is given the bet back to replay himself.

In contracts that expose a principal to significant risk and establish no explicit mechanism for discounting losses, we might expect an agent to have an incentive to over-perform, as does a prospective tortfeasor. However, courts are reluctant to give damages in contract when a loss is uncertain or speculative.[83] Because of this reluctance, damages will be denied entirely in the cases where the incentive to over-perform under a negligence standard would be sharpest were damages not discounted for risk—that is, in cases where a contract has a very risky or uncertain return.

In sum, an unbiased risk of error will give an agent an incentive to under-perform when two conditions are met: performance is finely graded, and return on performance either is certain or incorporates only risks that damages will be discounted to reflect. In many contracts with negligence-like terms, an agent's performance incentives are likely to be even lower than this observation suggests, because error is biased in his favor. In a mineral lease, for instance, the standard of performance requires the lessor to prove not just that measures not taken would have been jointly profitable but that these measures would have been profitable to the lessee.[84] This standard is more favorable to the lessee than is joint-maximization. Further, courts may defer to lessees' business judgment,[85] which would further bias the standard in the lessees' favor.

---

81. See Charles W. Wolfram, Modern Legal Ethics 218–21 (student ed. 1986). This solution is uniquely possible in the area of legal malpractice because courts have the capacity to simulate the play of legal bets. However, an attorney's negligence may make a fair replay impossible (for example, an essential witness may be lost).

82. See, e.g., supra notes 42–44 and accompanying text.

83. See, e.g., Hemingway, supra note 41, at 447 (damages from breach of implied covenants in oil and gas must be proven "with reasonable certainty, by substantial evidence"). Recovery also may be barred by the rule of causation if the court concludes that the principal would not have realized the gain even if the agent had performed adequately. See Smith v. Lewis, 530 P.2d 589, 595–96 (Cal. 1975) (discussing whether client may recover for attorney's malpractice on a legally doubtful claim).

84. See supra note 44.

85. See Eugene Kuntz et al., Cases and Materials on Oil and Gas Law 774 (1986). Williams argued that courts should and do defer to a lessee's judgment. See Stephen F. Williams, Implied Covenants' Threat to the Value of Oil and Gas Reserves, 36 Ann. Inst. of Oil & Gas L. & Tax'n § 3 (1985).

III. Why Open Terms Are Desirable in the Development of Assets of Uncertain Value

A principal could avoid the problems associated with a sharing arrangement and a negligence term by selling the asset to be developed to the agent for a fixed price.[86] This contract would ensure optimal performance by the agent, since all costs and returns of his performance would inure to him. This Part explains why open terms are preferable. The usual explanation is based on risk preference, but I suggest instead that open terms are used because they align the parties' individual and joint risks in entering into the contract. This alignment of risks greatly reduces the cost of contracting when the value of an asset is uncertain.

As before, oil and gas leases are good examples. Most oil and gas leases combine the characteristics of "bonus bid leases," under which the lessee makes a fixed payment and has no production obligation, and "royalty leases," under which the lessee pays a royalty and performs under a negligence-like term.[87] In addition, a lessee may promise to perform specific acts—for example, to drill a specific number of wells[88]—or he may promise to meet a production quota.[89] These other forms of fixed obligation may be analyzed as hybrids of a pure bonus bid lease, a royalty lease with a negligence term, and a royalty lease with no other performance obligation.[90]

---

86. See supra note 39 and accompanying text.

87. In the typical mineral lease in an unproven area, the bonus bid is relatively small. See Hemingway, supra note 41, at 51.

88. See id. § 8.13, at 452–53. Work commitment bidding is an interesting variation on a lease with specified performance terms. In such a lease, the lessee commits to spend a certain amount on development. If he spends less, he pays the balance to the lessor. See M. Said, Work Commitment Bidding as a Method of Subsidizing Development of Federally Owned Energy Resources, in Society of Petroleum Engineers, Hydrocarbon Economics and Evaluation Symposium 79 (1981).

89. Cf. Edwards v. Trinity & B.V. Ry., 118 S.W. 572, 572–73 (Tex. Civ. App. 1909) (promise to take no less than 5000 cubic yards of sand and gravel per month over contract term).

90. A production quota functions like a fixed-price contract except that the lessee has no legal claim to quantities above those specified in the contract. However, if another producer cannot easily step into the shoes of the lessee, the lessee may have a practical claim on excess quantities since only he can profitably extract them. If the quantity produced is lower than the quota, the lessee will pay damages. Usually, promises to perform specific acts are used in conjunction with sharing arrangements. Like negligence terms, such promises may be difficult to enforce. Further, if it turns out that the cost of performing the act exceeds the benefit to the lessor, then the lessee may in some states be liable only for the lost benefit to the lessor and not for the cost of the act. See Hemingway, supra note 41, § 8.13, at 452–53 (reporting this as the minority rule). For example, if a lessee promises to drill a well, but it turns out that the well would be of no value because the field is barren, the lessee may breach without paying damages. Calculating damages in this way produces a result similar to a negligence term in that the lessee is liable only insofar as the act turns out to be beneficial to the lessor.

A. *Risk Preference as an Explanation for Sharing Arrangements*

Risk preferences of agents or principals are the usual explanation for sharing arrangements in agency contracts. The agent's risk aversion is thought to motivate most sharing arrangements, because the alternative is assumed to be a contract in which the agent, after paying a fixed fee to the principal, is entitled to all returns from his performance.[91] For example, the conventional explanation of why most oil and gas leases include a significant royalty[92] is that lessees are risk averse.[93] Conversely, a sharing arrangement in the form of a contingent fee is often attributed to the principal's risk aversion, on the assumption that the alternative to a contingent fee is a fixed fee that the principal pays the agent without regard to success.[94]

However, risk preferences do not explain the use of sharing arrangements in many agency contracts. Often there are other ways for an agent to spread the risks that he assumes under a fixed-payment contract. In oil and gas leasing,[95] a significant part of oil exploration and development is conducted by a few large firms,[96] which may spread even large risks across leases. Small firms may spread risk on large leases through joint bidding, as well as by paying their suppliers and contractors out of production, a common practice in small wildcat leases.

Further, sharing arrangements often are used even when they are inconsistent with the parties' likely risk preferences. Royalties are common even in small leases where the lessor is not wealthy. In this situation, bonus bid leasing would enable lessees to spread risk among lessors who presumably are risk averse. This point is of more general

---

It is different in that the lessee is liable in damages for the foregone benefit to the lessor if it turns out that the act is not worth performing, but would have benefitted the lessor.

91. See R. Preston McAfee & John McMillan, Bidding for Contracts: A Principal-Agent Analysis, 17 Rand J. Econ. 326, 329 (1986); Sappington, supra note 39, at 49–50.

92. See Hemingway, supra note 41, § 7.1, at 358. A significant royalty is common even when leases are auctioned, as in the OCS leasing program. See James B. Ramsey, Bidding and Oil Leases 130 (1980).

93. See Ramsey, supra note 92, at 122–26.

94. See Schwartz & Mitchell, supra note 46, at 1125–27. If a fixed payment would be from the principal to the agent, a sharing arrangement also may be used to gnard against adverse selection by agents. The more capable the agent, the more likely she is to prefer an arrangement under which she is paid a share of the product of her efforts to an arrangement under which she is paid a fixed fee. See McAfee & McMillan, supra note 45, at 302.

95. See Dam, supra note 39, at 154–56.

96. Ramsey reports that in the 1960's the largest eight firms accounted for 47% of output and 26% of wells drilled, and that the large firms have an even larger share of development in remote and high cost areas where the risk is greatest. See Ramsey, supra note 92, at 153. In OCS leasing, large firms and consortia dominate. It is reported that in the 1960's, independents were responsible for less than 2% of OCS acreage and 1% of OCS production. See Albert K. Smiley, Competitive Bidding Under Uncertainty: The Case of Offshore Oil 7 (1979).

relevance. For example, why do real estate brokers not guarantee home sales?[97] Guaranteeing sales would enable brokers to spread losses among home sellers, who presumably are risk averse. Likewise, why do personal injury attorneys not buy claims from clients?[98] The risk aversion of clients is a usual explanation of contingent fees, but risk aversion points even more strongly to clients' selling claims to attorneys or other intermediaries. Rules against champerty may prevent attorneys from guaranteeing (or buying) claims,[99] but we might not expect these rules to persist if they were strongly inconsistent with people's interests.

---

97. Recently, brokers have offered "guaranteed sales" where the broker promises to buy a home if it is not bought within a specified period (often three to seven months). The guaranteed sale price is discounted below the appraised value of the home (often by 20%). Newspaper reports suggest that this practice is most prevalent in "thick" markets (i.e., markets with many transactions) and that it is sensitive to changing market conditions. In the Washington, D.C., area, for example, guaranteed sales are reported to have been "routine" from 1979 to 1981 and then to have dropped off to practically nothing after brokers lost money when interest rates rose and home purchases declined in 1982. Some brokers who continued to offer guaranteed sales in 1982 sought greater discounts of 30–40%. See Randolph E. Bucklin, Guaranteed-Sale Burnout: Brokers Now Take Fewer Trades at Lower Prices, Wash. Post, Aug. 21, 1982, at E1. Diane Henry, Talking Quick Sales: Guarantees and How They Work, N.Y. Times, Mar. 13, 1983, § 8, at 1, reports similar developments in the New York area.

This pattern is what we would expect. Guaranteeing home sales is less risky in thick markets, where prices can be established with some reliability and willing buyers are likely to be found. Even then brokers demanded significant discounts to minimize their risk. (It seems that a premium was not charged for a guarantee. This may reflect the fact that brokers' commissions are usually treated as nonnegotiable. See Owens, supra note 54, at 947. Guaranteeing sales is a form of non-price competition.) And when brokers learned that guarantees were risky, the practice ended. If recent newspaper reports are indicative of current trends, guaranteed sales are most often used now by home vendors as an inducement for existing home owners to buy. The vendor agrees to buy the original home if no one else will. Such programs are reported by Bongi, Offering Existing-Home Sales Guarantee, Chi. Trib., Mar. 24, 1991, at 2G; Ann Mariano, Buyers Offered Incentives as Market Slows, Wash. Post, Oct. 21, 1989, at E1; Mary Sit & Jerry Ackerman, Lots & Blocks, Boston Globe, Mar. 24, 1991, at A57. That home vendors continue to guarantee sales of current homes by buyers is not surprising, for in this situation the expected probability of selling a home is most likely to influence the decision of a homeowner to sell. An owner who tries to sell to move up in housing changes his position in reliance on the sale in a way an owner who is forced to sell because of other exigencies does not. Later I suggest that guarantees of a minimum return are to be expected when there is reliance and asymmetric information. See infra note 127 and accompanying text.

98. This is proposed by Melvin W. Reder, Contingent Fees in Litigation with Special Reference to Medical Malpractice, *in* The Economics of Medical Malpractice 211, 214 (Simon Rottenberg ed., 1978).

99. See, e.g., New York Judiciary Law § 489 (McKinney 1983) (barring buying a legal claim for the purpose of bringing an action).

B. *An Alternative Explanation: How Open Terms Reduce the Cost of Contracting When a Contract Has an Uncertain Positive Expected Return*

A better explanation of the role of open terms in these contracts is that they decrease the cost of contracting in two ways. First, open terms lessen the incentive to engage in costly testing that reduces the uncertainty about the return. Second, open terms lessen the incentive to haggle over the division of that return. Two assumptions are crucial to this argument: the parties' investment in the contract has a positive expected return, and that return is uncertain. Intuitively, if the outcome of a contract is uncertain and the parties are not confident that the investment in the contract nevertheless is better than other investments, then they should resolve that uncertainty or forgo the investment. If the expected return is positive and not uncertain, then the principal should sell the asset to the agent for a fixed price (assuming the parties are risk neutral and do not mind the implicit bet). Selling an asset for a fixed price ensures optimal performance at low enforcement cost. Price may be adjusted for risk.

1. *Optimal Precaution Under a Contract with a Positive Expected Return.* — An investment has a positive expected return when its expected return is better than the parties' expected return on the next-best investment of the same resources.[100] Logically, contracts are likely to have a positive expected return when the owner of an asset having no other use gives the asset to an agent to develop while keeping part of the return. These contracts must have a positive expected return if the asset contributed by the owner has no other use, since the owner gives up nothing that is otherwise of value by contributing the asset, and demands a share of the return from the agent's investment. The expected return on the agent's investment must be positive in this situation. The owner may have an investment in the asset, but this investment is a sunk cost that may be ignored in deciding how best to develop the asset.[101]

That an investment in a contract has a positive expected return is important because it is generally not in the parties' joint interest to expend resources evaluating, before contracting, how much better the investment is than other investments, or to expend resources haggling over the division of any gain. Spending resources to determine how

---

100. This concept is the same as that of economic rent or economic profit, which is formally defined as "the payment for a resource where the availability of the resource is insensitive to the size of the payment received for its use." See Armen A. Alchian, Rent *in* 4 The New Palsgrave: A Dictionary of Economics 141 (1987). Under this definition, rent includes any amount of payment infinitesimally above that which a resource would command in its next-highest-paying use, since any additional amount does not affect the choice to switch uses.

101. Part IV examines the situation where an asset has other uses but the expected return on the agent's use is better.

much better an investment is than other investments, or how the gain will be divided between the parties, has no productive value unless the expenditure makes it possible to enter into a fixed-term contract that provides an offsetting improvement in performance.

Richard Craswell and David Friedman make a related point about optimal precaution under contracts with positive expected returns. They show that if a contract may produce economic gain, then that a rule giving reliance damages on breach may sometimes be preferable to a rule giving expectation damages.[102] Imposing liability for expected economic gain makes a promisor more cautious in contract formation than is socially desirable, because the loss of such gain is not a real loss to society if that gain proves to be unrealizable.[103] Such potential "losses" ought to be disregarded in contracting. More simply, people ought not to worry about a risk in contracting unless it may make a contract less attractive than alternative investments.

This point is easy to see if we consider the unusual case of a contract that offers an uncertain gain with no risk of loss to either party. An example is a mineral lease of property having no other possible use, where the mineral deposit begins on the surface in a readily accessible location and is known to run in producible quantities to an uncertain depth. Under these unusual conditions, production is profitable from the start and will continue until it becomes too costly; an owner who produces the minerals himself will not test their depth before beginning production. Testing is of no value because he will proceed on the same course, taking the minerals that are there, whatever the test shows.

Ideally, a contract between two parties to develop the deposit should produce the same result, which will maximize the parties' joint expected returu. However, bonus-bid leasing gives the parties an incentive to test the depth of the deposit. The lessee will test to ensure that the lease payment does not exceed the value of the minerals; the lessor will test to ensure that the opposite is not true. If testing is impractical, the parties still will haggle over the size of the payment. Given the uncertainty of the lease's value, the lessor may insist on organizing an auction to get a range of offers, which is costly to do. The use of a royalty lease, in contrast, reduces the parties' incentive to test and to haggle. The lessee faces a smaller risk of loss if the size of the deposit is small,[104] and the lessor is assured a share of whatever is

---

102. See Craswell, supra note 32, at 287–93; Friedman, supra note 32, at 425–28.

103. If the gain proves to be realizable, the agent should be liable for that gain to ensure that it is realized. A negligence rule does this by making an agent liable for gains he could efficiently produce.

104. In theory, the lessee has some incentive to test in every case. Under a perfectly enforced negligence term, the lessee will know that he faces a loss on the last units produced if his cost exceeds the market value of his share of production, so he may want to assure himself that sufficient profit can be made on the earlier units to offset that

there.

Most mineral leases involve a risk of loss to the lessee: he incurs significant costs in exploration and development that will be recovered only if production is sufficient. In this situation, neither a royalty lease nor a bonus-bid lease is likely to create the optimal incentive to test. However, a royalty lease almost always creates a more nearly optimal incentive to test.

Consider first the incentives an integrated firm that owns and produces minerals faces in choosing whether to test before beginning development. The firm should weigh the loss to be avoided by testing, the accuracy of the test, the gain forgone if the test result is a false negative,[105] and the cost of the test. The greater the expected gain and the more imperfect the test, the less attractive testing is because of the risk the gain will be lost on a false negative. Thus if the expected gain is great and the test is imperfect, the high cost of a false negative will deter the firm from testing despite the risk of loss.[106]

Now consider a lessee's incentives to test under a royalty lease and a bonus-bid lease.[107] The lessee has too great an incentive to test

---

cost. In reality, under most mineral leases, a lessee may cancel the lease at any time without further liability.

105. A "false negative" occurs when a test predicts a loss when the actual result would be a gain.

106. To illustrate, assume v = value of the outcome on success, c = cost, which produces nothing of value in the event of failure, $PR(s)$ = probability of success, $PR(f)$ = probability of failure, t = cost of the test, $PR(ta)$ = probability the test is accurate, and $PR(ti)$ = probability the test is inaccurate. If the firm does not test, its expected return is $vPR(s) - c$. If it tests, its expected return is $(vPR(ta) - c)PR(s) - t$ (assuming, for the sake of simplicity, that the test predicts success or failure with the same probability as their occurrence without testing). The firm ought to test if $(vPR(ta) - c)PR(s) - t > vPR(s) - c$. Or, solving for t, the firm ought to test if $cPR(f) - (v - vPR(ta))PR(s) > t$. $cPR(f)$ is the expected loss on failure without testing. $(v - vPR(ta))PR(s)$ is the loss on a false negative from testing. This may be more easily seen if $(1 - PR(ti))$ is substituted for $PR(ta)$. Then the statement is $(v - v(1 - PR(ti)))PR(s)$ or $vPR(ti)PR(s)$, which is the value of success multiplied by the probability of success and the probability that the test will inaccurately predict failure.

Assume, for example, that the firm knows that a $1000 investment has a 20% chance of immediately returning $10,000 and an 80% chance of returning $0. This investment has an expected net value of $1000. The firm ought to be willing to spend up to $800 on a test to predict the outcome with certainty (i.e., the test is 100% accurate). This is equal to the expected value of the loss that the firm may avoid by testing. If the test is 80% accurate (i.e., 4 out of 5 times it predicts a loss there would actually have been a loss, but 1 out of 5 times there would have been a gain), the firm ought to be willing to spend up to $400 on testing. This is equal to the expected value of.the loss the firm may avoid by testing ($800) minus the expected value of the return forgone because of false negatives ($400). Compare a $1000 investment with a 20% chance of returning $7500 and an expected value of $500. In this situation, the firm ought to be willing to expend up to $500 to test with 80% accuracy. And if the $1000 investment has a 20% chance of returning $1000 (and a $0 expected value), the firm ought to be willing to expend up to $800 to test with 80% accuracy.

107. Testing may occur at different times under the two leases. Under a royalty

under a royalty lease: he bears the entire risk of loss on his investment, but reaps only part of the potential gain. More precisely, the lessee will undervalue the risk of false negatives because he reaps only part of the gain. For example, an oil and gas lessee may not be satisfied with proof of a sufficient joint return to cover his drilling and pumping costs, since part of that return will go to the lessor. He may test to ensure that there is a greater quantity, though such a test is not warranted from the parties' joint perspective.[108]

A bonus-bid lease is likely to have an even worse effect on the incentive to test. A bonus bid will cause the lessee to overvalue the risk of loss because his potential loss is increased by the amount of the bid. On the other hand, the lessee will properly value the risk of false negatives under a bonus-bid lease. Under a royalty lease, in contrast, the lessee will undervalue false negatives but correctly value the risk of loss. However, the bonus-bid lease is unlikely ever to result in more nearly optimal testing than a royalty lease would induce. In theory, the bonus-bid lease could create a more nearly optimal incentive to test if the risk of loss is very small and the test is very inaccurate. In this situation, the distortional effect of misvaluing false positives under a royalty lease outweighs the distortional effect of misvaluing risk of loss under a bonus-bid lease. Under the conditions postulated, however, a lessee probably will never test under either form of lease.[109]

2. *Pricing Risk Under Uncertainty*. — That a contract has a positive expected return is not sufficient to explain the use of open terms if the

---

lease, the lessee may wait to test before beginning development. Under a bonus bid lease, he will test before entering into the contract. An agent might test before contracting under a contract with a negligence term if he thought the negligence term required him to act to maximize joint return at all points.

108. To illustrate, assume that A (agent or the lessee) agrees to pay O (owner or the lessor) $\frac{1}{2}$ of v in case of success. A will test if $((.5^*v-c)PR(ta) - cPR(ti))PR(s) - t > (.5^*v-c)PR(s) - cPR(f)$ or if $cPR(f) - (v-vPR(ta))PR(s).5 > t$. From the parties' joint perspective, he ought to test if $cPR(f) - (v - vPR(ta))PR(s) > t$. Thus, A will undervalue false negatives by the share of v given to O. This point is similar to the point that a lessee will under-perform because gain is shared with the lessor.

109. To illustrate, assume price (the bonus bid) is fixed at p. A will test before contracting if $(p+c)PR(f) - (v-vPR(ta))PR(s) > t$. In effect, he properly values false negatives but overstates the loss in event of failure by p. Under the bonus bid lease, A overvalues the risk of loss by $pPR(f)$. Under the royalty lease, he undervalues false negatives by $(v-vPR(ta))PR(s)SH$, with SH defined as the portion of v given to O through the royalty. The bonus bid lease will produce closer to the optimal incentive to test if $(v-vPR(ta))PR(s)SH > pPR(f)$. This is unlikely ever to be true if we assume some constant relationship between p and vSH (i.e., if we assume that the lessor demands a royalty or bonus payment of equal expected value). For this to be true when there is a constant relationship between p and vSH, $PR(f)$ (the probability of failure) and $PR(ta)$ (the probability that the test is accurate) both must be very small. If there is little chance of failure and a significant chance that a test will be inaccurate, A ought never test under either form of contract. The assumption of a fixed price is crucial, for if price could be adjusted to compensate A for bearing risk, he would have no incentive to over-test. See infra notes 113–114 and accompanying text.

parties are risk neutral. It is also essential that the return be uncertain or that some other impediment obstruct bargaining to adjust price to compensate a party for bearing risk on the return.[110] I define the value of an asset as "uncertain" when risks affecting its value are sufficiently doubtful that people with the same information and preferences might value the asset significantly differently and when there is no auction-like market to price the asset notwithstanding that uncertainty.[111] These conditions hold for many mineral leases; reported variations between high and mean bids in recent auctions are on the order of three to one, and there are no auction-like markets to price many leases.[112]

---

110. Uncertainty about the return is not the only possible impediment to adjusting price for risk. Another possible impediment is information asymmetry. An unknowledgeable principal may demand a royalty rather than a fixed price if he cannot auction an asset, because he does not trust the agent to offer a fair price. It is difficult to disentangle the problems of uncertainty and information asymmetry, since it is partly the difficulty of valuation under uncertainty that makes the sophistication of the parties important. In addition, some forms of information asymmetry may promote the use of fixed terms. For example, if a principal is uncertain how capable an agent is, he may be better off demanding a fixed price than a royalty. The most capable agent will pay or bid the most.

Another possible explanation for open terms when a return is certain is that the parties are uncertain about each other's behavior in negotiation. This uncertainty may make it difficult for the parties to settle on a fixed price that divides gain between them. See Robert Cooter et al., Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior, 11 J. Legal Stud. 225, 234–37, 246 (1982) (showing that uncertainty about each other's behavior may prevent parties from settling a legal dispute though settlement is in their joint interest and definite probabilities can be assigned to outcomes of litigation).

Craswell and Friedman focus on the situation where market imperfections make price adjustment for known, calculable risks impossible. See Craswell, supra note 32, at 421–23 (analyzing case of bilateral monopoly); Friedman, supra note 32, at 285–97 (analyzing case of monopoly without price discrimination). They show that price adjustment may be impossible under certain conditions of bilateral monopoly or under unilateral monopoly without price discrimination. This line of inquiry is probably not profitable to pursue, since Friedman is properly skeptical about the capacity of courts to apply legal rules that depend upon a sophisticated understanding of market conditions. See id. at 304; cf. Craswell, supra note 32, at 426 (questioning applicability of model to real world because of difficulty of assessing expectation, reliance, and competitive conditions). Further, it seems unlikely that the explanation of why parties use open terms lies in conditions of imperfect competition.

111. See supra note 18.

112. See James L. Paddock et al., Option Valuation of Claims on Real Assets: The Case of Offshore Petroleum Leases, 103 Q.J. Econ. 479, 502 (1988); Smiley, supra note 96, at 7 (reporting a case in 1976 where the low bid was $518,000 and the high bid was $11.2 million); cf. E. Capen et al., Competitive Bidding in High-Risk Situations, 13 Nat'l Inst. for Petroleum Landsmen 171, 177 (1982) (reporting variations between low and high bids as great as 7 to 1, 10 to 1, 26 to 1, and even 109 to 1).

This range in valuation does not depend on any bias in bidding. Hendricks, Porter, and Boudreaux found a significant discrepancy between bids, but also found that with the exception of one firm (Texaco consistently was over-optimistic) firms tended to make both low and high bids randomly. See Kenneth Hendricks et al., Information, Returns and Bidding Behavior in OCS Auctions: 1954–1969, 35 J. Indus. Econ. 517

Uncertainty is important because if parties knew the probability and value of all possible outcomes on a contract, they would be able to adjust price cheaply to compensate for risk in a way that eliminates the incentive to over-test under a fixed-price term. To illustrate, assume the parties to a contract know that the net gain may vary across a range from $0 to $100,000, with a midpoint of $50,000 along a perfect bell-shaped curve. The parties may share the $50,000 expected gain equally, either by setting a fixed price of $25,000 or by sharing the actual net gain equally. The parties will do optimal testing under either contract if they have the same expectations and share test results.[113] Any test that decreases the expected return on the contract will cause a corresponding decrease in the testing party's expected return under either contract. Under our assumption that the worst possible net return is $0, the parties ought not test, since they can do no worse than on their next-best investments. Neither party will test if the test result will be known to the other party, even if the test is perfect and inexpensive. For instance, the lessee will not spend $1 to learn the outcome with certainty, since this reduces his expected return under either contract from $25,000 to $24,999 (or $24,999.50 if the lessor agrees to bear half the cost of the ill-advised test).[114]

Uncertainty makes it costly to price risks and assets.[115] If there is a

---

(1987). This finding suggests over-bidding is not due to systematic bias. Bid reversals also suggest there is no systematic bias attributable to characteristics of individual firms. Smiley reports two cases where one firm outbid another by a ratio of 16 to 1 on one lease while the second firm outbid the first by a ratio of 17 to 1 on another. This was in a situation where firms had access to precisely the same information on both leases. See Smiley, supra note 96, at 10; cf. R. Brush & S. Marsden, Bias in Engineering Estimations: A Case Study, *in* Society of Petroleum Engineers, Hydrocarbons Economics & Evaluation Symposium 151 (1981) (reporting that engineers consistently over-value reserves).

113. If they have different expectations, they may test to resolve a dispute over the value of the minerals. If one party could test and conceal the results from the other, he might test to take advantage of this information.

114. This result holds more generally. Assume, as before, that p is the value of the bonus bid. See supra note 109. Also assume that A expends c with a potential return of v, a probability of success of $PR(s)$, and a probability of failure (in which case c is lost) of $PR(f)$. The parties decide to divide the expected gain equally. Thus, $p = (vPR(s)-c)/2$ if they do not test. If A tests, they renegotiate price on the basis of the new information and share the cost of the test equally. The probability that the test is accurate is $PR(ta)$. The probability that the test is inaccurate is $PR(ti)$. If the test result is positive, then $p = (vPR(ta)-c)/2$. A will test if $(vPR(ta) - (c+(vPR(ta)-c)/2)PR(s)-t/2 > vPR(s) - c + ((vPR(s)-c)/2))$. Thus, A will test if $(vPR(ta)-c)PR(s) - t > PR(s) - c$. Solving for t, A will test if $cPR(f) - (v-vPR(ta))PR(s) > t$. This gives A the optimal incentive to test.

115. Many contingencies fall between the extremes of perfectly known risks and great uncertainty. Outcomes may be uncertain, but most expected outcomes may fall within a small range of values. In this situation, parties may be willing to fix terms disregarding the uncertainty. An example is where there is a small but uncertain chance of a loss-causing event (such as a strike delaying construction). The parties may account for this in the contract through a slight price adjustment, though no definite probability can be assigned to the risk. Further, in some situations, uncertainty may be reduced to

large disparity between the parties' valuations of the asset, they may be able to settle on a price only after they reduce the disparity by testing to obtain more information. If testing is impracticable, a wide range of possible valuations will result in haggling and may even make it impossible to settle on a price. A principal may not want to accept an isolated fixed-price offer, since he cannot know where it falls in the range of possible values. Uncertainty makes this range large. Indeed, the principal may not want to accept an offer even if it exceeds his asking price, for his valuation of the asset also may be low.

In many cases, an auction is the only viable means to price assets of uncertain value.[116] A principal may protect himself by auctioning the asset to several bidders (one analyst of oil and gas auctions suggests that at least three or four are necessary).[117] An auction improves the chance that the principal will receive an amount that reflects an optimistic valuation of the asset.[118] Yet, auctions are not always attractive

---

manageable levels by a low-cost test. It may be desirable to perform such a test, even if it is not merited by performance risks themselves, because of the improvement in performance under fixed terms.

116. If an auction is impractical, there is an additional problem with testing to determine the value of a mineral lease. Testing would have to be done by the principal or a firm he hires. Testing by an agent does no good if the agent does not communicate the results to the principal, since the principal will not trust the agent's valuation. However, an agent will not test if he must communicate the results to the principal before securing the right to the asset. The agent gains nothing by testing without advance rights, because positive results will drive up the price of the asset. The solution is for the principal to test and to share the results with potential agents. However, wealth limitations may prevent a principal from testing.

117. See Ramsey, supra note 92, at 150.

118. See id. at 64–103; Paul Milgrom, Auctions and Bidding: A Primer, J. Econ. Persp., Summer 1989, at 3, for good overviews of the enormous literature on auctions. If the bidders are equally informed, an auction also protects the principal from being underpaid because of his relative ignorance about the value of the asset. An auction may not protect the principal if bidders are not equally informed. See Kenneth Hendricks & Robert H. Porter, An Empirical Study of an Auction with Asymmetric Information, 78 Am. Econ. Rev. 865, 881–82 (1988) (finding that the government tends to get a smaller share of the gain from development in bidding on drainage tracts (tracts next to proven areas) than in bidding on wildcat tracts (tracts in unknown areas), a discrepancy that the authors attribute to the informational advantage oil companies that work on neighboring tracts have in bidding on drainage tracts); see also Hendricks et al., supra note 112, at 524.

One problem with the auction strategy is that bidders ought to be aware of the danger that they will be able to win only by over-bidding relative to the field, and ought to discount their bids accordingly. See Ramsey, supra note 92, at 69; Capen et al., supra note 112, at 181 (proposing a discounting strategy in oil and gas auctions); cf. Stuart E. Thiel, Some Evidence on the Winner's Curse, 78 Am. Econ. Rev. 884, 894 (1988) (finding that bidders in the construction industry succeed by using such a strategy). Where this strategy leaves the principal is not clear. Views on how well the government does in oil lease auctions are mixed. Capen et al. found that producers who "win" government leases tend to earn a below-market return, which suggests that they overbid and the government is overpaid. Hendricks and his collaborators also report findings consistent with over-bidding: they found that, with one exception, all firms bidding for

solutions for disposing of assets of uncertain value. To some extent, auctions exacerbate the problem of over-testing by inducing potential agents to replicate testing costs. Auctions are most commonly used when the information needed to value an asset is public and inexpensively analyzed, as in art auctins. The use of a sharing arrangement minimizes these costs by reducing the parties' incentive to determine the expected gain ex ante.[119]

Anecdotal evidence bears out the hypothesis that open terms are used in oil and gas leases because of uncertainty.[120] Definite production covenants tend to be used in proven areas, where the value of a lease is least uncertain.[121] When exploration, development, and production are done by separate firms, the development company often sells a lease under production to a production company for a fixed

---

OCS leases would have profited had they won all their bids but that they did substantially worse on the bids they won. See Hendricks et al., supra note 112, at 528. Firms would also have done better had they discounted their bids, even if bids by other firms are held constant. See id. at 529. They attribute these results to firms' underestimating the number of other bidders (the more bidders, the more a bid should be discounted). Douglas K. Reece, Competitive Bidding for Offshore Petroleum Leases, 9 Bell J. Econ. 369, 380, 383 (1978), concludes that the government tends to be underpaid on OCS leasing because of the small number of bidders and the uncertain value of the leases. John H. Kagel & Dan Levin, The Winner's Curse and Public Information in Common Value Auctions, 76 Am. Econ. Rev. 894, 917 (1986), found in an experiment with students that inexperienced bidders tend to overbid but that experienced bidders respond in a way that gives them a greater share of the profit (though even experienced bidders did poorly if the number of bidders increased. They also found that public information reducing uncertainty increases bidders' profits if they are inexperienced, but increases the seller's profit if bidders are experienced. See id. at 911. The debate about how well sellers and bidders do in auctions, and about strategies they may use to maximize their share of the return, is largely beside the point here, though it is relevant if maximization strategies increase the cost of an auction.

119. There is still an incentive to test if the magnitude of the gain determines the share that the principal should command (which it should) but the incentive is smaller. Interestingly, the royalty in oil and gas leasing is fairly well standardized at one-eighth (one-sixth in California). See Hemingway, supra note 41, § 7.1, at 358. Variable bonus payments may account for differences in the expected return on leases, as seems the case in OCS leasing. In private wildcat leases, bonus payments also seem to be fairly well standardized regionally on a per-acre basis. This practice may minimize transaction costs industry-wide, but it is difficult to explain if we assume that parties strive to maximize their returns on individual leases.

120. The findings of Keith B. Leffler & Randal R. Rucker, Transactions Costs and the Efficient Organization of Production: A Study of Timber-Harvesting Contracts, 99 J. Pol. Econ. 1060 (1991), are consistent with this explanation of open terms. Leffler and Rucker studied timber-harvesting contracts in North Carolina and found that contracts with per-unit pricing (i.e., sharing arrangements) tended to be used instead of lump-sum payments as the value of a tract became more uncertain (or, in their terms, exhibited greater variance) because the timber was heterogeneous, the size of tract was large, and the seller's presale information was unreliable. They also found that per-unit pricing tended to be used as testing by the buyer became more expensive and monitoring by the seller of the buyer's performance became cheaper and/or more effective. See id. at 1073.

121. See Hemingway, supra note 41, at 465.

price.[122] Leases in production have the most certain value.[123] Finally, bonus bids are largest in relation to the value of the lease when leases are auctioned, as in the Outer Continental Shelf ("OCS") leasing program.[124]

IV. THE PROBLEM OF RELIANCE UNDER A NEGLIGENCE TERM AND A SHARING ARRANGEMENT

The conclusion in Part III that a negligence term ensures at least the optimal level of precaution by an agent assumes that the asset contributed by the principal has no other value—in other words, the conclusion assumed that the principal did not rely on the contract. Reliance by a principal creates several additional problems for contracts with negligence terms and sharing arrangements.[125] When a principal's opportunity cost on an investment in the contract is known at the outset of the contract, these problems can readily be solved by having the agent guarantee the principal a minimum return equal to the principal's opportunity cost. The problems are more intractable when

---

122. In this situation, a landsman enters into a lease much like the typical lease. If seismic testing indicates that there may be mineral-bearing formations, the landsman will "farm out" the lease to an exploration company. Under a farmout agreement, the landsman agrees to assign all or part of the lease to the exploration company if it achieves certain goals within a stipulated period (usually shorter than the primary term). Sometimes the exploration company may "earn" the lease by drilling one or more wells to a designated formation or depth, or earning the lease may require production. The landsman will reserve an overriding royalty (often 5%) in the farmout agreement. In addition, he is likely to have an option to convert this royalty into an interest in net profits (often 25%) after the exploration company recovers its fixed and operating costs. Once a lease is in production, the exploration company often will sell its rights to a development company. Usually this sale is for a fixed payment.

123. There is another reason why the development company may not retain a royalty interest. Adding a royalty on top of the royalty retained by the owner of the mineral rights would reduce the share of the production company and so its incentive to perform.

124. In OCS lease auctions, this problem is dealt with by prohibiting lessees from conducting on-site drilling before bidding. See Smiley, supra note 96, at 103. Precautionary measures by lessees are limited to seismic analysis and the development of bidding strategies. It is also helpful if agents are required to share what information they do have (Smiley proposes that the government do seismic testing, see id. at 104), including information on bidding strategies. On the last point, it is interesting that one of the leading articles identifying the problem of the winner's curse in auctions and suggesting a solution is by industry economists. See Capen et al., supra note 112. Perhaps the obvious collective action problem in sharing information about intelligent bid strategies is lessened because it is in each bidder's interest that other bidders know of the problem of over-bidding so they will discount their bids.

125. Generally, a principal optimally relies when he invests resources in the contract only so long as the joint expected return is at least as good as his return on his next-best investment of the same resources. A principal under-relies if he fails to invest resources in a contract though the joint expected return is better; he over-relies if he invests resources though the joint expected return is worse.

a principal's investment in the contract is variable, as in the case examined in Part V.

A. *Divided Costs and the Problem of Over-Reliance and Under-Precaution*

Over-reliance and under-precaution are possible under a contract with a negligence term when a principal relies and an agent is better informed about risk. An agent has too little incentive to investigate risks that might result in a loss on a principal's investment in the contract, since the agent bears no part of that loss. Further, an agent has no incentive to disclose such risks to the principal. Under a rule of joint maximization, an agent is responsible only to perform at the level where his marginal cost equals the sum of his and the principal's marginal return. The agent is not liable for the loss to the principal if that level of performance leaves the principal worse off than he would have been had he used his assets in other ways. In effect, a negligence term requires the agent to do the best he can in pursuing a chosen path. It does not require the agent to ensure that the principal chooses the best path.[126]

That an agent will not be concerned with his principal's potential loss on investing in a contract is not a problem if the principal knows and can investigate relevant risks as well as the agent can. The principal bears the loss from an ill-advised investment and so has an incentive to invest wisely. However, often the principal is not as well-informed as the agent. For example, a mineral lessee may know better than the lessor the potential value of minerals and the potential harm to the land from development. If a lessee is not obligated to restore the land, he has no incentive to investigate the risk of harm, to determine whether

---

126. This point is illustrated more generally by the following table, which shows the outcomes facing S when he chooses whether to expend t to test before contracting to determine the probability of success when he knows B will invest r in reliance on the contract. I assume that the investment of r increases the possible return on the contract from v to $v(r)$. S also expends p in preparing to perform. There is a risk of an event θ with a probability of $PR(\theta)$ upon which r will be lost. If S tests, the risk that the test is inaccurate if it predicts success is $PR(t\theta)$. This table compares the joint return of the parties and S's individual return under a negligence rule.

	(a) Do Not Test Success	(b) Do Not Test θ	(c) Test Negative	(d) Test Positive Success	(e) Test Positive θ
Joint return	$v(r)-c-r$	$-(p+r)$	$-t$	$v(r)-c-r-t$	$-(p+r+t)$
S return-negligence	$p-c$	$-p$	$-t$	$p-c-t$	$-(p+t)$
Probability	$1-\text{Pr}(\theta)$	$\text{Pr}(\theta)$	$\text{Pr}(\theta)$	$(1-\text{Pr}(\theta))$ $(1-\text{Pr}(t\theta))$	$(1-\text{Pr}(\theta))$ $\text{pr}(t\theta)$

I assume that B's expectation exceeds his reliance, or that $v(r)-p > r$. S should test if the joint expected return if he tests (row (1) columns (c), (d), (e)) exceeds the joint expected return if he does not test (row (1) columns (a) and (b)). As can be seen, negligence gives S too little incentive to test because he is not liable for B's loss on failure.

the potential return warrants the risk, or to disclose this risk to the principal.

A solution to this problem is for the agent to guarantee a minimum return equal to the principal's opportunity cost on his investment in the contract.[127] When the agent is better informed about risk, the optimal contract is likely to be a hybrid of strict liability and negligence: the agent will be strictly liable for the principal's opportunity cost and also will be held to a rule of joint maximization in performance. A mineral lease under which the lessee promises to restore the land in addition to his other obligations roughly fits this patteru.[128]

When the agent is better informed about risk, this hybrid rule is likely to encourage closer to optimal precaution, reliance, and performance than the alternatives of pure negligence, strict liability for opportunity costs (or reliance damages), or strict liability for expected gains (or expectation damages). Pure negligence may result in over-reliance by the principal, because the agent has too little incentive to investigate and no incentive to disclose the risks of reliance to the principal. Strict liability for expected gains induces too much precaution, because liability for economic gain must be settled in the contract. Strict liability for reliance losses induces the agent to expend too little effort in performance, since he is not liable for failing to produce a realizable gain.[129]

---

127. Another possibility is to create a separate cause of action making the promisor liable if he is negligent in warning the promisee of performance risks. See infra notes 206–207 and accompanying text.

128. See infra note 268 and accompanying text for a discussion of legal rnles on whether a minimum guarantee in a contract eliminates any further performance obligation.

129. The following table illustrates.

	(a) Do Not Test Success	(b) Do Not Test θ	(c) Test Negative	(d) Test Positive Success	(e) Test Positive θ
Joint return	$v(r)$-c-r	$-(p+r)$	$-t$	$v(r)$-c-r-t-	$-(p+r+t)$
S return-strict liability	p-c	$-((v(r)-p)+p)$	$-t$	p-c-t	$-(v(r)-p)+p+t$
S return-hybrid	p-c	$-(p+r)$	$-t$	p-c-t	$-(p+r+t)$
Probability	1-$Pr(\theta)$	$Pr(\theta)$	$Pr(\theta)$	$(1-Pr(\theta))$ $(1-Pr(t\theta))$	$(1-Pr(\theta))$ $Pr(t\theta)$

Strict liability gives S too great an incentive to test by overstating the loss if he does not test and cannot perform. Under the hybrid rule, S properly values the potential loss on a failure to test (cell 3(b)). S will be too cautious under the hybrid rule for the same reason that he was found to be too cautious under the negligence rule in Part ll: he will undervalue false negatives since he captures only part of the gain from a successful contract. This effect exists under any of the rules. A pure negligence rule may be preferable to the hybrid rule if the tendency of S to be overcautious because he does not reap the entire gain on success offsets his tendency to be undercautious because he does not bear B's loss on failure.

The hybrid rule also gives S closer to the proper incentive to perform. A pure reliance rule invites underperformance. If $c > p+r$, S will have an incentive to breach

Likewise, the problem of reliance by a principal is relatively simple to solve in the case in which a principal gives an asset to an agent to improve, because in this case the principal's reliance is fixed. The principal's potential loss is not likely to vary on the basis of his own conduct. Further, that loss is readily known to the agent when the contract is made. Thus, the principal is not likely to over-rely even if the agent is responsible for any loss.[130] The agent ought to know of the potential

---

under such a rule, though $v(r) > c$. In such a case, B may renegotiate to induce S to perform, but if the cost of renegotiation is y, some efficient contracts will not be performed where $v(r)-y > c > p+r$, that is, where the cost of renegotiation exceeds the benefit. See Steven Shavell, The Design of Contracts and Remedies for Breach, 99 Q.J. Econ. 121, 143–44 (1984).

If we assume that litigation is costless and judges never err in determining whether performance is efficient, then the hybrid rule avoids this problem. Once these factors are introduced, the hybrid rule may still be preferable to a pure reliance rule in some situations: to the extent that expected litigation costs and damages exceed $c+r$, a promisor faced with the situation where $v(r) > c > p+r$ will perform under the hybrid rule where he would not perform under the reliance rule. If litigation costs are defined as l and the probability of paying expectation damages $(v(r)-p)$ is defined as $PR(d)$, the promisor will perform if $p + r(1-PR(d)) + l + (v(r)-p)PR(d) > c$.

130. This problem is an instance of the more general problem of over-reliance in contract, which arises because a promisee bears no risk from reliance if a promisor is strictly liable for reliance losses on breach. See Lewis A. Kornhauser, An Introduction to the Economic Analysis of Contract Remedies, 57 U. Colo. L. Rev. 683, 700–02 (1986); Steven Shavell, Damage Measure for Breach of Contract, 11 Bell J. Econ. 466, 470–72, 478 (1980). The problem of over-reliance is illustrated by the following table. The table illustrates the outcomes B faces when he chooses, knowing S will test before contracting, whether to invest r to increase the value of the contract from v to $v(r)$.

	No r; success	No r; θ	r; success	r; θ
Joint return	$v\text{-}c$	$-p$	$v(r)\text{-}r\text{-}c$	$-(r+p)$
S return-strict liability	$v\text{-}p$	$v\text{-}p$	$v(r)\text{-}r\text{-}p$	$v(r)\text{-}r\text{-}p$
Probability	$1\text{-}PR(t\theta)$	$PR(t\theta)$	$1\text{-}PR(t\theta)$	$PR(t\theta)$

B ought to rely if $(v(r)-v)(1-PR(t\theta)) > r$—i.e., if the increased return from reliance discounted for the probability of success exceeds the reliance cost. But B will rely under strict liability if $v(r)-v > r$.

The problem of overreliance in contract has an analog in tort, where it has been shown that victims tend to take too little care under strict liability (this is like over-relying on a promise) because they bear no risk of loss from their activities. See Landes & Posner, supra note 7, at 63; Shavell, supra note 7, at 11, 37. Thus, in tort, a strict liability rule must be combined with a contributory negligence rule in order to induce the socially optimal level of care.

There have been proposals that in contract a promisee be allowed to recover on breach what his expectation interest would have been had he chosen the optimal level of reliance. See Charles J. Goetz & Robert E. Scott, Enforcing Promises: An Examination of the Basis of Contract, 89 Yale L.J. 1261, 1279–80 (1980). This rule is similar to a rule of contributory negligence in that it imposes on the promisee any loss from excessive reliance. Craswell proposes a rule which would limit a promisee's damages on nonperformance to what his expectation would have been had he chosen what appeared to be the optimal level of reliance given what the promisor led him to believe was the

loss and may readily protect himself against it. For example, if a mineral lessee must reclaim land, he will not mine unless the expected value of the minerals (net of expected production costs) exceeds the expected cost of reclamation. More generally, if an agent knows of a principal's potential reliance loss at the time of contracting, and if the agent can adjust price to pass the risk of reliance loss back to the principal (or otherwise regulate reliance through conditions or terms limiting damages), then the principal has no incentive to over-rely.[131]

There remains a risk that the principal will not disclose his potential loss. For example, a mineral lessor may not disclose that he places extraordinary personal value on his land. However, nondisclosure is not likely to be a problem, since the rule in *Hadley v. Baxendale* [132] limits the agent's liability to foreseeable losses. Further, other rules make it difficult to collect uncertain[133] or highly subjective damages.[134] These rules encourage the principal to disclose his potential loss at the time of contracting and to negotiate a liquidated damage provision. If the principal must disclose his potential loss to recover that loss on breach, he will probably disclose. Once the potential loss is disclosed, the agent may adjust the price to pass the risk of the loss back to the principal. Further, the principal will not over-rely even if he does not disclose, because he then bears the risk of the reliance loss.[135]

---

probability of performance. See Richard Craswell, Performance, Reliance, and One-Sided Information, 18 J. Legal Stud. 365, 367–68 (1989). This rule gives the promisor an incentive to inform the promisee accurately about performance risks, and gives the promisee the optimal incentive to rely.

131. Assume that B contracts with S to purchase a good with an expected value of v. The initial contract price is p. There is a risk of an event θ which will prevent production of the good. B may invest r to increase the value of the good from v to $v(r)$. This investment is lost in the event of θ. B ought to make this investment only if $(v(r)-v)(1-PR(\theta)) > r$. If B invests r and discloses this investment to S, S will increase p by $rPR(\theta)$. Thus, B will invest r only if $v(r)-(p+rPR(\theta))-r > v-p$, which will be true only if $(v(r)-v)(1-PR(\theta)) > r$; that is, if the increase in the value of the contract $(v(r)-v)$ discounted by the probability of success $(1-PR(\theta))$ exceeds the cost of reliance.

132. 9 Ex. 341, 156 Eng. Rep. 145 (1854). See generally Restatement (Second) of Contracts § 351 (1979) (stating *Hadley* rule). This argument for the rule in *Hadley* is similar to Bishop's argument that the rule protects against adverse selection, or high-risk promisees' obtaining artificially low-priced "insurance" by obtaining contractual guarantees without disclosing the unusual extent of potential damages. See William Bishop, The Contract-Tort Boundary and the Economics of Insurance, 12 J. Legal Stud. 241, 254–60 (1983). However, Bishop's concern is somewhat different. His concern is the promisor's response (promisors will take precautions that are unnecessary in many cases and increase price more widely than is necessary) and not the promisee's over-reliance. See id. at 257.

133. See Freund v. Washington Square Press, Inc., 314 N.E.2d 419, 421 (N.Y. 1974) (denying recovery of anticipated royalties lost through publisher's failure to publish book).

134. See Kewin v. Massachusetts Mut. Life Ins. Co., 295 N.W.2d 50, 53–55 (Mich. 1980) (denying recovery for "mental distress" resulting from breach of disability insurance contract).

135. Under a rule that requires B to disclose $v(r)$ if he is to recover $v(r)-p$ as

B. *Divided Returns and the Problem of Under-Reliance and Over-Precaution*

There is another reason why a principal may under-rely or be over-cautious in investing in a contract with a negligence term when the gain from his investment is shared with the agent: the principal bears the entire risk of loss on his investment but reaps only part of the gain.[136] If his share of the return is less that his return on alternative investments, the principal may fail to make an investment with positive joint

---

damages on breach, *B* will not over-rely whether he discloses or not. To demonstrate this, assume that *B* knows investment *r* will increase the value of the contract to him to $v(r)$ and that *B* thinks *S* may not know of this investment. Assume the disclosure rule limits the liability of *S* to $v-p$ on breach if he does not know of *B*'s reliance. *B* faces four possible outcomes depending upon whether he discloses $v(r)$ to *S*. First, if *B* discloses and they adjust price by Δp, his return will be $v(r)-p-\Delta p-r$. Second, if *B* does not disclose, *S* is ignorant of *r* and $v(r)$, and *S* performs, then *B*'s return will be $v(r)-p-r$. Third, *B* does not disclose, *S* is ignorant of *r* and $v(r)$, and *S* breaches, *B*'s return will be $v-p-r$. The most interesting outcome is the fourth, where *B* does not disclose *r* and $v(r)$ but *S* knows of them (or learns of them because *B* offers to renegotiate upon the occurrence of θ). The risk *B* faces here is that *S* will seek a higher price increase than he could have obtained had *B* disclosed his plan to invest *r* before making the investment. The price increase could be higher because once *r* is a sunk cost, *B* would, in theory, be willing to forgo the entire gain on reliance to recoup *r*. Since the outcomes *B* faces are $v-p-r$ if he does not renegotiate and *S* breaches and pays damages, and $v(r)-p-\Delta p-r$ if they do renegotiate, and Δp is the increase in price on renegotiation, *B* would be willing to agree to any increase in price where $v(r)-v >$ Δp. *B* is unlikely to expect the worst, especially if he has good relations with *S*, but even in the happiest relationship he may harbor some fear of *S* taking advantage of undisclosed reliance.

If *B* knows *S* does not know of his reliance—i.e., outcome (4) is precluded—and *B* chooses not to disclose $v(r)$, *B* will rely only if it increases the parties' joint expected return. *B* will invest *r* if $(v(r)-p-r)(1-PR(\theta))+(v-p-r)(PR(\theta)) > v-p$, which will be true only if $(v(r)-v)(1-PR(\theta)) > r$, which defines when reliance increases the parties' joint expected return. *B* will not over-rely if he discloses $v(r)$, so long as *S* can increase price in response to the expected cost of damages on disclosure (i.e., by an amount equal to $(v(r)-v)PR(\theta)$. Indeed, if *B* is certain that *S* will not try to take advantage of his investment *r*, he will be indifferent to disclosing. If we introduce a risk that *S* knows of *r* and $v(r)$, that gives *B* an incentive to disclose. But, as we have seen, if *B* does disclose, he will not over-rely so long as price is not constrained and *S* can increase price to offset his greater risk of liability.

136. The following table compares the parties' joint return and *B*'s individual return under a negligence rule when *B* must choose whether to invest *r* to increase the value of the contract from *v* to $v(r)$. It assumes *S* tests, so the probability of failure is $PR(t\theta)$.

	No r; success	No r; θ	r; success	r; θ
Joint return	$v-c$	$-p$	$v(r)-r-c$	$-(r+p)$
B return-negligence	$v-p$	0	$v(r)-r-p$	$-r$
Probability	$1-PR(t\theta)$	$PR(t\theta)$	$1-PR(t\theta)$	$PR(t\theta)$

B ought to rely if $(v(r)-v)(1-PR(t\theta)) > r$—i.e., if the increased return from reliance discounted for the probability of success exceeds the reliance cost. This defines when *B* will rely under a negligence rule if *B* captures the entire expected profit on the contract. If part of the expected profit is shared with the promisor, the promisee will tend to

return to the parties. Alternatively, a principal may conduct testing of risks in ways that reduce the parties' joint expected return because he does not reap the entire reward from bearing untested risks.

This analysis differs from the analysis in tort, which concludes that a negligence rule induces optimal precaution by victims.[137] Because a victim knows that he will bear the loss on an accident that the injurer could not efficiently avoid, the victim will take care if the return in accident reduction exceeds the cost of care. This difference results from different assumptions about how the parties interact. In tort, the usual assumption is that a victim bears the entire loss from his own negligence. In contract, a principal's reliance produces a gain that he and the agent may share. The analog in tort might be a two-party accident where each party's conduct increased the risk of loss to the other.[138]

There is a contractual solution to the problem of divided returns if the principal's reliance is known: the agent may guarantee the principal a minimum return equal to the principal's opportunity cost on his investment in the contract. Under such a contract, an agent takes precautions to ensure the expected return warrants an investment by a principal, and the principal makes any warranted investments because he is guaranteed a return at least as good as his return on other investments.

Railroad sidetrack agreements illustrate another solution to the problem of ensuring optimal reliance when information is asymmetric and returns are divided. Railroad sidetracks are tracks built between railroads and shippers. Typically, a shipper bears the cost of building a sidetrack, but the agreement will provide for the railroad gradually to refund that cost out of shipping fees.[139] We would expect the shipper

---

under-rely under a negligence rule, because he bears the entire risk on the reliance but does not reap the entire reward.

That a negligence rule tends to induce optimal reliance by B only if he captures the entire gain on his reliance may also be illustrated in a case where the risk is that S's costs will vary across a continuous range with performance inefficient at some costs. Assume that S's costs are drawn from a probability density function $f(c)$ and will range from 0 to x. S should perform if $v(r) > c$, and the probability of this may be expressed as $\int_0^{v(r)} f(z) dz$. As we have seen, S will perform if $v(r) > c$ under negligence if we ignore error and execution costs in administering the rule. From the parties' joint perspective, B ought to contract and rely if $\int_0^{v(r)} v(r) - z] f(z) dz - r > 0$. And, again disregarding error and execution costs, B will contract and rely under a negligence rule if $\int_0^{v(r)} v(r) - p] f(z) dz - r > 0$. Reliance is efficient when p is set at S's break-even price (i.e., B captures the entire expected profit on the transaction). (At S's break-even price, $\int_0^{v(r)} [p - z] f(z) dz = 0$ so $\int_0^{v(r)} v(r) - p] f(z) dz = \int_0^{v(r)} v(r) - z] f(z) dz$.) If S captures some of the expected gain on the transaction, B will tend to under-rely under a negligence rule since he bears the entire risk of his loss on reliance but captures only part of the gain.)

137. See Shavell, supra note 7, at 14.

138. This case might be dealt with by making each party liable to the other for negligence, if rules of contributory negligence are not a bar.

139. See Russell Pittman, Specific Investments, Contracts, and Opportunism: The Evolution of Railroad Sidetrack Agreements, 34 J.L. & Econ. 565, 580–86 (1991).

to bear the cost of the sidetrack because it knows better whether its projected use warrants the investment. We also would expect the railroad to refund that cost out of fees. The increase in fees because of increased shipping through the sidetrack partly represents rents to the railroad, for the railroad's rates are set by tariff above its operating costs. The railroad should forego such rents until the shipper recovers its investment in a sidetrack so the shipper will not be too cautious in making the investment.

C. *A Note on the Effect of Cost and Error in Enforcing a Negligence Rule on Reliance*

If a negligence term can be costlessly and perfectly enforced, if information is fully shared, and if the principal reaps the entire return from his investment in a contract, then reliance generally will be optimal.[140] It is likely that enforcement costs will discourage reliance: the principal will discount the expected return from reliance by the cost of collecting that amount if the agent negligently performs. An unbiased error in determining negligence may not affect reliance adversely.[141]

---

140. See supra note 136. There is one other caveat: B may tend to over-rely under a negligence rule if his reliance affects the level of performance required of S. To illustrate, assume that S has three possible costs $(cl, cm, \text{and } ch)$, and that $cl < v < cm < v(r) < ch$. Thus, if B invests r, performance at level cm becomes efficient. Investing r increases the parties' joint expected return if $(v(r)-cl)PR(cl) + (v(r)-cm)PR(cm) - r > (v-cl)PR(cl)$, or if $(v(r)-v)PR(cl) + (v(r)-cm)PR(cm) > r$. Under a negligence rule, if S is liable for breach at cost cl or cm if B relies, B will rely if $(v(r)-p)(PR(cl)+PR(cm)) - r > (v-p)PR(cl)$, or if $(v(r)-r)PR(cl) + (v(r)-p)PR(cm) > r$. Comparing the two statements, B will overrely by $(cm-p)PR(cm)$. This point relates to Shavell's conclusion in tort that victims may take too little care under a negligence regime, if the tort is sequential and the victim acts after the injurer and with the knowledge that the injurer was negligent. See Steven Shavell, Torts in Which Victim and Injurer Act Sequentially, 26 J.L. & Econ. 589, 605–06 (1983).

141. Assume that B is considering whether to employ S to manufacture a widget. S's costs may range from 0 to x and B will invest r to realize $v(r)$ if the widget is produced. A negligence rule is in effect, so S will be excused from performance if $c > v(r)$, but there is a risk that a court will over- or underestimate the cost of performance by a factor of e. The situation may be pictured this way:
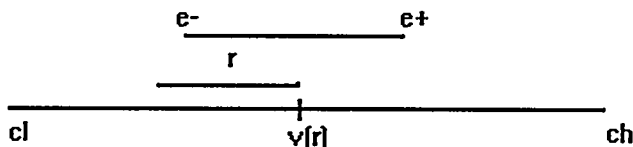
Earlier we saw that a negligence rule induces optimal reliance by B if he captures the entire expected gain on the transaction. B will contract and rely if $\int_0^{v(r)} (v(r)-p)f(z)dz - r > 0$, which is also when reliance is efficient if $\int_0^{v(r)} (p-z)f(z)dz = 0$. Intuitively, if $c < v(r)$, B will balance the expected gain—$v(r)$-p—with the reliance—r. Introducing a risk of error changes this result, because B will know that in some outcomes performance may be efficient but S is excused from paying damages—i.e., where $v(r) > c > v(r)$-e—and in

However, a principal's control over information and the reluctance of courts to question a principal's business judgment may bias negligence determinations downward, which will discourage reliance. Of course, these problems are largely avoided if the agent guarantees a minimum return equal to the principal's opportunity cost; such a guarantee minimizes enforcement problems.

V. Open Terms in More Complex Relationships

To this point, we have been concerned with the case where a principal employs an agent to develop an asset of uncertain value. The use of open terms, more specifically a sharing arrangement and a negligence term, reduces the cost of contracting in this case by reducing the parties' incentive to test economic gain and to haggle over its division. Part IV introduced reliance by the principal, and showed that even with perfect and cost-free enforcement of a negligence term, the division of cost and return may discourage optimal reliance and caution under a contract with a negligence term and a sharing arrangement. Part IV then suggested that a solution to these problems is for an agent to guarantee the principal a minimum return equal to the principal's opportunity cost on his investment in the contract.

This Part extends the analysis to more complex contracts in which parties work together for a lengthy period and make significant investments, the return on which depends on the success of the parties' relationship. It uses as an example a case where a coal producer and a utility develop a mine and a coal-fired power plant next to each other to reduce transportation costs. The outcome of the contract depends on each party's investment in its respective facility,[142] how each performs, and exogenous risks (for example, the quality of the mineral deposit

---

other outcomes performance may be inefficient but S is required to pay expectation damages—i.e., where $v(r)+e > c > v(r)$. B will weigh three factors: the probability that cost will be in the range where an error may be made, the probability that an error will be made within this range, and the probability that S will misrepresent his cost if it is below $v(r)$ (S should always breach if $c > v(r)$). Thus, if the risk of error and the probability of cost are symmetric around $v(r)$, the risk of error ought to have no effect on B's reliance: the risk of loss if a court sets the level of performance too low is exactly offset by the risk of gain if the court sets the level too high.

There is a subtle reason why error may discourage reliance. If the probability of c diminishes as it approaches and goes beyond point $v(r)$ and if the risk of error is unbiased, then the risk that a court will set $v(r)$ too low will weigh more heavily on B than the risk that it will set $v(r)$ too high. This is because outcomes where c is less than $v(r)$, and so where a court may erroneously excuse S, are more likely than outcomes where c is greater than $v(r)$.

142. Reliance may also take the form of not making an investment. An example is an output contract between a coker and a calciner. Coke is produced as a by-product of oil refining. Cokers do not invest in storage facilities and depend upon the calciner to take the coke as produced. If the calciner fails to take coke, the cokers are faced with problems of disposing of the coke and may have to halt coke production. See Goldberg & Erickson, supra note 30, at 376–77.

and the price of energy). Each party is vulnerable to opportunism by the other. If the mine could credibly threaten to halt production, for example, it might be able to capture much of the value of the utility's investment in the coal-fired plant if that investment could not be redeployed and if the utility had no other source of supply of coal with a comparable cost.

Experience shows that a contract between a mine and utility in this situation is likely to be a long-term requirements contract that includes terms adjusting price to equal the mine's cost of production.[143] This Part shows that this contract has many of the same characteristics, positive and negative, as a contract with a negligence term and a sharing arrangement. The price term, rather than a negligence term, regulates the utility's exercise of discretion under the open quantity term, but if price is set to equal the mine's cost, the outcome is similar. The price term also divides gain on the contract between the parties, and because price is adjusted on the basis of external criteria defining the mine's cost and not on the basis of the mine's actual costs, the price term encourages the mine to minimize its production cost.

Like the open term agency contract, this contract does not create the optimal incentives to test, invest, and perform; incentives are distorted by error in regulating performance and the division of cost and return. Nevertheless, the contract may maximize the parties' joint expected return, since it aligns individual and joint risk in a way that reduces the cost of contracting. Risk alignment may be possible because the contract involves risks with offsetting impacts on the parties.

Other forms of open term contracts have similar characteristics.[144] An output contract in which price is adjusted to equal the value of the good to the buyer is obviously similar to a cost-pricing requirements contract.[145] Cost-pricing in a contract with a fixed quantity term may align risk in a way that reduces the cost of contracting,[146] though cost-

---

143. See Joskow, Vertical Integration, supra note 12, at 72–73.

144. In a survey of corporate general counsels, Russell Weintraub found that provisions to protect against price changes were commonly used in long-term contracts. Other provisions used were price indexing (71.6% firms used), cancellation options (66.2%), force majeure clauses (40.5%), renegotiation clauses (41.9%), and other types of provisions, mostly "most favored nation" clauses. See Russell J. Weintraub, A Survey of Contract Practice and Policy, 1992 Wis. L. Rev. 1, 17.

145. Cost-pricing is also used in output contracts, perhaps because output is inflexible and so it is not necessary to regulate output through the price term. See Goldberg & Erickson, supra note 30, at 377, 389–90 (describing output contracts between cokers and calciners where price was initially indexed to components of the seller's cost and later price renegotiation terms were substituted).

146. See Goldberg, supra note 30, at 534–36 (discussing price-adjustment term in contract in *Alcoa v. Essex*); J. Harold Mulherin, Complexity in Long-Term Contracts and Analysis of Natural Gas Contract Provisions, 2 J.L. Econ. & Organization 105, 111 (1986) (describing natural gas supply contracts with take-or-pay provisions with most favored nation pricing terms and explaining that such terms are the best measure of a producer's cost because they track costs in region); cf. Joskow, Price Adjustment, supra

pricing does not play as significant a role in regulating performance when quantity is fixed as when quantity is open. Renegotiation clauses (or even informal practices of renegotiation)[147] may align risks and regulate performance, though renegotiation is costly and rife with dangers of opportunism.[148] Price renegotiation ensures that gains are shared, and the need to win the other party's continued assent may encourage parties to perform in a manner that increases their joint gain.

---

note 38, at 57–60 (finding that 123 of 158 coal supply contracts used a base-price with escalator provisions tied to the mine's cost, and another 24 used cost-plus pricing; he does not indicate the quantity term in the contracts, but the implication is that in many the quantity is fixed). Crocker & Masten, supra note 30, at 89, found that natural gas supply contracts were likely to have more flexible price renegotiation provisions as quantity became more inflexible. As they correctly observe, this pattern belies the hypothesis that flexible price terms are used primarily to regulate the exercise of discretion under flexible quantity terms. See id.

147. Parties may rely on a practice of renegotiation where it is not formally provided. Goldberg and Erickson found that price adjustment was common in petroleum coke contracts even where it was not provided for in the contract. See Goldberg & Erickson, supra note 30, at 389–90, 395–96. Russell Weintraub found that 95% of respondents sometimes granted price adjustments, with a long and satisfactory relationship with the requesting firm and the reasonableness of the request being the most cited reason for granting relief. See Weintraub, supra note 144, at 19. Similarly, the great majority had requested relief, and found such requests often granted. See id. at 23.

148. None of the contracts studied by Joskow had short-term renegotiation clauses. See Joskow, supra note 38, at 66. Crocker and Masten found that both price-adjustment provisions and renegotiation provisions were commonly used in natural gas contracts between producers and pipelines. See Crocker & Masten, supra note 30, at 82–83. They observe that price-adjustment terms do not divide neatly into those that fix price by external, objective criteria and those that give parties discretion in setting price. Instead, price-adjustment terms fall on a continuum between those that fix price by external criteria, to those that give limited discretion in setting price (for example, a party may choose among indices), to those that give greater discretion (for example, renegotiation with a ceiling and a floor). Crocker and Masten found that more flexible renegotiation provisions are used as duration increases. See id. at 89. This greater price flexibility is what we would expect if parties were trying to align joint and individual risk since long duration makes failure of fixed-adjustment terms more likely. Interestingly, Crocker and Masten found no significant correlation between the method of adjustment and the extent of appropriable quasi-rents (which they measured by the number of buyers and sellers in a field). Also they found no correlation between method of adjustment and the volatility of the oil market. See id. at 89–90. Crocker and Masten suggest this may be because neither method of adjustment is clearly superior to the other.

Goldberg and Erickson's study of price-adjustment terms in long-term petroleum coke contracts found an increased use of renegotiation clauses in contracts made from 1966 to 1973. They attribute this partially to the success of voluntary renegotiation in a slump in 1962 to 1965. See Goldberg & Erickson, supra note 30, at 390–91. This suggests that trust may contribute to the use of renegotiation clauses. After 1973 and two significant shocks to the industry (from the rise in energy prices and an antitrust decision), price indexes were refined to provide greater short-term protection from price changes and regular renegotiation (e.g., on a three to six month basis) was used to provide longer-term protection. See id. at 394–95.

A. *A Cost-Pricing Requirements Contract as a Self-Programmed Negligence Term*

Together the price and requirements terms in a cost-pricing requirements contract function like a negligence term. This similarity is clearest if we assume (for the moment) that price always equals the seller's cost of producing the last unit of output taken by the buyer. In response to this price signal, the buyer will demand the quantity that maximizes the joint return on production in the short run.[149] More precisely, the buyer will set quantity where its marginal return from consuming an additional unit equals the seller's marginal cost of producing that unit.

Unlike a fixed-quantity term, the requirements term enables the buyer to adjust its demand in response to the price signal. It also commits the buyer to the contract: the buyer must either buy the input from the seller or accept a nonexistent or much smaller return on its investment in its facility.[150] The seller is bound to the contract by its promise to supply whatever quantity the buyer requires. Thus, both parties are discouraged from trying to hold up the other to capture a greater share of the gain.[151]

A cost-pricing requirements contract is unlike a contract with a negligence term in one respect: rather than relying on a court to regulate performance, the parties try to regulate the buyer's performance through the price term. The use of the price term to regulate performance reduces enforcement costs, but increases the cost of entering into the contract by the cost of designing the price term. The price term will not perfectly regulate performance, partly because of errors in designing the term to track the seller's cost, but also because the price term has functions to serve other than regulating quantity, including inducing the seller to minimize its costs and serving as a mechanism for sharing returns.

---

149. See Goldberg, supra note 30, at 531; Goldberg & Erickson, supra note 30, at 387–88; R. Hubbard & R. Weiner, Regulation and Long-Term Contracting in United States Natural Gas Markets, 35 J. Indus. Econ. 71, 73–74 (1986). The mine's cost is its opportunity cost. At a minimum, the opportunity cost is the alternative price at which the mine could sell coal at the mine mouth. More likely, it is the alternative return the mine could earn on resources expended in production—e.g., the alternative return on money spent on labor, fuel, and other production inputs plus a charge for depletion of the coal reserve.

150. This assumes that the input has no ready substitute and that the buyer's investment cannot be redeployed.

151. An output term could serve the same function. A requirements term may be used in the mine mouth coal contract because the utility has a more significant investment that cannot be redeployed. This investment gives a requirements term more "bite" than an output term would have on the mine since the mine could more plausibly threaten to shutdown and so coerce a favorable adjustment of terms. See Joskow, Vertical Integration, supra note 12, at 59.

B. *Defects of Cost-Pricing Requirements Contracts*

A cost-pricing requirements contract suffers the same three fundamental defects as a contract with a negligence term and a sharing arrangement: (i) error in regulating performance will lead to suboptimal performance; (ii) costs are divided, so parties may take inadequate precautions when information is asymmetric; (iii) returns are divided, so parties will under-invest or take excessive precautions.

1. *Performance Error.* — In a cost-pricing requirements contract, the buyer's performance is regulated primarily by the price term.[152] Price must be based on objective criteria to induce the seller to minimize cost and to avoid problems with monitoring the seller's cost.[153] However, this objectively defined price may diverge from the seller's true cost; this divergence may result in performance error. For example, if price is below the seller's cost, the buyer may increase quantity though the gain from so doing is less than the seller's loss on producing the increased quantity. The result is a net joint loss on performance. Deviation between price and cost also may result in breach by either party, with the attendant cost of resolving a claim. Further, deviation between price and cost may give a party an incentive to over- or under-invest.[154]

A type of performance error is inherent in a cost-pricing requirements contract. The contract optimizes performance in the short run, but not investment in the long run. This occurs because the contract induces a buyer to optimize the parties' joint return when his return curve is fixed (that is, if there is nothing the buyer can do to increase his return per unit), but it does not induce him to make the optimal investment to improve his return curve.[155] For instance, a buyer will have

---

152. The rule of good faith is a secondary constraint. See infra notes 224–238 and accompanying text.

153. The utility of objective criteria is illustrated by the 21 mine-mouth coal contracts studied by Joskow. See Joskow, Vertical Integration, supra note 12, at 69–73. Fourteen contracts used a base price with escalator provisions. These contracts broke price into various components. Typically, the component prices for wages and materials were indexed to general inflation rates. In contrast, taxes and cost changes due to government regulations and union work rules were almost always based on actual costs. Escalator provisions for other items (i.e., depreciation and profit) were either indexed or based on actual costs. See id. at 70–71. The rationale behind the different treatment seems fairly clear. Actual labor and material costs may be difficult to monitor. Further, adjusting price to reflect actual cost gives the mine too little incentive to control such costs, which partly are under its control. Taxes and cost increases due to union demands or regulatory changes are more easily verified, and are more likely to be outside the control of the mine. Eight of 21 contracts used cost-plus pricing. (One contract is counted twice by Joskow because the mine could switch the pricing mechanism.) In these contracts, there usually was a bonus or penalty provision if the cost varied from an objectively indexed cost, and the utility usually had some power to review costs. See id. at 72–73.

154. See infra notes 162–165 and accompanying text.

155. Shavell makes the similar point that a negligence rule may lead to unduly harmful behavior if negligence is determined without questioning an injurer's activity level. See Shavell, supra note 7, at 25–26. For example, a driver may venture out on a

too little incentive to invest in lowering his per-unit cost of processing the input. Part of the return on any investment will be reaped by the seller if the measure results in a consequent increase in quantity and increase in the seller's cost that will be reflected in a price increase.[156] There is no mechanism in the cost-pricing requirements contract to combat this problem, for the buyer is under no general obligation to maximize the parties' joint return.[157]

2. *Under-Precaution Because of Divided Losses.* — The second problem with a cost-pricing requirements contract arises because losses are borne individually: parties that are not responsible for each other's loss may take inadequate precautions when information about risk is not fully shared.[158] For example, in the mine-mouth coal contract, the utility may not adequately investigate or disclose the risk of its using other energy sources that will reduce the power plant's demand for coal. The utility will not care about the mine's loss on a decrease in demand. Concern that the buyer may not adequately investigate or disclose risks that threaten to cause the seller loss by reducing demand may be one reason why requirements contracts often have minimum-take terms or other minimum guarantees when a seller relies.[159]

---

stormy night, though the risk to others outweighs the benefit to himself, if a court will not question the reasonableness of his trip, but instead merely will ask whether the driver drove with as much care as he could under the conditions. See id. This problem is not inherent in a negligence rule. It is a function of the scope of the negligence determination, and disappears if a court considers activity level in determining negligence. See Landes & Posner, supra note 7, at 66–67.

156. See infra note 165 and accompanying text.

157. No similar problem exists on the seller's side if price is set on the assumption that he will make the investment that minimizes his production costs. In this case, the seller will bear the loss from under-investment.

158. A similar problem exists under an agency contract with a negligence term, where an agent may not take adequate precaution to protect a principal from a reliance loss. See supra note 126 and accompanying text.

159. Minimum payment terms often are used when there is significant reliance. For example, Goldberg and Erickson found that minimum-take requirements are used in long-term coal coke contracts because of the seller's significant opportunity cost (e.g., storage costs) if coke is not taken. See Goldberg & Erickson, supra note 30, at 376–77. They also found that fixed-price, fixed-quantity contracts were more likely to be used where there was a high degree of reliance. See id. at 391. Protecting reliance also may be why a utility is required to pay a mine's fixed cost under a mine-mouth coal contract if the utility exercises an option to terminate the contract. See Joskow, Vertical Integration, supra note 12, at 66. These terms protect the seller from undisclosed risks, though they may also protect the seller from opportunism by the buyer in the form of quantity manipulation. Cf. Mulherin, supra note 146, at 108–10 (suggesting that take-or-pay provisions are used in natural gas contracts to prevent pipe line from exploiting producer's vulnerability to loss from reductions in demand because of drainage of common pool).

Scott E. Masten, Minimum Bill Contracts: Theory and Policy, 37 J. Indus. Econ. 85, 88–91 (1988), suggests another function served by minimum-take contracts. Masten observes that a minimum take requirement may best reflect the seller's marginal cost of production at low-levels of production where that cost is likely to approximate zero. For example, at low levels of production the marginal cost of production to the mine may be

When the seller's investment is variable, as in the case of the mine-mouth coal contract, there is no perfect way to protect the seller from the risk that the buyer will not adequately investigate or disclose risks that may reduce the return on the seller's investment.[160] For the buyer to guarantee a minimum return to the seller on its investment can be problematic. If the guarantee is open-ended—that is, the buyer guarantees a minimum return on whatever investment the seller makes—the seller may over-invest because it bears no risk.[161] Of course, a guarantee is not likely to be open-ended. A fixed guarantee creates other problems when the seller's investment is variable. If the guaranteed return is less than the seller's opportunity cost on what turns out to be the optimal investment, then the seller may under-invest or the buyer may not take adequate precautions. In contrast, if the guaranteed return exceeds the seller's opportunity cost on the optimal investment, then the seller may over-invest or the buyer may be over-cautious in contracting.

3. *Over-Precaution and Under-Investment Because of Divided Returns.* — The third problem with the cost-pricing requirements contract arises because the return on the investment is shared while the cost is borne individually.[162] Similar problems arise under an agency contract with a sharing arrangement. If there is risk under such a contract, an agent may invest too little or take excessive precaution, since he bears the entire cost of his investment but reaps only part of the return;[163] a principal may likewise be overcautious for the same reason.

This problem may seem more tractable in cases where both parties rely, as in the case of the mine-mouth coal contract. If the parties share returns in proportion to the costs they bear, they seem to have the same incentives to invest and to take precautions as a single firm would face. However, sharing of returns in proportion to costs does not give the parties the same incentive to take precautions when there is risk. Such an allocation gives the parties the optimal incentive to test only if the

---

equal to or below zero because the mine will incur greater costs mothballing the mine and laying off workers than in producing at a low level. A minimum-take requirement makes the marginal cost of the good to the buyer zero up to the minimum guaranteed.

160. There is a corresponding danger that the seller will not disclose risks that may increase its costs. However, the seller will bear such risks if price is set on the basis of predicted costs—for example, using a base price with adjustment for inflation—and not actual costs.

161. This is an aspect of the broader problem of over-reliance. See supra note 130 and accompanying text.

162. See Goetz & Scott, supra note 2, at 1109–11; Oliver Hart & John Moore, Incomplete Contracts and Renegotiation, 56 Econometrica 755, 774–75 (1988). Goetz and Scott suggest that the problem results from the fact that two dimensions of activity are being compensated on the basis of a single variable. Goetz & Scott, supra note 2, at 1109. Hart and Moore suggest that the problem could be solved by introducing a third party who mediates so that each party pays the other their revealed cost and benefit. Hart & Moore, supra, at 774 n.20.

163. See supra notes 51, 108 and accompanying text.

test is perfectly accurate and the testing party is liable for the other party's potential loss. If either condition is violated, the parties may have an incentive to over-test or to under-test even under a contract in which they share returns in perfect proportion to their costs.[164]

The operation of the price term in a cost-pricing requirements contract further misaligns cost and return. The ideal price term (albeit an unattainable ideal) would set price at the seller's cost of producing the last unit taken by the buyer. This price is ideal because it optimizes the level of production in the short term. Under such a price term, however, the buyer may have too little incentive to invest in increasing his per-unit return on the good. The buyer's increased return may cause a quantity increase and an increase in the seller's marginal cost of production; this cost increase will result in a price increase across all quantities taken, which will give the seller a significant return on the buyer's investment. This problem will exist whenever an investment by the buyer increases quantity, the seller has rising costs, and a single price is paid for all quantities taken.

Additional problems arise because price must be set by objective criteria that may not track a seller's cost. If price does not rise with the seller's cost, the buyer may have too great an incentive to invest in increasing his per-unit return and the level of production, since any in-

---

164. Assume that B invests r and S invests p to realize v. These investments will be lost in event of θ, which has a probability of $PR(\theta)$. If they test, the risk of loss is $PR(tq)$. The cost of the test is t. The parties ought to expend t to test if $(v-(r+p))(1-PR(\theta))(1-PR(t\theta))$ $-$ $(r+p)(1-PR(\theta))PR(t\theta)$ $-$ t $>$ $(v-(r+p))(1-PR(\theta)) - (r+p)PR(q)$. Solving for $(1-PR(tq))$, the parties ought to test if $(1-PR(tq)) > (v(1-PR(\theta)) - (r+r)PR(\theta) +t)/v(1-PR(\theta))$. Two contracts need to be considered. In the first, a party is liable only for the loss of their own investment in case of failure. In the second, the testing party is liable for both parties' losses in case of failure. Under both contracts, a party's share of gain is determined by the relative size of his investment (i.e., his potential loss).

Under the first contract, the incentive to test is skewed by two effects. A party will have too little incentive to test because he is not liable for the other party's loss on failure, and he will have too great an incentive to test (assuming the test is imperfect) because he does not reap the entire gain upon success. S will test if $(v(p/r+p)$ $-$ $p)(1-PR(\theta))(1-PR(t\theta)) - p(1-PR(\theta))PR(t\theta q) - t > (v(p/r+p) - p)(1-PR(\theta)) - pPR(\theta)$. Solving for $(1-PR(t\theta))$, S will test if $(1-PR(t\theta)) > (v(p/r+p)(1-PR(\theta)) - psPR(\theta) + t)/v(p/r+p)(1-PR(\theta q))$. Substituting \$6 for r, \$4 for p, \$20 for v, .1 for t, and .3 for $PR(q)$, we find that the parties ought to test before proceeding if $(1-PR(t\theta)) > .857142$. Under the sharing arrangement just stated, S will test if $(1-PR(t\theta\theta)) > .798648$. If we substitute 1 for $(1-PR(t\theta))$—i.e., we assume that the test is perfectly accurate—then S will have too little incentive to test because he is not liable for B's potential loss. S will test if $(v(p/r+p) - p)(1-PR(\theta)) - t > (v(p/r+p) - p)(1-PR(\theta)) - pPR(q)$, or he will test if $pPR(\theta) > t$. S ought to test if $(r+p)PR(\theta) > t$.

Under the second contract, S is liable for B's loss (r) in case of failure. This gives S the optimal incentive to test if the test is perfectly accurate. But if the test is inaccurate S will be too cautious. S will test if $(v(p/r+p)$ $-$ $p)(1-PR(\theta))(1-PR(t\theta))$ $-$ $(r+p)(1-PR(\theta))PR(t\theta) - t > (v(p/r+p) - p)(1-PR(\theta)) - (r+p)PR(\theta)$. Solving for $(1-PR(t\theta))$, S will test if $(1-PR(t\theta)) > (v(p/r+p)(1-PR(q)) - rPR(q) + t)/v(p/r+p)(1-PR(\theta))$.

crease in quantity results in a transfer of wealth from the seller to him. Conversely, if price rises faster than the seller's cost, the buyer will have too little incentive to invest in increasing his per-unit return and the level of production. In this case, increases in quantity will augment the transfer of wealth from the buyer to the seller, enabling the seller to capture an even larger part of the return on the buyer's investment.[165]

---

165. The following graph illustrates this point.

Quantity
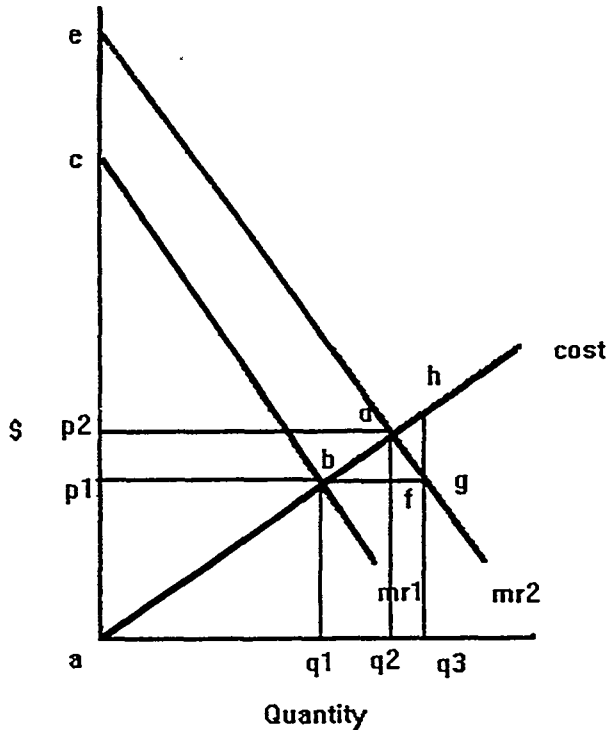
This chart assumes that the buyer has a chance to make an investment that could increase the value of the input to him, shifting from *mr1* to *mr2*. The return on the investment is the difference in the areas of triangles *abc* and *ade*. If price is set always to equal the seller's cost of producing the last unit taken, then price will move from *p1* to *p2*. However, because of the price rise, the buyer reaps only part of the increase in return, and he may not make the investment though the overall return justifies the cost. If price is fixed at *p1* (price may be based on external criteria that do not change with the shift to *mr2*), the buyer captures the entire gain and then some. Two problems result when the price is fixed at *p1*. The buyer has an incentive to increase quantity to *q3*, which results in a loss on performance (equal to *hdg*) and a greater loss to the seller (equal to *fdhg*). The transfer from the seller to the buyer gives the buyer too great an incentive to make the investment to move to *mr2*. Even if quantity moves to *q2* (and there is no loss on performance), the buyer has too great an incentive to invest to try to move to *mr2* because there is a transfer equal to *bdf* from the seller to the buyer if he succeeds.

C. *Benefits of Open Price and Quantity Terms*

Cost-pricing requirements contracts must offer significant benefits to offset their disadvantages. Open price and quantity terms are thought to serve three general purposes: they allocate risks, they improve performance by sharing returns, and they are less expensive to enter into than fixed-term contracts. I think the third explanation is the most persuasive and suggest that this reduction in the cost of contracting may be possible because cost-pricing terms are better than fixed terms in aligning individual and joint risk for risks that have an offsetting impact on the parties.

1. *Risk Allocation and Regulation of Performance.* — One theory attributes the use of open terms to risk aversion: risk-averse parties use flexible price and quantity terms to spread risk.[166] Recent studies, however, undermine this theory by showing that the use of flexible price and quantity terms is inconsistent with their supposed purpose of spreading risk.[167] Further, risk-spreading does not plausibly explain the near-universal use of flexible price terms in long-term supply contracts in general, and in long-term coal contracts in particular.[168] The risk-allocation theory would argue that flexible price terms are used because coal producers are more risk averse than utilities;[169] but sometimes this is not the case, for some coal producers are quite large and may spread or absorb risk as well as utilities.[170]

Another theory holds that flexible price and quantity terms are used to regulate performance,[171] reasoning that parties are likely to perform better under the open term contract because they share in the return.[172] On this issue it is appropriate to compare the open-term

---

166. See Polinsky, supra note 26, at 28–29.

167. See Leffler & Rucker, supra note 120, at 1081–84 (finding that in timber-harvesting contracts, transaction-cost hypothesis better explains use of open terms than risk-based hypotheses); Mulherin, supra note 146, at 114–15 (finding that price-adjustment provisions were most likely to be used in natural gas supply contracts when producer was a major company, which is the opposite of what we would predict if they were used to shift risk from small producers who were most likely to be risk averse).

168. See Joskow, Price Adjustment, supra note 38, at 57–60 (reporting 158 contracts of four-years or more duration had flexible price terms, none had fixed-price term).

169. See Polinsky, supra note 26, at 28–29 (arguing that flexible price protects seller).

170. Federal Trade Commission Staff, Report on the Structure of the Nation's Coal Industry, 1964–1974, at 38, 48, 58 (1978) (reporting that in 1974 top eight companies accounted for 34.8% of national coal production, for 41.4% of coal shipments to utilities nationally, and for 88% of western coal production).

171. Enforcement problems figure more significantly in agreements like the mine-mouth coal contract than in the oil and gas lease because the mine-mouth coal contract involves the performance of complex tasks by both parties over an extended period of time. In the oil and gas lease, a fixed-term contract could take the form of a simple payment by the lessee of cash to the lessor for all mineral rights.

172. See Goldberg & Erickson, supra note 30, at 388; Goldberg, supra note 30, at

contract with a simple fixed-price, fixed-quantity contract. The simple fixed-term contract is the easiest contract to enforce, and has few defects other than enforcement problems if it is not too costly to enter into.[173]

The contracts rely on different primary mechanisms to regulate performance: the fixed-term contract regulates performance primarily by the threat of legal sanction, while the open-term contract regulates performance primarily by sharing the return. The open-term contract may better regulate performance if obligations under the fixed term contracts are difficult to enforce. Obligations may be difficult to enforce because of problems in monitoring performance[174] or in measur-

---

532; cf. Joskow, Vertical Integration, supra note 12, at 61 (rejecting a fixed-price contract because it creates a strong incentive to breach).

173. My argument is contrary to the view that risk-neutral parties may use open terms because of the difficulty of writing and enforcing fixed-term contracts independent of uncertainty. See Hart & Holstrom, supra note 25; Oliver Hart, Incomplete Contracts, *in* 2 The New Palsgrave, supra note 19, at 754–55 (1987). Drafting and enforcement problems may be telling if the alternative to an open term contract is, as Hart assumes, a contract with finely drafted conditions to deal with many known contingencies.

The simple fixed-term contract is easy to negotiate if both parties know the probability of all possible outcomes for given levels of investment in the mine and the plant. They need merely determine their return on each outcome at a given quantity and price and discount for probability and time. Moreover, each party ought to make the investment and take the level of precaution that maximizes their joint expected return, since this maximizes the share of the return they may claim. Assuming damages are accurately calculated and always paid, the optimal quantity will be delivered and taken even if price and quantity are fixed.

The fixed-term contract works well even if information is not shared. The contract tempers the incentive of parties to try to take advantage of private information in ways that may reduce their joint expected return. A party has no incentive to take advantage of private information about risks that may increase the cost or reduce the return on his own performance, since he bears the loss on such risks. In this respect, the fixed-term contract is superior to the cost-pricing requirements contract. There is an incentive under the fixed-term contract not to disclose private information about risks that affect the cost of the other party's performance. For example, in the mine-mouth coal contract, the utility may not disclose that labor costs in the area are likely to be higher than the mine expects. However, there is a similar problem under the requirements contract unless the way the price is indexed puts the risk of such a cost increase on the utility. Further, parties are likely to know risks affecting their own performance.

Finally, there is an incentive under the fixed-term contract not to disclose private information that makes the contract more valuable than the other party expects. For example, the utility may not disclose a projected increase in shipping rates that makes it even more desirable to develop the plant near the mine. However, this incentive should not have adverse allocative consequences. If greater potential gain justifies greater investment by the mine, the utility ought to adjust quantity or price to elicit such investment.

174. Compliance with a fixed-quantity term is easily monitored by parties and courts. However, other aspects of performance, such as the quality of coal produced under a coal-supply contract, may not be as easily monitored. See Joskow, Vertical Integration, supra note 12, at 59. Sharing also may combat subtle performance defects. For example, either party may drag his feet in performance in ways that are costly to the

ing damages on breach, or because of reputational or other constraints (such as insolvency) on enforcing claims.[175]

There are several problems with this explanation of flexible price terms. First, there are significant defects in the open-term contract, so the problems with enforcing the fixed-term contract would have to be fairly grave before they by themselves could explain the use of open terms. Second, often a fixed-term contract is not that difficult to enforce. Reputational constraints aside, enforcement of a fixed-term contract is relatively easy when there are no significant consequential damages on breach[176] and the contracted-for good has no significant

---

other party but are not sufficient to provoke a response (e.g., the utility may pay slowly and the mine may deliver a few days late). See Goldberg, supra note 30, at 532–33.

175. Concerns for reputation or for the future relationship with the other party may discourage a party from suing to collect damages even when they are certain and easily proven. Stuckey gives a possible illustration. See Stuckey, supra note 4, at 103–07. Reynolds Metals Co. breached a two-year contract to supply alumina to Anaconda Co. The contract had a fixed quantity (327,000 tons) and a narrowly defined price range ($77 to $84 per ton). Reynolds breached after its production costs rose to $110 to $130 per ton and the spot market price of alumina rose to $150 to $165 per ton. Stuckey expresses surprise that Anaconda brought suit after Reynolds breached. I find even more surprising that the suit was settled for $4 million, which represented only $11.11 per short ton. This was much less than the contract-market differential (approximately $80 per short ton). Stuckey attributes the initial reluctance of Anaconda to sue (it waited more than six months) to a concern for reputation as well as the status of the relationship with Reynolds (the two were partners in another joint venture). He explains the low settlement (unconvincingly) by the acquisition of Anaconda by Atlantic Richfield and its decision to acquire its own alumina production facilities. It is not clear why new management or a change in organization would induce Anaconda to leave around $25 million on the table in settlement. If anything, Anaconda's decision to henceforth produce its own alumina would give it a freer hand to deal with Reynolds harshly.

Goldberg and Erickson provide another illustration from the petroleum coke industry. Prior to 1973, aluminum companies purchased coke under fixed-price minimum quantity contracts. This gave them a windfall when energy prices rose. Most companies renegotiated price "trading off part of the windfall to enhance their future access." Goldberg & Erickson, supra note 30, at 395. Goldberg and Erickson also offer an example of the cost of noncooperation. One aluminum company refused to renegotiate. Because of the ill will this generated, the contract was not extended and the aluminum company was required to demolish a functioning calciner that was on the seller's property and to build a new calciner. See id. at 396.

176. Such damages would arise in the mine-mouth coal contract if it is cheaper for the mine to close than to continue production and sell on the market if the utility refuses to take coal. The presence of consequential damages is problematic because such damages are difficult to measure, which obviously raises the cost of enforcement. Error in the assessment of damages would have no adverse effect on performance if the risk of error is perceived to be unbiased—i.e., the parties perceive that there is an equal risk that damages will be assessed too high or too low and by the same amount—since the effects cancel out. See Shavell, supra note 129, at 131. Error would have a distributive impact ex post—some promisees and promisors would be enriched and others impoverished—but no allocative impact ex ante. But it is likely in contract that there is a systematic tendency to undervalue damages because of the rule in *Hadley v. Baxendale* and other rules limiting damages. To the extent damages are systematically

unmonitorable qualitative element;[177] in this case, breach and damages are easily proven. Third, there is evidence that flexible terms are not used as we would expect if their function were to regulate performance: a recent study of natural gas contracts shows that price becomes more flexible as quantity becomes more rigid.[178]

2. *Risk Alignment and the Reduction of Contract Costs.* — The cost-pricing feature of a requirements contract may significantly reduce the cost of contracting when the contract involves risks with offsetting effects on the parties. Cost-pricing may blunt the individual impact of such risks on the parties, and so reduce their incentive to test the risks or take other measures to protect themselves.[179] That is, for risks with offsetting effects on the parties, cost pricing reduces contract costs by aligning individual and joint risk.[180]

---

undervalued, we would expect promisees to rely less on promises and promisors to be less concerned with potential damages on breach, which will reduce care taken by promisors in contracting and performance.

Problems of assessing damages may pose insuperable problems for the fixed-term contract, if there is a significant probability of outcomes where resale or cover is more costly than closure and that cost differential is great. If resale or cover is impracticable only on rare outcomes and/or the loss is small, the parties could always require resale or cover on breach and accept the inefficiencies that this entails, since their discounted effect would be small. This solution may be untenable if the inefficiencies are great. An alternative solution is to try to draft a contract that specifies when resale and cover or closure and consequential damages are appropriate on breach. In theory, liquidated damages could be specified for every outcome (or every outcome with consequential damages) since the parties know all possible outcomes. But this solution poses precisely the drafting and monitoring problems that make complete contingent claim contracts unworkable. The parties may not be able to draft descriptions of relevant outcomes, and courts may not know when a particular description holds. See Hart, supra note 173, at 758.

177. Quality of coal under a mine-mouth coal contract may be effectively monitored. Most long-term coal contracts specify such coal characteristics as BTU, sulfur, and ash content. See Joskow, Vertical Integration, supra note 12, at 67–68. The utility may test random samples of coal on a regular basis to ensure compliance with these standards.

178. See Crocker & Masten, supra note 30, at 89.

179. Another possibility is that the contract has a positive expected return and that the use of an open price and quantity term reduces the incentive of the parties to test the amount of gain or to haggle over its division. Relational contracts may offer a positive return because the relational gain (e.g., the savings in transportation from locating a power plant near a mine) may exceed the return necessary to make an investment in a contract more attractive than other investments. For example, the expected return on a stand-alone mine and power plant may be negative so neither would be developed alone, but the saving in transportation cost by developing them together may be more than that necessary to make the investments profitable.

180. Goldberg seems to make a similar point when he observes that price adjustment may reduce "pre-contract search . . . [because of] its ability to reduce the variance of outcomes." Goldberg, supra note 30, at 532. He explains in more detail:

A contract establishes gains to be divided between the parties; a fixed-price contract determines the distribution of these gains. The parties could attempt to increase their share of the gains before signing the contract by improving their information on the future course of costs and prices. The more they

Risk alignment through cost-pricing is possible because often a contingency that causes a loss to one firm in the chain of production produces a gain for another firm in the chain.[181] For example, the discovery of new coal supplies may reduce the market price of coal, which will reduce the value of the investment in the mine. However, the loss to the mine will be matched by a gain to the utility; there will be a lag before new coal generators can be brought on line to take advantage of the low price.[182]

Concentration of offsetting risks is a recognized reason for the integration of activities in a single firm.[183] Cost-pricing in a contract

---

spend on this search, the smaller the pie. *Ceteris paribus*, the larger the variance of the outcomes, the more resources would be devoted to this effort. The parties, therefore, have an incentive to incorporate into the initial agreement a device that would discourage this wasteful searching. Price adjustment mechanisms can do precisely that by reducing the value of the special information.

Id.; accord Goldberg & Erickson, supra note 30, at 388. Goldberg does not say what he means by "variance of the outcomes." It may imply offsetting risks if by "variance of the outcomes" he means a variance between the parties' individual outcomes and their joint outcome.

181. See Demsetz, supra note 32, at 172.

182. The example is suggested in Klein et al., supra note 35, at 311 n.30. They refer to such risks as negatively correlated risks.

183. See Roger D. Blair & David L. Kaserman, Law and Economics of Vertical Integration and Control 91–93 (1983); Demsetz, supra note 32, at 172–73. Blair and Kaserman discuss other ways uncertainty promotes integration, including ensuring supply or demand in the face of uncertainty, improving information flow, or shifting risk. See Blair & Kasermon, supra, at 83.

Concentration of risks is not thought a major reason for integration. Klein et al., supra note 35, at 311 n.30, argue that this phenomenon does not compel integration in the way relation-specific investments (or, in their terminology, investments that give rise to "appropriable quasi rents") do for two reasons. First, changes are a function of external factors and not opportunistic behavior. Second, the gains of integration can be accomplished as well through other means (such as the coal mine buying stock in the utility). A broader criticism is that corporate managers ought not care about offsetting risks because investors may better protect themselves from such risks through diversification. See Demsetz, supra note 32, at 173; see generally Henry T.C. Hu, Risk, Time, and Fiduciary Principles in Corporate Investment, 38 UCLA L. Rev. 277, 292–93 (1990) (arguing that managers best serve shareholders by ignoring diversifiable risks). This broader criticism is an argument for more general reform of corporate fiduciary standards. Regulating contract terms without more general reform may only induce managers to take more costly measures to protect their firms from risk.

For a study suggesting that vertical integration may diminish systematic or nondiversifiable risk, see Constance E. Helfat & David J. Teece, Vertical Integration and Risk Reduction, 3 J.L. Econ. & Org. 47, 59 (1987). They found that vertical integration had a strong positive correlation with a reduction in aggregate beta in a study of 14 mergers from 1953 to 1978. See id. at 53–54, 59. Beta is a feature of the capital asset pricing model that tries to capture risks that are unique to a firm or industry and that will not have offsetting consequences in other sectors of the economy. These are nondiversifiable risks. See id. at 49–50. Helfat and Teece attribute the positive correlation of vertical integration and reduction in aggregate beta to a reduction in uncertainty about how other agents in the chain of production will behave—a risk they

serves a similar function,[184] albeit imperfectly. Some evidence that parties use cost-pricing to offset risk is found in *Aluminum Company of America v. Essex Group*.[185] The case involved a twenty-year contract that guaranteed Essex a fixed quantity of aluminum and gave Essex the option to purchase additional aluminum in fixed increments. Essex intended to use the aluminum to supply a new wire manufacturing plant that it built near the Alcoa plant. The contract price was set using a base price that was partly indexed to general price indices to account for changes in Alcoa's costs.[186] According to the court, Essex's goal in the contract was to secure a price that reflected Alcoa's relatively low production cost, and thus to ensure that Essex could produce wire products at a competitive price.[187] Alcoa's goal was to ensure that it received a minimum return on its investment in its plant.[188] Both goals could be met by cost-pricing: changes in Alcoa's costs were not likely to affect the success of the joint enterprise, since there would be a corresponding change in the price of wire products.

The advantage of cost-pricing is that it is a relatively inexpensive way to deal with uncertain risks that are expected to have an offsetting impact on the parties. Cost-pricing enables the parties to contract without either resolving differences in their valuations of uncertain risks in order to reach an acceptable price adjustment or making other provision for those risks. If Alcoa and Essex had to enter into a fixed-price contract, they presumably would have to test and haggle over the likelihood and direction of future cost and price changes in order to adjust price in a way both would find acceptable. Alternatively, they would

---

consider nondiversifiable. See id. at 48–49. The small size of the sample (fourteen cases) and the difficulties of assessing nonsystematic risk make the finding nonconclusive.

184. In the majority of the 21 mine-mouth coal contracts studied by Joskow, a base price was adjusted for inflation or for specific cost changes due to new government regulations, union demands, or changes in the price of common inputs (such as explosives). In the minority of contracts, price was indexed to the market price of coal. See Joskow, Vertical Integration, supra note 12, at 72; cf. Joskow, Price Adjustment, supra note 38, at 57–60 (finding that 123 of 158 long-term coal supply contracts used a base price with specific cost escalators, 24 contracts use cost-plus pricing, and 11 contracts adjusted to market price or renegotiated price). Under either form of pricing provision, the mine is protected from cost increases of general effect, which would be likely to produce an offsetting gain to the utility under a fixed-price contract. Using a base price with adjustment for specific cost factors also protects the mine from a general decrease in the market price of coal for reasons independent of cost; indexing to market price leaves a mine exposed to this risk.

185. 499 F. Supp. 53 (W.D. Pa. 1980). See generally Goldberg, supra note 30, at 534–36 (providing background).

186. Only part of the price was indexed. The initial contract price was 15¢ per pound. Five cents per pound was a "demand charge," which was indexed. Ten cents per pound was a "production charge," which was divided into three separate components. Two were indexed, one was not; see id. at 535; see also 499 F. Supp. at 58.

187. See 499 F. Supp. at 58.

188. See id.

want to draft conditions or take other special measures to protect them-
selves from cost and price changes. The advantage of cost-pricing in
dealing with uncertain risks exists even if the parties are risk neutral.[189]
A risk-neutral seller will insist that price be adjusted to equal an aver-
age of possible costs under a fixed-price contract.

Nonetheless, cost-pricing is an imperfect solution to the problem
of offsetting risks. Because of the operation of the cost-pricing term,
such risks may still affect the parties' individual expected returns. In a
requirements contract, price ideally should be set to equal the seller's
cost of producing the last unit demanded by a buyer. This price opti-
mizes production in the current period. Under this arrangement, the
seller's share of gain depends on the spread between price and its aver-
age cost, and the buyer's share of gain depends on the spread between
price and its average return. Thus, offsetting risks will affect the par-
ties' shares of gain when risks alter the shape of their cost and return
curves.

Defects in the pricing term also may cause individual risk and joint
risk to diverge.[190] The *Alcoa* case[191] dramatically illustrates this dan-
ger. The contract at issue in *Alcoa* resulted in large losses to Alcoa, and
even greater gains to Essex, because of two features of the price adjust-
ment provision. One was the use of the Industrial Component of the
Wholesale Price Index to adjust the base non-labor cost.[192] Because
fuel prices affected Alcoa's cost more than they affected the price index,
the indexing term generated a price below Alcoa's non-labor cost when
energy prices rose dramatically.[193] The other feature was the failure to
index a significant part of the base price.[194] Goldberg suggests that
this part of the payment was, in effect, rent on the part of the Alcoa
facility devoted to the Essex contract.[195] If Goldberg is right, this part

---

189. Risk aversion is the usual reason for concentration of offsetting risks in a
single firm. See Blair & Kaserman, supra note 183, at 91–93.

190. In some long-term contracts, the risk that the contract may produce
significantly different outcomes to the parties is dealt with through "gross inequity"
clauses. See Joskow, Vertical Integration, supra note 12, at 73; Joskow, Price
Adjustment, supra note 38, at 59–60; Marvin O. Young, Construction and Enforcement
of Long-Term Coal Supply Agreements—Coping with Conditions Arising from
Foreseeable and Unforeseeable Events—Force Majeure and Gross Inequities Clauses,
27A Rocky Mtn. Min. L. Inst. 127, 140 (1982); Weintraub, supra note 144, at 17
(reporting that 41.9% of respondents had contracts with renegotiation clauses covering
substantial deviation in contract and market prices). Typically, these clauses provide for
mandatory arbitration if the contract results in grossly uneven losses to the parties.
Some clauses also provide for arbitration in case of grossly uneven gains. Such terms
may reduce the divergence between individual and joint risk, but their indefiniteness
and the cost of invoking them makes them very imperfect solutions.

191. Aluminum Co. of Am. v. Essex Group Inc., 499 F. Supp. 53 (W.D. Pa. 1980).

192. See id. at 58.

193. See id.

194. See id. The fixed component of the production charge—4¢ out of a base price
of 15¢ per ton—was not indexed.

195. See Goldberg, supra note 30, at 537–38.

of the payment may have represented Alcoa's opportunity cost in 1967 of expanding its facility to serve Essex. This cost would bear no necessary relationship to Alcoa's eventual cost from the lost opportunity to sell aluminum at a greatly increased price.[196]

The comparison of a cost-pricing requirements contract with other contracts is not simple. A cost-pricing requirements contract imperfectly regulates precaution, investment, and performance. While such a contract may reduce the cost of contracting by aligning individual and joint risk, this alignment is far from perfect. Nevertheless, this type of contract may be more attractive than the alternatives. Uncertainty may make it costly or impossible to negotiate a fixed-price contract, and even a fixed-term contract regulates performance imperfectly.

VI. REGULATING PERFORMANCE UNDER OPEN TERMS

This analysis does not suggest any single or simple approach to regulating performance under open terms. One obvious possibility is to test performance under the joint-maximization rule. However, this rule does not always create the perfect incentives: it ensures optimal performance only if enforcement is perfect and free. Imperfect and costly enforcement may induce an agent performing under such a rule to expend more or less effort than is optimal.[197] Even with perfect and free enforcement, the rule may induce an agent to be too cautious or not cautious enough in contracting. An agent may be too cautious if he does not reap the entire return from his investment,[198] yet he may not be cautious enough if his principal relies on the contract.[199] Moreover, if a principal does not reap the entire return from his investment, he may under-invest even if the agent can be trusted to perform in a manner that maximizes joint return.[200] Enforcement problems may further skew precaution and reliance by principal and agent in either direction. Nevertheless, the analysis does provide some guidance on how courts should enforce contracts with open terms, and this Part shows how the analysis helps resolve some imporant current issues.

---

196. The actual issue in *Alcoa* was whether Alcoa was to be relieved from its contract on grounds of impracticability, mistake, or frustration of purpose. Alcoa won in the trial court and the case was settled before appeal. Goldberg criticizes the result. See id. at 529. I think the case was rightly decided, though explaining why would take me beyond the scope of this Article. *Alcoa* raises the difficult question of when, if ever, courts should revise formally complete contracts to ensure gains are shared. Briefly, I would revise the price term in *Alcoa* because I think a rule that allows courts to intervene to correct malfunctioning price adjustment terms which result in significant losses is likely to reduce contract costs by making it safer to use such terms.

197. See supra notes 71–84 and accompanying text.

198. See supra notes 136–139, 162–165 and accompanying text.

199. See supra notes 126–135, 158–160 and accompanying text.

200. See supra notes 162–164 and accompanying text.

A. *Why Courts Should Enforce Open Terms*

Courts should enforce contracts with open terms because such terms significantly reduce the costs of contracting. One argument against enforcement is that people who use vague terms may not take into account the costs they impose on others, in particular on the courts.[201] Parties may use vague terms because the savings to them in contract costs outweigh their expected enforcement costs. However, they will not consider that courts also bear enforcement costs and that these public costs may outweigh the parties' private savings. According to this argnment, the result is a net social loss.

This is an economic argument for the now (happily) discredited doctrine that courts ought not enforce indefinite contracts,[202] but it is not persuasive. Typically, people who use open terms care greatly about enforcement costs. They take pains to reduce the risk and cost of litigation. Price adjustment terms, mandatory renegotiation clauses, and arbitration provisions all serve this function. Further, litigation is the type of remote risk that people are unlikely to value accurately.[203] While there is no reason to think there is a bias in risk-assessment leading people to over-value litigation risks, the effect of such error is likely to be so large in comparison to the effect of ignoring social costs that even a small bias toward over-valuing litigation risks could swamp the effect of ignoring social costs. In addition, people may not consider the social benefit in the precedent the litigation may provide to guide others in the future. Finally, at most the argument suggests that some contracts with open terms ought not be enforced because the social cost of enforcing open terms outweighs the private savings from their use. Yet this fact will not hold true for all contracts with open terms, and it will probably not hold true for many. Thus, a universal rule of nonenforcement is overinclusive: it may deny private gains from the use of open terms that would have exceeded the social savings in avoiding litigation. A partial rule of nonenforcement is even worse; it denies private gains from the use of open terms haphazardly, without producing any clear social gain, since the rule itself will be a source of litigation.

Another argument against open terms is that such terms sometimes enable one person to take advantage of another's ignorance, unsophistication, or misplaced trust. For example, there is a risk that an agent who performs under a negligence term will not warn his principal

---

201. See Ayres & Gertner, supra note 4, at 97–98 (arguing in favor of "penalty defaults" to help parties internalize ex post litigation costs).

202. A recent case refuses to enforce a promise to use best efforts in negotiations because of the lack of a definite standard of performance. See Pinnacle Books, Inc. v. Harlequin Enters., Ltd., 519 F. Supp. 118, 121–22 (S.D.N.Y. 1981). But cf. Channel Home Ctrs., Grace Retail v. Grossman, 795 F.2d 291, 299 (3d Cir. 1986) (enforcing promise to negotiate in good faith).

203. See supra note 73.

of risks in reliance.[204] Contracts that vest a party with undue discretion in performance are also troubling. An example is a fixed-price requirements contract with a jobber who may freely manipulate quantity to take advantage of changes in market price.[205]

Special rules may be justified to deal with these cases, if the rules can be closely tailored so that they do not threaten the gains from the use of open terms. To deal with nondisclosure of risks under contracts with negligence-like terms, courts might provide an action for negligent misrepresentation in contract formation.[206] The action would lie if the agent knew or should have known of risks that would have affected a principal's reliance, and the agent failed to warn the principal of such risks. There is precedent for such a rule in the area of medical malpractice: even if a doctor competently performs a procedure, he may be held liable for failure to warn of risks attendant to the procedure.[207] Of course, such an action should be limited to cases analogous to the doctor-patient relationship, where the principal is less informed than the agent about the risks inherent in reliance. Furthermore, a sophisticated principal should be expected to protect himself against unknown risks of reliance by demanding a minimum guarantee or its equivalent.[208]

To deal with the opportunistic jobber, courts could refuse to enforce requirements contracts in which the price may deviate significantly from the market price and in which the quantity is not otherwise constrained by the nature of the buyer's operations. There is precedent for such a rule: historically, it was in such output and require-

---

204. See supra Part IV.A.

205. See Crane v. C. Crane & Co., 105 F. 869, 872 (7th Cir. 1901) (quantity of oak lumber involved in the contract in question is not "capable of approximately accurate forecast"); Oscar Shlegel Mfg. Co. v. Peter Cooper's Glue Factory, 132 N.E. 148, 149–50 (N.Y. 1921) (agreement held invalid because it lacked mutuality).

206. An alternative is to presume that an agent is strictly liable for a principal's opportunity cost or reliance loss. Cf. Globemaster, Inc. v. Magic Am. Chem. Corp., 386 F.2d 420 (6th Cir. 1967) (holding that a requirements buyer of adhesives under a contract of indefinite term could terminate the contract at any time if it purchased the seller's closing inventory). However, this solution is generally undesirable. Principals who want such protection may obtain it contractually through minimum take or other minimum payment terms. See supra note 159. Further, protecting reliance outside the contract creates the risk that principals will over-rely since they may be able to recover for losses that were not communicated to the agent.

207. See, e.g., Harnish v. Children's Hosp. Medical Ctr., 439 N.E.2d 240 (Mass. 1982). Actions for negligent misrepresentation in contract negotiations sometimes prevail, but there are many doctrinal hurdles. See Mark P. Gergen, Liability for Mistake in Contract Formation, 64 S. Cal. L. Rev. 1, 34–36 (1990).

208. Reliance also may affect the interpretation of ambiguous performance guarantees. If a principal relies on an ambiguous guarantee, we may presume a guarantee to induce the agent to clarify the risk. Cf. USM Corp. v. Arthur D. Little Sys., Inc., 546 N.E.2d 888, 896 (Mass. App. Ct. 1989) (holding that a best efforts term did not negate express warranties in a case where the buyer relied on the warranties), appeal denied, 550 N.E.2d 396 (Mass. 1990).

ments contracts that courts found no mutuality of consideration.[209]
The rule is also similar to the U.C.C. rule that treats a firm offer as
binding only for a three-month period, a time limitation diminishing
the risk that the market price will vary significantly from the offer
price.[210]

    However, the costs of such a rule would probably outweigh the
benefits. A seller may enter into a seemingly one-sided requirements
contract because he trusts the buyer, a trust that may be cemented by
concerns for reputation or for future dealings. The rule would void a
requirements contract even when a buyer is trustworthy, and thereby
compel parties to negotiate terms to constrain the buyer's discretion
even in situations where formal constraint is not necessay. Further,
sellers may try to use the rule to renege on contracts that buyers have
honored. The rule denies the benefit of the open term in cases where
the buyer is trustworthy and the seller is not, imposing costs in perfor-
mance and litigation.

B. *Why Joint Maximization Should Be the Benchmark Standard of Performance Under Open Terms*

    Courts should use the rule of joint maximization as the benchmark
standard in regulating performance under open terms unless the con-
tract or well-established presumptions clearly indicate otherwise.[211]
The usual arguments for imposing a lower standard are without merit.

---

    209. See *Crane*, 105 F. at 872; *Oscar Shlegel Mfg.*, 132 N.E. at 149–50.
    210. See U.C.C. § 2-205 (1977). The Restatement (Second) of Contracts also
dispenses with the requirement that an option be supported by consideration. It
requires that the option be in writing, have purported consideration, and be of
"reasonable" terms. See Restatement (Second) of Contracts § 87(1) (1979).
    211. Courts often test performance against customary or traditional practices.
Custom is relied on in enforcing the covenants in mineral leases, see 5 Williams &
Meyers, supra note 44, § 832.1 (discussing duty to drill additional wells to hasten
production), "best efforts" terms, see Arnold Prods., Inc. v. Favorite Films Corp., 176 F.
Supp. 862, 866, 867–68 (S.D.N.Y. 1959), aff'd, 298 F.2d 540 (2d Cir. 1962); cf. Bloor v.
Falstaff Brewing, 601 F.2d 609, 612 & n.4, 615 (2d Cir. 1979) (using sales of similar
beers to test performance under best efforts clause and as a measure of damages), and
the duty of good faith, see Gregory v. Scorcia, 493 F. Supp. 984 (S.D.N.Y. 1980); U.C.C.
§ 2-103(1)(b) (1977) (defining good faith for merchants as "the observance of
reasonable commercial standards of fair dealing in the trade."). Customary norms may
approximate the ideal, especially if they can be drawn from parts of the industry where
there is no conflict of interest in performance.
    How close a standard of due care approximates Hand's formula is a contested issue
in torts. Cf. Landes & Posner, supra note 7, at 85–87, 96–107 (arguing that the Hand
formula accurately states the legal standard of negligence). The conflict between the
reasonable person standard and the Hand formula is most squarely presented when the
customary practice is inefficient. Helling v. Carey, 519 P.2d 981 (Wash. 1974), raises the
issue in a medical context. The court found it was negligent not to test though this was
the customary practice, but does not discuss costs and benefits. For different views on
the case, see William B. Schwartz & Neil K. Komesar, Doctors, Damages and Deterrence:
An Economic View of Medical Malpractice 5 (1978); Richard N. Pearson, The Role of

A common argument for a lower standard is that parties use open terms because they want discretion in performance.[212] To the contrary, parties often use open terms because it is too costly to specify the manner of performance in the contract, not because they desire unregulated discretion in performance.

Another argument for a low standard is that a high standard will cause agents to over-perform for fear of incurring liability.[213] This argument also fails to withstand scrutiny. Even under a joint-maximization standard, agents will have an incentive to under-perform unless performance is very risky and damages for breach are not discounted for risk, or unless there is a particular reason to think that litigation costs may encourage over-performance.[214] Yet another argument is that a sharing arrangement gives an agent an adequate incentive to perform.[215] This too is wrong, unless performance is lumpy.[216]

Custom in Medical Malpractice Cases, 51 Ind. L.J. 528, 528–29 (1976) (*Helling* stands for the "proposition that professional custom no longer determines the standard of care").

212. The assumption that the absence of specific performance terms in a mineral lease means that the lessee intended to reserve discretion to himself is one reason courts gave for adopting a subjective, good faith standard. See 5 Williams & Meyers, supra note 44, § 806.2 (citing Brewster v. Lonyon Zinc Co., 140 Fed. 801 (8th Cir. 1905)). Occasionally courts acknowledge that parties use open terms to be able to pursue their own interests, and then scrutinize performance nonetheless. See Van Valkenburgh, Nooger & Neville, Inc. v. Hayden Publishing Co., 281 N.E.2d 142, 144–45 (N.Y.) (stating that a best efforts term allows publisher to pursue its own interests but may not act in a way that is strongly inimical to the author's interests), cert. denied, 409 U.S. 875 (1972).

213. See Zilg v. Prentice-Hall, Inc., 717 F.2d 671, 681–82 (2d Cir. 1983) (arguing that publishers will make too great an effort in publishing books if held to a high performance standard like best efforts); Williams, supra note 85, at 3 (criticizing implied covenant of further exploration in oil and gas law on ground that it will induce lessees to over-develop leases).

214. See supra notes 70–73 and accompanying text. For a situation in which a peculiar concern with litigation costs may justify a lower standard, see *Zilg*, 717 F.2d at 676. *Zilg* argues that the litigious bent of authors would make publishers especially fearful of litigation under a high performance standard and so cause them to over-perform. The case also suggests that there is evidence that publishers do behave in this way by publishing books of no value with limited advertising to placate authors.

215. See id. at 680 (arguing that publisher has sufficient incentive to promote book once it is in print because of its share of return).

216. See supra notes 45–69 and accompanying text. The decision in *Zilg*, 717 F.2d at 681, gets this point precisely backwards. The court ruled that a publisher is under a limited obligation once it completes the first printing of a book and expends sufficient funds on advertising to give the book a reasonable chance of success. Once this is done, the author may establish breach only if he can show that factors other than business judgment influenced the publisher. The court reasoned that once a publisher makes a significant investment in a book, the publisher has adequate incentive to print and promote the book to recover its investment. This argument is clearly wrong on the facts in *Zilg*, and is an example of the sunk cost fallacy. Once a book is in print, cost and return appear incrementally. We would expect a publisher under no performance obligation to perform below the level that maximizes the parties' joint return, because it bears the entire cost of producing and selling but reaps only part of the gain. Before it is

In many situations, the law requires a party to consider the other party's interest in performing, but does not specify how much weight must be given to those interests. For example, the standard of "best efforts" is poorly defined.[217] This problem is exemplified by the various definitions in *Bloor v. Falstaff Brewing Corp.*,[218] a leading case involving an express best efforts term. The defendant purchased the plaintiff's beer labels, trademarks, and distribution facilities; paid a royalty based on sales of the plaintiff's brand; and promised to use best efforts to maintain sales of the brand. The District Court opined that best efforts required the defendant to exert itself "to the extent of its total capabilities," and found the defendant did not meet this standard. The Court of Appeals affirmed, but it based its decision on the ground that the defendant had acted indifferently to the plaintiff's interests.[219] The Court of Appeals also said that the defendant did not have to take "financially disastrous" steps or "spend itself into bankruptcy,"[220] and cited as authority a leading New York case holding that best efforts entails a duty to perform for less profit than expected, unless the loss "would be more than trivial" or would lead to "a bankruptcy or genuine imperiling of the very existence of [the promisor's] entire busi-

---

in print, a book is a lumpy good because it is of little or no value until it is published. A publisher who has invested significant resources in a book might be trusted to carry the book through to publication if it has any chance of success even in the absence of legal sanction (though a publisher may shade on effort that affects the quality of the book). Thus, a stronger argument can be made for loosely scrutinizing a decision to stop a book on which substantial progress has been made and strictly scrutinizing decisions about promoting a book in print.

217. On how best efforts is defined by courts, see Robert E. Scott & Douglas Leslie, Contract Law and Theory 290–92 (1988); Goetz & Scott, supra note 2, at 1119–26. Goetz and Scott also propose a joint maximization rule. They observe that this clarification of the standard probably will not matter in many cases, since uncertainty about the costs and benefits of performance make greater precision in the standard superfluous. Courts must rely on rough indicators of effort, and breach is likely to be found only in a flagrant case. See id. at 1122. For example, in CKB & Assocs., Inc. v. Moore McCormack Petroleum, Inc., 809 S.W.2d 577, 581–82 (Tex. App. 1991), a failure to use best efforts was found because the promisor's plant manager testified that he operated to maximize the dollar value of refined product, without regard to its effect on the plaintiff or on the contract to use best efforts in refining plaintiff's product. Utter indifference is clearly not best efforts. In Burma-Bibas, Inc. v. Excelled Sheepskin and Leather Coat Corp., No. 83 Civ. 4117 (MEL), 1986 WL 13470, at *14 (S.D.N.Y. Nov. 20, 1986), a drastic reduction in promotional efforts under a license was found not to be best efforts. In Leonard v. Koval, 543 N.E.2d 911, 915 (Ill. App. Ct. 1989), a failure to present an application to proper authorities was held not to be best efforts in seeking a zoning ordinance variance. Cf. Triple-A Baseball Club Assocs. v. Northeastern Baseball, Inc., 832 F.2d 214, 227–28 (1st Cir. 1987) (not pressing application for reclassification of baseball club is best efforts when it was clear that application would be denied), cert. denied, 485 U.S. 935 (1988).

218. 454 F. Supp. 258 (S.D.N.Y. 1978), aff'd, 601 F.2d 609 (2d Cir. 1979).

219. See 601 F.2d at 614.

220. See id. at 614–15.

ness."[221] All told there are four quite different standards stated in the two opinions in *Bloor*, ranging from something more than indifference to the other party's interests, to willingness to incur trivial losses for the other party's sake, to willingness to incur losses up to those that imperil one's own existence, to total effort.

This poor definition of "best effort" imposes significant costs with little benefit.[222] It probably increases the range and probability of variance in litigation outcomes, exacerbating the problem of under-performance. A greater variance in the standard probably also increases the likelihood of litigation,[223] and thus the cost of enforcement. Increasing enforcement costs likely suppresses reliance, but has an uncertain impact on performance. Further, the variance in the standard does nothing to help with the problem of under-precaution when information is asymmetric and there is reliance.

Adoption of a rule of joint maximization also would helpfully clarify the definition of good faith in output and requirements contracts. The requirement of good faith in such contracts is thought to entail some duty to consider the other party's interest,[224] but a lesser duty than is imposed by a best efforts term.[225] A recent decision, *Empire Gas Corp. v. American Bakeries Co.*,[226] illustrates how poorly good faith is now

---

221. Feld v. Henry S. Levy & Sons, Inc., 335 N.E.2d 320, 323 (N.Y. 1975).

222. In addition, an explicit joint-maximization rule directs parties to collect information on the costs and benefits of performance; this information ought to at least be relevant to evaluating the quality of performance.

223. See George L. Priest & Benjamin Klein, The Selection of Disputes for Litigation, 13 J. Legal Stud. 1, 16 (1984). See generally Robert D. Cooter & Daniel L. Rubinfeld, Economic Analysis of Legal Disputes and Their Resolution, 27 J. Econ. Literature 1067 (1989).

224. See U.C.C. § 2-306(1) (1977). That there is some duty to consider the other party's interest is implicit in the statement that a requirements buyer may not shut down "merely to curtail losses." See U.C.C. § 2-306 cmt. 2 (1977). Under the UCC, there is an additional objective requirement that quantity cannot be unreasonably disproportionate with stated estimates or prior demands. The latter rule is thought to apply only to increases in quantity demands and not decreases. See Empire Gas Corp. v. American Bakeries Co., 840 F.2d 1333, 1337–38 (7th Cir. 1988); James J. White & Robert S. Summers, Uniform Commercial Code 126–27 (2d ed. 1980).

225. See E. Allan Farnsworth, Contracts 553 (2d ed. 1990) ("[I]t is clear that the duty of best efforts is more onerous than that of good faith.") [hereinafter Contracts]; E. Allan Farnsworth, On Trying to Keep One's Promises: The Duty of Best Efforts in Contract Law, 46 U. Pitt. L. Rev. 1, 8 (1984). But see Paramount Lithographic Plate Serv., Inc. v. Hughes Printing Co., 2 Pa. D. & C.3d 677 (C.P.) (affirming jury verdict that buyer breached requirements contract where it did not use "best efforts" to promote requirements: describing difference in "good faith" and "due diligence" as semantic quibble), aff'd, 377 A.2d 1001 (Pa. Super. Ct. 1977).

As an interpretive matter, an output or requirement term may be recast as an exclusive dealing term. See *Paramount*, 2 Pa. D. & C.3d at 687–88. The output seller gives the buyer the exclusive right to his output; the requirement buyer deals exclusively with the input of the seller. Best efforts is the standard for exclusive dealing. See U.C.C. § 2-306(2) (1977).

226. 840 F.2d 1333 (7th Cir. 1988).

defined in output and requirements contracts. Ironically, the decision is by one of our most economically-minded jurists, Judge Richard Posner.

American Bakeries contracted with Empire Gas to convert 3,000 trucks, or however many it required, to run on natural gas, and to buy gas for those vehicles at a reasonably competitive price. A few days after making the contract, American Bakeries changed its plans and decided not to convert any trucks.[227] The trial court found a breach of contract and awarded Empire Gas the profits it would have made on converting 2,242 trucks and supplying gas for those trucks. The Court of Appeals affirmed, basing its decision on American Bakeries' failure to give any reason for the change of plans.[228] However, Judge Posner's opinion gives little guidance on what reason would suffice. He stated that American Bakeries could halt orders "if it had a business reason . . . that was independent of the terms of the contract or any other aspect of its relationship with Empire Gas."[229] But he also said that not just any business reason would do: American Bakeries could not just decide "that its capital would be better employed in some other investment than conversion to propane."[230] The latter statement implies that American Bakeries was obligated to incur some loss for the sake of Empire Gas, but the opinion does not tell us how much loss. On this crucial issue, Judge Posner only said that the standard of exigency is lower than that for avoiding a contract under the impracticability doctrine,[231] which imposes a very high standard indeed.[232]

No better guidance is provided by the two rules usually defining good faith in output and requirements contracts.[233] These are that a

---

227. American Bakeries eventually converted 229 trucks with equipment purchased elsewhere. See id. at 1338. This did not affect the decision because the purchase was made after the term of the contract.

228. See id. at 1341.

229. Id. at 1339.

230. Id. at 1340.

231. See id.

232. Actual costs 15% to 33% in excess of estimated costs have been rejected as too small to warrant relief under the impracticability doctrine. See American Trading & Prod. Corp. v. Shell Int'l Marine Ltd., 453 F.2d 939, 942 (2d Cir. 1972) (less than 33% increase); Transatlantic Fin. Corp. v. United States, 363 F.2d 312, 319 (D.C. Cir. 1966) (14.4% cost on contract price); Maple Farms Inc. v. City School Dist., 352 N.Y.S.2d 784, 790 (N.Y. 1974) (10.4% cost over contract price); cf. Publicker Indus. v. Union Carbide Corp., 17 UCC Rep. Serv. 989, 992 (E.D. Pa. 1975) (stating that nothing less than a 100% cost increase will do); Drennan v. Star Paving Co., 333 P.2d 757 (Cal. 1958) (denying relief on claim of mistaken bid where bid was 30% less than next lowest bid). Costs ten times estimates have won relief. See Mineral Park Land Co. v. Howard, 156 P. 458 (Cal. 1916) (granting relief because costs were ten to twelve times what was expected); cf. Aluminum Co. of Am. v. Essex Group, Inc., 499 F. Supp. 53, 58–59, 74–75 (W.D. Pa. 1980) (granting relief where net income of between 1¢ and 7¢ per pound was anticipated, yet net loss of 10¢ per pound resulted).

233. See Stacy A. Silkworth, Quantity Variation in Open Quantity Contracts, 51 U. Pitt. L. Rev. 235 *passim* (1990), for an effort to systematize many cases.

party may reduce quantity for a legitimate business reason,[234] but not to avoid an unfavorable price.[235] The problem is defining what makes a price "unfavorable" so that a reduction in quantity in response to price to save money is not a legitimate business reason. There is no clear answer to this question.

A joint-maximization rule clarifies how much loss a requirements buyer must bear for the sake of the seller. Under this rule, American Bakeries could reduce quantity if its gain exceeded Empire Gas' loss. In a case like Empire Gas, where there is no relationship-specific investment, this issue is fairly easy to resolve.[236] A court should first ask

---

234. Northern Ind. Pub. Serv. Co. v. Colorado Westmoreland, Inc., 667 F. Supp. 613 (N.D. Ind. 1987) (Easterbrook, J., sitting by designation), aff'd, 845 F.2d 1024 (7th Cir. 1988), offers a thorough analysis of business justification for a reduction in quantity. A utility greatly decreased purchases of coal under a requirements contract for one of its power plants. Because of a reduction in the spot price of coal and the high cost of transportation (the contract coal came from the West), coal under the contract was much more expensive than other coal. The utility reduced its quantity demands because it took its two highest cost plants off-line and substituted power from smaller (and more efficient) plants and purchases from other utilities. The reduction came about after the Public Service Commission ordered the utility to purchase more power; an action which made it unprofitable to operate large, high-cost plants because they generated surplus power. It seems that the outcome of the case would have been the same under a joint-maximization rule. That the utility would have made the same choice even had it borne the seller's loss on the reduction in quantity is suggested by the fact that at the second plant where the utility decreased production it had to pay the seller damages because it had a fixed-quantity contract. See id. at 628.

Agfa-Gevaert, A.G. v. A.B. Dick Co., 879 F.2d 1518, 1523–24 (7th Cir. 1989), states that the measure of damages for breach of a requirements contract is different from the measure of damages for breach of a best efforts term. This statement would seem to imply a different standard of performance. However, the opinion addresses only the situation where the buyer breaches by buying elsewhere. It holds that those purchases provide the measure of damages. Presumably the court does not mean that a requirements buyer is never liable for damages if he terminates purchases from all sources. If a buyer ignores a requirements term and buys at a cheaper market price, his purchases presumably are close to what he would buy from the seller under a joint-maximization rule (though he may buy less because he adds a premium for damages he may pay because of breaching the requirements contract).

235. For example, if a requirements buyer halts orders because he substitutes one input for another, bad faith will be found if he cannot identify a business reason for the change, such as new production techniques. See, e.g., Andersen v. La Rinconada Country Club, 40 P.2d 571 (Cal. Dist. Ct. App. 1935) (per curiam) (requirements buyer of water held to breach contract when it purchased land to obtain water from well); cf. Southwest Natural Gas Co. v. Oklahoma Portland Cement Co., 102 F.2d 630 (10th Cir. 1939) (requirements buyer of natural gas held not to breach contract when it decreased purchases because it replaced gas-fired boilers with more efficient system utilizing heat from its cement kilns). A requirements buyer may not increase quantity to take advantage of a favorable price if he increases quantity by changing the nature of his operations or by holding for speculation. See, e.g., Orange & Rockland Utils., Inc. v. Amerada Hess Corp., 397 N.Y.S.2d 814, 819–20 (App. Div. 1977).

236. Had the seller in *Empire Gas* made a relation-specific investment (for example, the seller might have invested in facilities at the buyer's plant to convert trucks and to supply gas before the stop order), the analysis is different since the seller's cost of

whether the contract price equals the market price. If contract price equals market price, a court should ask whether the seller has excess capacity at current market conditions. If contract price equals market price and the seller has no excess capacity, the seller suffers no loss on the quantity reduction and the buyer wins.[237] If contract price is above market price or the seller has excess capacity, a court should compare the buyer's gain from the quantity reduction with the seller's loss. This inquiry is similar to asking whether the buyer would have made the same choice had the contract price equalled the market price or the seller's cost.[238] In this situation, the buyer might be asked to produce

completing performance might bear no relation to the market price of conversions. In such a case, a court should compare the seller's loss from the reduction with the buyer's gain.

237. Silkworth, supra note 233, at 276–77, suggests courts look to the discrepancy between contract and market price. Demands by a requirements buyer at the market price may impose a loss on the seller if his production cost is greater than the market price (i.e., the seller cannot compete at the market price). However, such losses are unlikely to occur. There is no incentive for a buyer to deny the seller relief in this situation, since if the buyer does make demands, the seller may be able to cover in the market to avoid loss, and even if the seller cannot cover he should be able to breach without damages because the buyer can cover at no loss. For similar reasons, an output seller probably will not force goods on a buyer at the market price when the buyer does not want the goods.

238. Cf. Lambert Corp. v. Evans, 575 F.2d 132, 138 n.5 (7th Cir. 1978) (suggesting that a requirements buyer cannot avoid obligation because of an expected loss unless it can show that the contract price was not the "tipping point," i.e., that the shut-down would have occurred even had the contract been more favorably priced). If the claim is that a buyer substituted a different input for a requirements input to avoid a high price, a court may ask whether the buyer would have made the same substitution had the price equalled the market price. See Loudenback Fertilizer Co. v. Tennessee Phosphate Co., 121 F. 298, 301–02 (6th Cir. 1903) (contract to purchase requirements of raw phosphate rock; buyer switched to buying already processed phosphate); cf. Feld v. Henry S. Levy & Sons, Inc., 335 N.E.2d 320, 323 (N.Y. 1975) (contract to sell output of bread crumbs by bakery; seller ceased producing bread crumbs and instead sold imperfect bread used to produce crumbs to animal food manufacturers). If the buyer would have made the substitution anyway, then it is likely that the gain to him from the change offsets the loss to the seller from losing sales at the higher-than-market price (this assumes that the seller gets no benefit from selling to the particular buyer).

When market price and contract price diverge, a court also may ask whether the buyer is able to take advantage of this to profit at greater expense to the seller. Sometimes the buyer is unable to do this. Consider Eastern Air Lines, Inc. v. Gulf Oil Corp., 415 F. Supp. 429 (S.D. Fla. 1975). Eastern contracted to buy its requirements of jet fuel at certain locations from Gulf. Price was indexed. However, because of the advent of a two-tier system for pricing gas under which only some gas was price controlled, the index price turned out to be less than the market price. See id. at 434. Gulf complained that Eastern took advantage of this by "fuel freighting." Gulf claimed that Eastern was loading excess fuel at locations served under the contract to reduce purchases at other locations where the market price was paid. The court reached the plausible conclusion that "operating realities" prevented this. See id. at 437. Safety concerns probably prevented underloading fuel at high-cost stops, and the extra fuel consumed carrying excess fuel may have made overloading at low-cost stops unattractive

evidence of its expected return on the conversions and its alternative return.

The requirement that quantity demanded in an output or requirements contract cannot be "unreasonably disproportionate" with stated estimates or prior demands[239] warrants special criticism. This rule applies to restrict quantity increases,[240] but not quantity decreases.[241] It is difficult to justify limiting quantity changes that are of clear positive net value to the parties, merely because such changes deviate from estimates. Such a limitation would impose a certain loss in performance for an often speculative savings in the cost of contract.[242]

This point can be illustrated with *State Department of Fisheries v. J-Z Sales Corp.*[243] J-Z promised to take the output of fish and eggs from the Department of Fisheries, which was estimated at 1,355,000 pounds of fish and 39,000 pounds of eggs, but turned out to be over 2,150,000 pounds of fish and 123,000 pounds of eggs. The contract was for a fixed price, and the glut of fish and eggs greatly reduced their value.[244] The increase in quantity probably is consistent with the rule of joint maximization, for J-Z could better dispose of the fish than the Department of Fisheries. If nothing else, the Department of Fisheries would incur the expense of finding another distributor if J-Z did not take the fish. Thus, allowing J-Z to refuse the fish imposes a definite cost in disposing of the fish.

---

despite the low price. Thus, Eastern may have been unable to take advantage of the low price.

239. See U.C.C. § 2-306(1) (1977).

240. See Harold C. Havighurst & Sidney M. Berman, Requirement and Output Contracts, 27 Ill. L. Rev. 1, 4–7 (1932); John C. Weistart, Requirements and Output Contracts: Quantity Variations Under the UCC, 1973 Duke L.J. 599, 642–46. The UCC may be read in this way since it requires both good faith and consistency with stated estimates or previous course of dealings. There is little clear case authority for the point. Silkworth suggests that in cases where increases have been forbidden as disproportionate there is a lack of business purpose as well. See Silkworth, supra note 233, at 258–60, 266–70.

241. See Fort Wayne Corrugated Paper Co. v. Anchor Hocking Glass Corp., 130 F.2d 471, 473 (3d Cir. 1942) (pre-U.C.C. case holding that requirements buyer may reduce purchases to zero for valid business reasons); Silkworth, supra note 233, at 253 n.131 (collecting many similar cases).

242. If a change in quantity is of no or slight net benefit to the parties, consistency should be required. First, in this situation, there is no standard other than consistency for regulating quantity. Second, in this situation, requiring consistency imposes no cost in performance and may reduce contract costs by reinforcing trust that quantity will not be manipulated.

243. 610 P.2d 390 (Wash. Ct. App. 1980). The actual issue in the case was whether the Department of Fisheries would be held to an accord and satisfaction when it gave to a court for safekeeping a check that had been sent by J-Z in satisfaction of all claims. J-Z won.

244. The potential loss to J-Z is suggested by the fact that it sought to renegotiate a price of $205,000 for the full amount delivered while the Department of Fisheries demanded $418,000 under the contract.

There are two possible economic arguments for forbidding a quantity change notwithstanding its consistency with the rule of joint-maximization; both are weighty, but neither is entirely persuasive in *J-Z Sales Corp.* One reason is administrative: sharp changes in quantity often will violate the rule of joint maximization, since abrupt changes in operations are likely to be costly. Thus, we might require consistency to avoid having to evaluate cost on a case-by-case basis. However, it is difficult to see why this rule should be more than a presumption, and in a case like *J-Z Sales Corp.*, where the seller has no control over quantity and cannot increase quantity to take advantage of a favorable price, and where the good must be disposed of in any event, any such presumption should be overcome.

The other argument for forbidding significant changes in quantity that satisfy the rule of joint maximization is that doing so reduces contract costs. Large changes in quantity, even when efficient, are likely to impose large losses on a party. It is possible that a rule of consistency reduces contract costs by making it unnecessary for parties to deal with the risk of such losses in the contract. But this benefit is speculative. If a party fears disproportionate quantity increases, it may address that risk inexpensively by imposing a ceiling on quantity. A ceiling is less flexible than a rule barring disproportionate increases, but it also is easier to administer and more dependable. A party may not realize there is a risk of an increase—perhaps J-Z did not—but if so, protection from the risk cannot affect her behavior in contracting. Imposing a vague limit on increases is of benefit only if the risk is great enough to be foreseeable, so that a party will rely on such protection, but not so great that the party is better off dealing with it expressly in the contract. This combination may be rare.

C. *Demanding More than Joint-Maximization*

In some cases, the conflict between an agent's interest in performance and the parties' joint interest is so great that a court ought to do more than test performance by a joint-maximization standard. In extreme cases, an agent may be denied the right to pursue the activity that creates the conflict. In other cases, strict liability is in order. This subpart illustrates these solutions.

1. *Denying Agents' Rights That Create Conflicts.* — In rare cases, the best solution to a strong conflict of interest is to eliminate the source of the conflict. An agent may be denied the right to pursue an activity that creates a conflict between his interest and the parties' joint interest. Denial of a right may save a court from having to evaluate the quality of an agent's performance. However, an agent should be denied a right only under two conditions: when denial does not impose a significant real cost on the agent, and when the parties could not be expected to bargain for such a term even though it is in their interest.

Real estate brokerage law offers an example of a case where denial

of a right is appropriate. Some states presume[245] and at least one requires[246] that a broker not be paid a commission until a sale is final. This rule gives the broker an incentive to investigate the reliability of potential buyers,[247] something brokers can do better than sellers. Pre-clearing buyers saves the expense of processing empty offers, including the reduced opportunity to sell to another buyer while a contract is pending. The absence of such a condition in the brokerage contract does not mean that it is not in the parties' joint interest, for brokers have no incentive to include such a term, and sellers often will not realize the need for it.

Denying a right to an agent is inappropriate when such denial would impose a significant real cost on the agent and the restriction sought usually is expressly negotiated. The near universal refusal to imply a term of exclusive dealing in a best efforts contract can be explained on these grounds.[248] *Parev Products Co. v. I. Rokeach &*

---

245. See, e.g., DeFranceaux Realty Group, Inc. v. Leeth, 391 A.2d 1209, 1210–11 (Md. 1978); Tristram's Landing, Inc. v. Wait, 327 N.E.2d 727, 730–31 (Mass. 1975). See generally D. Barlow Burke, Jr., The Law of Real Estate Brokers § 3.6.3 (1982) (characterizing this as minority view). In a state where the broker is entitled to be paid when the contract to buy is signed, the seller may avoid the obligation to pay the broker's commission if he can show that the buyer was not "ready, able, and willing" to buy. See, e.g., Goetz v. Anderson, 274 N.W.2d 175, 179–80 (N.D. 1978) (buyer who is denied third-party financing is not able to buy, and so seller is not obligated to pay commission to broker). Some states hold that a seller who accepts a buyer's offer is estopped to deny his ability to buy. See Burke, supra, § 3.2.2., at 109.

246. See Ellsworth Dobbs, Inc. v. Johnson, 236 A.2d 843, 852–54 (N.J. 1967).

247. Claims of negligence on such grounds have succeeded. See Crutchley v. First Trust & Sav. Bank, 450 N.W.2d 877, 879–81 (Iowa 1990) (broker liable for failure to warn owner of risk on nonrecourse note from buyer). But see McDonald v. Century 21 Real Estate Corp., 390 N.W.2d 68, 71 (Wis. Ct. App. 1986) (broker not liable for failure to prequalify buyer), appeal denied, 393 N.W.2d 544 (Wis. 1986); Vicki Bagley Realty v. Laufer, 482 A.2d 359 (D.C. App. 1984) (broker liable for failure to ascertain creditworthiness of buyer).

248. See, e.g., Van Volkenberg, N & N, Inc. v. Hayden Publishing Co., 281 N.E.2d 142, 144–45 (N.Y.), cert. denied, 409 U.S. 875 (1972). Nevertheless, a recent case implying an exclusive dealing term seems correct. The case is Joyce Beverages v. Royal Crown Cola, 555 F. Supp. 271 (S.D.N.Y. 1983). Royal Crown sought to cancel the cola franchise of Joyce Beverages, a bottler and distributor, on the ground that Joyce Beverage was selling a competing brand. The court concluded that there was an implied obligation on the part of Joyce Beverage under a best efforts contract to sell no products that competed with Royal Crown. The court noted the many conflicts that arise in distributing competing brands, and it emphasized that it is customary in the trade for a distributor to handle only one cola. See id. at 275–77. Further, of the four franchise agreements between Royal Crown and Joyce Beverages, the two new ones had express exclusivity clauses. See id. at 273. In this case, imposition of an exclusive dealing term seems not to be unduly onerous to the agent, and its absence appears to be a product of oversight and not conscious choice. That Royal Crown sought to cancel the franchise, and not to require Joyce Beverages to continue to sell its product exclusively, also may be relevant. Absent a significant relation-specific investment by one or both parties (and nothing in the decision suggests such an investment by either party), implying an

Sons[249] is a well-reasoned decision illustrating both the attraction of and the problem with implying exclusivity. Rokeach gave Parev an exclusive license to sell its recipe for kosher schmaltz (rendered chicken fat). Parev sold the product under its own brand name, Nyafat. About twenty years into the relationship, Parev began to sell Kea, a kosher cottonseed cooking oil. The contract had an exclusivity clause but it did not unambiguously apply to other cooking oils. Canceling the contract was not a viable solution: Nyafat's value was by then dependent upon the Parev tradename and distribution network. Barring Parev from selling other cooking oils also was unattractive: the decline in sales of schmaltz was an industry-wide trend, and prohibiting Parev from selling other cooking oils would have prevented it from carrying an important product line. Rokeach was left with a damage remedy, which also was unsatisfactory given the problems of proving breach and damages. However, there was no clearly better solution to the conflict.

2. *Reversion to Strict Liability.* — The remedy in Parev is interesting. The court ordered Parev to pay Rokeach damages for buyers of Nyafat that switched to Kea.[250] To require Parev to pay damages for any buyers who switched to Kea is not in accordance with a best efforts rule, since Parev might have to pay damages even if it used best efforts to promote Nyafat. In effect, the court required Parev to compensate Rokeach for the likely loss that the introduction of Kea caused the latter, without regard to the quality of Parev's performance. This remedy is a form of strict liability.

Oil and gas law offers another example of a case in which this unusual remedy may be appropriate. The issue arises when a lessor claims that a lessee has failed to protect against drainage by nearby wells that the lessee operates. To recover in this situation, a lessor must generally show that a reasonably prudent operator would have drilled a protective well.[251] Some states impose a greater duty when the lessee also operates the draining wells: they require the lessee to compensate the lessor for drained oil and gas without the lessor's having to prove that a protective well could have been drilled profitably.[252]

This unusual remedy may be justified by two factors. First, there is a strong conflict of interest when the lessee drains a leasehold. Drilling a protective well is often of little or no benefit to the lessee, because such a well may only hasten recovery of oil and gas that the lessee will soon recover anyway. Second, the loss from drainage is more easily

---

exclusive dealing term to give the principal grounds to break off the relationship is likely to be in the parties' joint interest.

249. 124 F.2d 147 (2d Cir. 1941).

250. See id. at 150–51.

251. See Spiller v. Massey & Moore, 406 P.2d 467, 468–69, 471 (Okla. 1965).

252. See R.R. Bush Oil Co. v. Beverly-Lincoln Land Co., 158 P.2d 754, 758 (Cal. Ct. App. 1945); Hemingway, supra note 41, at 474–75. Williams & Meyers, supra note 44, § 824.2, at 146–47, criticize this rule and propose that the danger of opportunistic behavior be dealt with by shifting the burden of proving profitability.

evaluated than the joint return on a protective well. Thus, compensation for drainage is the easiest remedy to administer. It is also least likely to result in performance error.[253]

D. *A Case Study of a Rule in Need of Reform*

One of the most controversial issues in oil and gas law is the extent of a lessee's obligation to explore areas under a lease to determine their mineral-bearing potential.[254] Generally, a lessee can hold a lease with only part in production, as long as production is in paying quantities.[255] The lessee is under a duty to develop a lease prudently, but the lessor must prove that such development would be profitable to the lessee under the normal standard of prudent development.[256] Since it is difficult to establish that exploration would be profitable in undeveloped areas, lessors have had little success in challenging lessees under this standard.

Some states have lightened the standard, requiring a lessor to establish only that a reasonably prudent operator would conduct further exploration. A lessor is not required to show that the lessee would have profited.[257] The usual remedy for breach of this "covenant of fur-

---

253. Owen Anderson tells me that how damages should be measured is an open issue. He suggests four possibilities: first, the royalty on the amount of oil drained; second, the royalty on the oil that would have been produced from the protective well; third, the higher of these numbers; or fourth, the lower of these numbers. The first number may be higher than the second because a protective well would not completely prevent drainage. The second number may be higher than the first because the protective well may increase production over the rate of drainage. My explanation of the rule as a prophylactic to the conflict of interest created by drainage suggests the first number should be damages. That eliminates the conflict. On the other hand, if the payment is meant to produce the same incentives as a joint-maximization rule, then the second number should be damages.

254. For a criticism of the rule, see Williams, supra note 85. Williams argues that the implied covenant will reduce the return on oil and gas production because producers may be required to hasten production though the cost to them far exceeds the return to the lessor. For a response to Williams, see Meyers, supra note 49, § 1.04.

255. See supra note 68 and accompanying text.

256. In Texas, the burden is on the lessor to prove that further production would be profitable (and he must prove that it would be profitable to the lessee as well as to himself). See Clifton v. Koontz, 325 S.W.2d 684, 695 (Tex. 1959). Further, it seems that the duty extends only to proven areas and that a lessee need not explore unproven areas. See id. at 696–97. A later federal case interpreting Texas law suggests that there may be a duty to explore if the acreage involved is large. See Sinclair Oil & Gas Co. v. Masterson, 271 F.2d 310 (5th Cir. 1959), cert. denied, 362 U.S. 952 (1960), but this is contradicted by even later decisions of lower Texas courts, see Atlantic Richfield Co. v. Gruy, 720 S.W.2d 121, 124 (Tex. Ct. App. 1986); Felmont Oil Corp. v. Pan Am. Petroleum Corp., 334 S.W.2d 449 (Tex. Civ. App. 1960). The issue was finally resolved against the lessor in Sun Exploration & Prod. Co. v. Jackson, 783 S.W.2d 202, 204 (Tex. 1989).

257. See North York Land Assoc. v. Byron Oil Indus., 695 P.2d 1188, 1190–91 (Colo. Ct. App. 1984); Sauder v. Mid-Continent Petroleum Corp., 292 U.S. 272, 281 (1934); Doss Oil Royalty Co. v. Texas Co., 137 P.2d 934, 937 (Okla. 1943). The state of

ther exploration" is partial cancellation of the lease to release the unexplored areas.[258] For example, where part of a leasehold has been left undeveloped for a long period of time, and there is credihle evidence that other producers want to explore or develop that part, it may be freed from the lease.[259]

This change is desirable; if anything, it does not go far enough. First, absent any rule requiring exploration and development, the option quality of a lease gives a lessee too little incentive to explore or develop new areas. Because a lessee bears the entire cost of exploration and development and reaps only part of the return, and because he also reaps most of the gain if the market price of the mineral goes up, he has a strong incentive to hold property out of production to speculate on an increase in price, even though the expected return of development to the parties jointly or even to him individually is positive.[260]

Second, even if a court were to impose a joint-maximization rule, we still would expect a lessee to have an incentive to under-perform because of the character of the remedy for breach—cancellation of the lease in unexplored areas.[261] Courts will err in evaluating exploration decisions under a joint-maximization rule, but if that error is unbiased (and there is no reason to assume a bias), we would expect it to induce lessee's to under-perform because the remedy, release, is similar to discounted probabilistic damages.[262] That even a joint-maximization rule would result in under-performance means that a move to such a rule from an even weaker rule ought to result in an improvement in performance with little risk of inducing over-performance.

Third, the covenant of further exploration is less onerous than a rule of joint-maximization. The general rule, requiring a lessor to show that a measure would be profitable to a lessee to establish breach of the operating covenants, is itself too generous to lessees; under a joint-

---

Oklahoma has since rejected the covenant. See Hemingway, supra note 41, at 456–59; Mitchell v. Amerada Hess Corp., 638 P.2d 441, 449–50 (Okla. 1981). See generally Meyers, supra note 49. Hemingway reports that partial cancellation may apply horizontally (i.e., to undeveloped tracts) or vertically (i.e., to undeveloped depths or formations). See Heminway, supra note 41, at 492.

258. See 5 Williams & Meyers, supra note 44, § 844. One way to get a sense of the covenant's scope is to consider the facts of a case that the authors criticize as "extreme" and an "unbridled application of a duty to explore." See id. § 824.4, at 276–77. The case is Humble Oil & Ref. Co. v. Romero, 194 F.2d 383, 386 (5th Cir. 1952). The lessee was held to breach the covenant to explore on the basis of a two-year delay and the testimony of one other producer that he would explore further. The authors apparently find two years to be too short a grace period and the testimony of one witness insufficient to establish that a reasonably prudent operator would explore.

259. See 5 Williams & Meyers, supra note 44, § 844.3, at 329–30.

260. See supra notes 49–51 and accompanying text.

261. It might be troubling if partial cancellation could result in competition against a lessee on formations in production, but it seems that line-drawing has not been a problem. See 5 Williams & Meyers, supra note 44, § 844.2, at 328–29.

262. See supra notes 76–78 and accompanying text.

maximization rule the test is whether the joint return is positive. The covenant of further exploration moves closer to a joint-maximization rule, allowing a lessor to establish breach by showing that other operators would explore the area. But even this standard falls short of a joint-maximization rule, since those other operators would discount the return by the royalty they would pay the owner.

A simpler and even more radical solution to the problem of lessees holding leases out of production may be in order: a rule automatically canceling a lease, after the primary term, in areas not under production.[263] Canceling a lease in areas not under production resolves the conflict between the lessee's interest and the parties' joint interest by restricting the lessee's rights. Automatic cancellation avoids inquiry into what a prudent operator would do. Further, it ensures that ripe areas are developed.

There is, however, a line-drawing problem. It may not do simply to cancel a lease for formations that are not in production, since prudence may require gradual extension of development. For example, a lessee may plan to drill a well to a deeper deposit once a shallower deposit is exhausted. However, these line-drawing problems are solved in leases today through retained acreage clauses.[264] These solutions may be duplicated.

The existence of express retained acreage clauses should not deter courts from implying similar restrictions. Courts traditionally have played an active role in formulating the terms of mineral leases. Many of the terms in the modern lease—in particular the implied covenants— are judicial innovations.[265] The active role of courts is appropriate: often lease terms are not bargained over and landowners are unsophisticated. Further, in many cases involving the covenant to explore, the lease was entered into fifty or more years ago. Parties should not be expected to have anticipated the problem of the lessee's lacking incentives to develop properly, particularly in leases entered into prior to the adoption of conservation laws in the 1930s, which control competition

---

263. No state takes this approach, though occasional cases interpret ambiguous leases to provide for partial cancellation. See, e.g., SMK Energy Corp. v. Westchester Gas Co., 705 S.W.2d 174, 176 (Tex. Ct. App. 1985).

264. For such a clause, see Hanscome v. Coppinger, 331 P.2d 590, 592 (Kan. 1958); Humphrey v. Seale, 716 S.W.2d 620 (Tex. Ct. App. 1986); Mayfield v. de Benavides, 693 S.W.2d 500, 502–03 (Tex. Ct. App. 1985); Hemingway, supra note 41, at 547; Eugene O. Kuntz et al., Cases and Materials on Oil and Gas Law 774 (1986); Ernest Smith, Developments in Nonregulatory Oil and Gas Law, 38 Inst. on Oil & Gas L. & Tax'n, 1-1, 1-22 to 1-23 (1987). It is common to provide for division of a lease if part of it is under a pooling arrangement (this is an arrangement where multiple leases are pooled for joint production, often hy state regulation). These sometimes are called "Pugh" clauses. See 5 Summers, supra note 44, 83–85.

265. See 3 Williams & Meyers, supra note 44, § 601.4, at 10 (observing that the modern lease evolved over time with the assistance of courts and "satisfies the reasonable requirements of both lessor and lessee").

for oil and gas in common pools and so reduce the pressure on lessees
to develop leases.

E. *The Limits of Reform*

A wholesale revision of contract terms and legal rules to enforce a
joint-maximization rule is not in order. Because of the problems with a
joint-maximization rule, it is best if parties define their own perfor-
mance obligations, for courts are not likely to do better. Courts ought
to respect a contract that imposes a lower standard of performance un-
less they do not consider it the product of free and intelligent bargain-
ing. Thus, licensing contracts between equals that expressly disclaim
any duty of the licensee to maximize royalties ought to be, and are,
respected.[266]

Further, courts ought not alter well-established and clear interpre-
tive presumptions that are inconsistent with the joint-maximization rule
if people are able to contract around the rule.[267] That sophisticated
parties have not contracted around such a rule suggests that it is not in
their interest to do so. And even if a different interpretive rule seems
preferable, the transition cost in moving to a new rule often outweighs
the benefits of that new rule.

One such rule is the presumption in percentage leases that a lessee
who pays a minimum rent has no further obligation to maximize
rents.[268] It is not clear what the best rule is for regulating use in per-

---

266. See, e.g., Turner v. Johnson & Johnson, 809 F.2d 90, 97 (1st Cir. 1986); VTR,
Inc. v. Goodyear Tire & Rubber Co., 303 F. Supp. 773, 777–79 (S.D.N.Y. 1969).

267. The general view is that background rules should mimic the terms that
informed, attentive parties would choose. See Charles J. Goetz & Robert E. Scott, The
Limits of Expanded Choice: An Analysis of the Interactions Between Express and
Implied Contract Terms, 73 Cal. L. Rev. 261, 320 (1985). Under this view, background
rules are set so that the parties need not worry about spelling out every detail of a
transaction. That background rules should mimic what would be desired by most
people follows naturally from the proposition that these rules save people from having
to express their desires more fully. This result assumes that we know what rule is in
peoples' interest. If we do not know, any clear rule that satisfies the interest of a
significant number is sufficient since parties who dislike the rule may avoid it.

268. See Fifth Ave. Shopping Ctr., Inc. v. Grand Union Co., 491 F. Supp. 77, 80
(N.D. Ga. 1980); Carl A. Schuberg, Inc. v. Kroger Co., 317 N.W.2d 606, 610 (Mich. Ct.
App. 1982); Mercury Inv. Co. v. F.W. Woolworth & Co., 706 P.2d 523, 532 (Okla. 1985);
Woodland Theatres, Inc. v. ABC Intermountain Theatres, Inc., 560 P.2d 700, 703 (Utah
1977). Some cases suggest a more particularized inquiry. See Professional Bldg. of
Eureka, Inc. v. Anita Frocks, Inc., 2 Cal. Rptr. 914, 916 (Ct. App. 1960) (adequacy of
minimum return is jury question); Kretch v. Stark, 193 N.E.2d 307, 310 (Ohio 1962)
(16% minimum return suffices); see also Farnsworth, Contracts, supra note 225, at
315–16 (stating rule as settled). Timothy J. Muris, Opportunistic Behavior and the Law
of Contracts, 65 Minn. L. Rev. 521, 566–68 (1981), has a good discussion of problems
of opportunism and good faith in percentage leases.

In other contexts, a minimum guarantee may not presumptively eliminate further
performance obligation. Compare Reback v. Story Prods., Inc., 181 N.Y.S.2d 980 (Sup.
Ct. 1958), aff'd, 193 N.Y.S.2d 520 (App. Div. 1959) (holding that a minimum royalty in a

centage leases. Under the traditional rule, a lessee may under-use property when its use results in a rent above the minimum, since the lessee reaps only part of the return from additional use. Yet the traditional rule may be desirable if other factors suffice to induce optimal use by a lessee. For example, a tenant may be a franchisee who operates on a standardized basis, and who cannot adjust effort in response to the rent term.[269] Or it may be desirable because a lessee is sensitive to cost or to the risk of error in enforcing a more stringent standard. Even if we could determine what rule was likely to optimize returns in most cases, this rule might not be the best background rule. Courts might choose a different rule to compel the parties to address the issue explicitly in the contract.[270]

Courts do not have the time, the information, or (in some instances) the sophistication to determine case by case what obligation the parties intended in a percentage lease[271] or what obligation is in the parties' best interest. A clear rule is necessary, and while the existing background rule on percentage leases may not be the rule we would have adopted had we begun with a clean slate, the arguments for a different rule are not compelling enough to justify setting aside such a well-established rule. Adoption of a new rule is costly, creates litigation during the transition, and requires parties to decide and state whether

---

licensing contract does not foreclose best efforts obligation), and Vacuum Concrete Corp. v. American Mach. & Foundry Co., 321 F. Supp. 771, 773–74 (S.D.N.Y. 1971) (holding that a minimum royalty with entire understanding clause does negate further obligations). Maximum and minimum purchase clauses in output and requirements contracts are thought to protect the promisee and do not eliminate the duty of the promisor to act in good faith in setting quantity. See Tennessee Valley Auth. v. Imperial Professional Coatings, 599 F. Supp. 436, 439 (E.D. Tenn. 1984).

269. Cf. Slater v. Pearle Vision Ctr., 546 A.2d 676, 680 (Pa. Super. 1988) (holding that franchisee must open store in mall to satisfy obligation in percentage lease).

270. See Ayres & Gertner, Filling Gaps, supra note 4, at 97–98. This may be done, for instance, when one party has better access to relevant information than the other to compel disclosure. For example, even if it is in the parties' joint interest for a promisor to be liable for all damages that flow from breach, we may want a background rule of immunity for unusual damages to compel the promisee to disclose such damages to the promisor. Ayres and Gertner describe such counter-preferential background rules as penalty defaults. See id. at 97. More recently, Ayres and Gertner show that minor changes in assumptions about market power and transaction costs may significantly change the optimal background rule, a point that makes the design of optimal rules daunting. See Ayres & Gertner, Strategic Contractual Inefficiency, supra note 4, at 759.

271. The presence or absence of an obligation to provide a return above the promisee's opportunity cost may he explained by the relative bargaining position of the parties. In some situations, the additional return may be attributable to the lessee. For example, a real estate lessee might get a higher than normal return on a lease because the proximity of the property to his other operations provides unique advantages. In this situation, the lessee could resist a lessor's claim to a legally enforceable entitlement to a return above the going rent. Returns above normal in a percentage lease may be attributable to the lease in some cases. Such would be the case, for example, if a specific type of store in a mall provided a higher than normal return so long as there is only one (this might be true of a cafeteria) and there is more than one competitor to fill that slot.

they want a further performance obligation in every contract while the rule is uncertain.[272]

CONCLUSION

One important lesson of this Article may be summarized as follows: Parties often do better under a contract if they do not create risks for themselves beyond those that are inherent in their joint project. In a world of bounded rationality, where information is limited and costly to acquire and bargaining is costly, alignment of individual and joint risk reduces the cost of contracting because fewer risks need be accounted for in the contract. Norms of sharing and cooperation that some advance on moral grounds[273] turn out to make good economic sense.

To be attractive, open terms must significantly reduce the cost of contracting, for contracts with open terms suffer significant defects. There is an incentive to under-perform in a sharing arrangement when returns are not shared in proportion with cost. If the contract involves a lumpy or step good, the agent's interest and the parties' joint interest in performance may be better aligned, but in few cases will the lumpy nature of the good ensure optimal performance by an agent. A negligence term helps to induce an agent to perform, but such a term is not likely to ensure optimal performance because of problems of cost and error in enforcing it. In particular, if performance is finely graded and the return on performance is certain or damages for breach are discounted for uncertainty, error in enforcing a negligence term is likely to give an agent an incentive to under-perform. Further, reliance creates significant problems under a negligence term, for an agent has too little incentive to take precautions against risks that might result in a loss to the principal.

These qualities are not limited to contracts like mineral leases and contingent-fee contracts for legal services, in which an agent develops an asset for a principal under a negligence-like term and a sharing arrangement. Similar qualities are exhibited by a requirements contract when the price is adjusted to equal the seller's cost, for the price and requirements terms function like a negligence term, by inducing the buyer to a set quantity to maximize the parties' joint return in the immediate period. As in the open-term agency contract, flaws in the mechanism for regnlating performance (that is, flaws in the price adjustment term) are likely to lead to suboptimal performance: parties have too little incentive to take precautions against each other's losses because they do not bear the risk of those losses, and parties are likely

---

272. There is also a troubling distributive problem, for if the new interpretive rule is applied retroactively to leases entered into before the rule change, it shifts wealth from lessees to lessors.

273. See Charles Fried, Contract as Promise 71 (1981).

to be too cautious about investing because they bear the entire risk of loss of the investment but reap only part of the return. The contract may be attractive despite these flaws, since it reduces the cost of contracting by reducing the parties' incentive to test or haggle over risks that will have an offsetting impact on them.

Several incremental changes should be made in the law governing open term contracts. The standard of best efforts in exclusive dealing and other contracts, of reasonable prudence in mineral leases, and of good faith in output and requirement contracts ought to be superseded by a joint-maximization rule, which would require the party with discretion in performance to perform to maximize the parties' joint return. In situations where there is a strong conflict between an agent's interest in performing and the parties' joint interest, courts ought to scrutinize performance more strictly, perhaps making an agent strictly liable for a principal's loss or even denying a principal the right or the privilege that creates the conflict. One situation warranting stricter regulation is oil and gas lessees' failure to explore unproven areas that are held under a lease by production on part of the leasehold.

This Article is about easy cases where parties expressly invite courts to regulate performance by using open terms. Harder questions beckon. When ought courts intervene to adjust obligations in formally complete contracts to ensure parties do not act in ways that reduce their joint returu? When ought courts intervene to redress outcomes that seem grossly unbalanced? These questions are the province of such doctrines as impracticability, mistake, frustration of purpose, and good faith, along with many interpretive rules.