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Publication Date

1999-07-01

School of Law, Boalt Hall

**Program
In
Law and Economics**

Working Paper Series

Working Paper 99-12

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Hadley v. Baxendale

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The Questionable Ascent of *Hadley v. Baxendale*

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The venerable case of Hadley v. Baxendale serves as the prototype for default rules designed to penalize, and thus encourage disclosure by, an undesirable contractual counterpart. Penalty-default analysis is now widely accepted as a plausible approach to the issues presented by incomplete contracts. The ambition of this article is to challenge and refine the accepted wisdom. The article demonstrates that the structure of penalty-default theory as derived from Hadley rests on a faulty implicit premise. The premise is that damages from breach of contract are certain. In fact, damages are stochastic. Consequently, the standard penalty-default model of Hadley overlooks the potential incentive of a party to conceal information even though the party is subject to a penalty-default rule. This incentive, which is shown to exist in other contexts, may greatly complicate the evaluation of a default rule's efficacy. Thus, a lawmaker may have reason to be skeptical of her ability to identify an efficient penalty-default rule, the seeming simplicity of Hadley notwithstanding.

INTRODUCTION

At the center of contract theory is the role of default rules. Contracts are necessarily incomplete and therefore a court or legislature must fill gaps. Recent scholarship has recommended that a lawmaker charged with this task look beyond the individual parties to a contract. This scholarship suggests that a default rule can be designed to induce an equilibrium at which parties of one type accept the default rule while parties of another type, to whom the rule is costly, opt for an alternative contract term and thus reveal their type. When such a rule works as intended, the revealed information permits efficient contractual arrangements and enhances social welfare. Explained this way, as an abstraction, the analysis seems simple and sound. The devil, though, is in the details. A default rule might fail at separation for reasons that have so far escaped scholars. The analysis of default rules thus requires amendment.

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A thorough analysis of default rules designed to induce separation begins with an exemplar, the widely read *Hadley v. Baxendale*.¹ The case is best known for the rule that bears its name:

Where two parties have made a contract which one of them has broken, the damages which the other party ought to receive in respect of such breach of contract should be such as may fairly and reasonably be considered either arising naturally, i.e., according to the usual course of things, from such breach of contract itself, or such as may reasonably be supposed to have been in the contemplation of both parties, at the time they made the contract, as the probable result of the breach of it.²

Recently, this venerable rule has taken on a new aspect. Economic analysts have recognized that the limitation on damages inherent in the *Hadley* rule is merely a default position. A party who will suffer exceptional damages from breach need only communicate her situation in advance and gain assent to allowance so that the damages are unmistakably “in the contemplation of both parties” at the time of contract. The economic question, then, is not whether a damages limitation is inherently sensible, but whether a rational rule would impose the burden of contracting for exceptional damages on those who wish to avoid the limitation. Abundant contract scholarship supplies an explanation of why one might answer this question with a yes.³ The idea is that the party who bears special risks from breach should identify those risks so that the party with whom she contracts is on notice to take the proper precautions wherever necessary. The alternative—broad insurance for all *unless* such insurance is disclaimed—would waste contracting costs for disclaimer in the ordinary case or, absent disclaimer, would yield inefficient precautions taken to avoid indiscernible risks.

1. 156 Eng. Rep. 145 (Ex. Ch. 1854).

2. *Id.* at 151.

3. Though qualifications are often stated. See generally, e.g., Ian Ayres & Robert Gertner, *Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 YALE L.J. 87 (1989) (providing a theory of how courts and legislatures should set default rules); Lucian Arye Bebhuk & Steven Shavell, *Information and the Scope of Liability for Breach of Contract: The Rule of Hadley v. Baxendale*, 7 J.L. ECON. & ORG. 284 (1991) (developing a formal model in which socially desirable behavior of buyers and sellers and their behavior under alternative rules are characterized); William Bishop, *The Contract-Tort Boundary and the Economics of Insurance*, 12 J. LEGAL STUD. 241 (1983) (suggesting that the *Hadley* rule could promote efficient revelation of information); Charles J. Goetz & Robert E. Scott, *Enforcing Promises: An Examination of the Basis of Contract*, 89 YALE L.J. 1261 (1980) [hereinafter Goetz & Scott, *Enforcing Promises*] (positing that the limitation on damages for unforeseeable consequences of breach can increase efficiency by stimulating the provision of information between bargainers); Charles J. Goetz & Robert E. Scott, *Liquidated Damages, Penalties and the Just Compensation Principle: Some Notes on an Enforcement Model and a Theory of Efficient Breach*, 77 COLUM. L. REV. 554 (1977) [hereinafter Goetz & Scott, *Liquidated Damages*] (noting that precontractual disclosure of idiosyncratic value can result in more equitable damages); Gwyn D. Quillen, *Contract Damages and Cross-Subsidization*, 61 S. CAL. L. REV. 1125 (1988) (analyzing contract damage limitation rules and the problem of cross-subsidization).

From *Hadley*'s apparent lesson of efficient precautions, "penalty-default" theory has been drawn.⁴ A penalty default is a rule intended to encourage opt-out by a party with private information that she will disclose when contracting for an alternative to the rule. In *Hadley*, a party who will suffer exceptional loss from breach is denied damages for such loss if her contract is silent. She can avoid the default rule by proposing that the contract include insurance against exceptional loss. With this proposal, she identifies herself as someone at risk of such loss and permits her counterpart to take, and charge for, efficient precaution. Penalty-default theory abstracts from the damages term at issue in *Hadley*. In principle, the theory may explain or justify any rule that is particularly costly for a party with private information she would like to conceal. Such a default rule may force the disclosure of information that will yield efficient contractual relationships, such as efficient precaution in *Hadley*.

Possible topics for penalty-default rules, suggested by scholars, range from simple terms, such as a provision controlling the method of contract acceptance, to more complex terms, such as a provision that determines a fiduciary's duty of disclosure.⁵ The potential use of a penalty-default rule is not limited to the revelation of information about the party induced to reject the default term. For example, a penalty-default rule might encourage a party knowledgeable about legal rules to explicitly opt out of the default and thus inform her potentially ignorant counterpart of the term that will govern their contract.⁶ Separation of parties by type, then, is not the only objective of penalty-default theory. It will, however, occupy virtually the entire analysis here.

Penalty-default theory represents a departure from traditional contract theory, which instructs a lawmaker to fill any gap in a contract with the term fully informed parties would have adopted explicitly had they addressed the contingency in question.⁷ The objective of such instruction is to save the

4. The term "penalty default" was coined in Ayres & Gertner, *supra* note 3.

5. These examples are taken from the seminal article on this topic. *See id.* at 105-06, 119-21; *see also* PETER V. LETSOU & LARRY E. RIBSTEIN, *BUSINESS ASSOCIATIONS* 26-27 (3d ed. 1996) ("The law imposes liability on an undisclosed principal in order to force the principal to come out into the open and clearly disclaim its liability, rather than forcing third parties to investigate whether this situation exists.").

6. *See* Robert E. Scott, *A Relational Theory of Default Rules for Commercial Contracts*, 19 J. LEGAL STUD. 597, 610 (1990) (discussing an implied warranty of fitness); Ayres & Gertner, *supra* note 3, at 98-99 (noting that a default rule could be set against an informed real estate broker rather than an uninformed seller); Victor P. Goldberg, *An Economic Analysis of the Lost-Volume Retail Seller*, 57 S. CAL. L. REV. 283, 295-96 (1984) (discussing a dealer purchasing from ordinary customers). Also, a default rule of nonenforcement may penalize both parties to a contract and thus induce them to leave few gaps in their agreement rather than rely on the government subsidized court system to fill gaps. *See* Ayres & Gertner, *supra* note 3, at 95-97 (discussing zero-quantity defaults).

7. *See, e.g.*, RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 82 (3d ed. 1986) ("The task for a court asked to apply a contract to a contingency that the parties did not foresee is to imagine

parties the cost of explicit agreement.⁸ Penalty-default theory offers that a potentially more important objective can be the disclosure of information by a party who has anticipated the disputed contingency. Thus, penalty-default theory can support the rule in *Hadley*, for example, even if a party at risk of exceptional loss in that case would *not* contract for that rule's limitation on liability.

There is no question that a penalty-default rule can, in principle, be an optimal rule. Thus, there is no question that penalty-default theory represents an advance beyond traditional theory.⁹ There is question, however, about the scope of this advance, which this article narrows. Others have identified limitations on the efficacy of penalty-default rules. The literature notes potential inefficiency from acceptance of such a rule by those who face high contracting costs,¹⁰ from rejection of the rule by those who spend too much on explicit contracting,¹¹ and from acceptance of the rule by those who possess private information but lack the market power to prevent exploitation of that information by others.¹² Yet, it will be shown here that these qualifications do not go far enough. Even as qualified, the models of *Hadley* in prior work are inaccurate in a way that tends to overstate the potential efficacy of a penalty-default rule.

As typically modeled, the *Hadley* default rule serves to distinguish two contractual types who differ in a single respect. In the model, the common type places a low value on contract performance and will, therefore, suffer low damages in the event of default. The exceptional type places a high

how the parties would have provided for the contingency if it had occurred to them to do so.”); Charles J. Goetz & Robert E. Scott, *The Mitigation Principle: Toward a General Theory of Contractual Obligation*, 69 VA. L. REV. 967, 971 (1983) (“Ideally, the preformulated rules supplied by the state should mimic the agreements contracting parties would reach were they costlessly to bargain out each detail of the transaction.”).

8. For a description of potential contracting costs, see Oliver Hart & Bengt Holmström, *Theory of Contracts*, in *ADVANCES IN ECONOMIC THEORY FIFTH WORLD CONGRESS* 71, 112-19 (Truman F. Bewley ed., 1987) (noting, among others, the costs to bargainers of asymmetrical information).

9. Since the term “penalty default” was used in Ayres & Gertner, *supra* note 3, it has been quoted, often reverently, in more than one hundred articles. For examples of such reference, see Lawrence A. Cunningham, *Hermeneutics and Contract Default Rules: An Essay on Lieber and Corbin*, 16 CARDOZO L. REV. 2225 (1995) and Mark P. Gergen, *The Use of Open Terms in Contract*, 92 COLUM. L. REV. 997 (1992).

10. See Bebchuk & Shavell, *supra* note 3, at 290 (stating that a no-communication equilibrium under a limited-liability rule cannot be optimal).

11. *Id.* (observing that a communication equilibrium under a limited-liability rule may not be optimal).

12. For a discussion of the case where the party who seeks to conceal private information lacks bargaining power, see generally Ian Ayres & Robert Gertner, *Strategic Contractual Inefficiency and the Optimal Choice of Legal Rules*, 101 YALE L.J. 729 (1992); Jason Scott Johnston, *Strategic Bargaining and the Economic Theory of Contract Default Rules*, 100 YALE L.J. 615 (1990); and Alan Schwartz, *The Default Rule Paradigm and the Limits of Contract Law*, 3 S. CAL. INTERDISC. L.J. 389 (1994). See also Part III *infra*.

value on performance and will, therefore, suffer high damages in the event of default. Under a rule of expansive liability, conditions can exist such that the high-value type will conceal her true nature, pay a price for performance that would be appropriate to an average party, and then collect the full level of damages should her counterpart breach. Under the limited-liability default rule of *Hadley*, in contrast, the high-value type loses every incentive to be confused with the low-value type, as she can never collect the full measure of damages. Therefore, in this standard model, unless the high-value type fears exploitation from the party with whom she contracts, she has an incentive to defect from the default rule so that she may seek extra protection for her interests in the contract. If the transaction costs of such defection are sufficiently low, defection will occur and will be efficient. Thus, under the assumptions of the standard model, one might easily conclude that a penalty-default rule enhances social welfare.

The assumptions of the standard model, however, are not particularly rich. Consider the rule in *Hadley* under the realistic assumption that value, and thus damages, are not certain but stochastic. If damages are stochastic, a high-value type can be described not as a party who will suffer high damages in the event of breach, but as one who is highly *likely* to suffer damages in the event of breach. More precisely, a high-value type might be described as a party more likely than a low-value type to suffer *at least* any specified level of damages. Under these circumstances, a high-value type could decline to contract explicitly for expansive liability, however low the transaction costs. Such defection from a limited-liability default would induce her counterpart to charge not only for the higher level of anticipated liability, as is assumed in the standard *Hadley* model, but for the higher probability of even ordinary liability. The charge would not be the product of market power but would reflect the revealed actual cost of efficient service and expected liability. A high-value type can avoid the full cost of service and expected liability if she accepts the default rule and remains indistinguishable from the low-value type. The high-value type will weigh the expected cost against the expected benefit from inclusion in a "pool" with low-value types. The cost is limited protection for a valuable shipment. The benefit is a subsidy from low-value types. Depending on this balance, the penalty-default rule may not yield separation from the pool even if the transaction costs of defection do not present an obstacle. And if a pool is inevitable, it may be efficient for the pool to form on an expansive-liability rule, where the average precaution taken would reflect the full value of performance, not merely the value up to a liability limit.

This enriched *Hadley* model thus illustrates that an efficiency-minded lawmaker's choice of default rule is not simple. The potential for a pool on a penalty-default rule weighs against adoption of such a rule. This is so because, if a penalty is borne, the default rule has not done its work and can

impose a cost. A correct determination of whether or to what extent a pool on a penalty-default rule will form in equilibrium requires information about the extent of the subsidy a pool would provide for high-value types. A determination of this subsidy, in turn, depends on perhaps unobtainable information about the full range of each type's expected damages from breach. Thus, an accurate evaluation of a penalty-default rule's efficacy in the *Hadley* setting could be a heroic task.

The lawmaker's task would be particularly difficult in the case of a partial-pool equilibrium. Such a pool is possible in a model that assumes homogeneity among parties of a type because the subsidy each high-value party receives from an equilibrium-pool price varies inversely with the number of such parties in the pool. (The fewer high-value types mixed with the low-value types, the more the average pool member resembles a low-value type.) Consequently, it can be an equilibrium for some, but not all, high-value parties to sacrifice expansive liability for the subsidy a limited-liability pool provides. Because it would not be clear *which* high-value parties would defect—limited data might dictate an assumption of homogeneity by type—it would not be clear *whether* the parties would achieve any equilibrium derived from such a model. A lawmaker asked to set a default rule might well lack information about the refinements parties would use to set prices and other contract terms.

With these difficulties in mind, a creative lawmaker might attempt to force separation through a damages default rule different in nature from that adopted in the *Hadley* case. For example, a judge might attempt to induce separation with the adoption of a case-invariant liquidated-damages default. Under such a rule, the victim of a breach would receive the *average* damages that a low-value type would suffer, regardless of actual damages. This rule would eliminate the stochastic nature of a damages award and would cause the high-value types to defect, just as they would under conditions described by the standard *Hadley* model. But a liquidated-damages default rule could be less than ideal for the low-value types who remained subject to it. *Actual* damages from breach remain stochastic even where a rule or contract term fixes an award. Consequently, for parties subject to a liquidated-damages award, the price of breach need not equal the value of performance, and a party could have an incentive to behave strategically in light of the liquidated-damages amount. In a simple example, where a liquidated-damages award was substantial, a putative victim might fabricate a claim of breach even where actual breach would have caused no injury. Similarly, a party who would benefit more from a liquidated-damages award than from performance might request an excessive payment for consent to terminate a contract that had become inefficient. Such strategic behavior could yield costly negotiation or litigation. Moreover, if parties to a contract are risk averse, liquidated damages could be costly inasmuch as such damages im-

pose a risk of undercompensation from breach, a risk not present to the extent an award reflects actual damages.

Given that *Hadley*, when properly modeled, is problematic for penalty-default theory, it is not surprising that an attempt to generalize from *Hadley* is also problematic. In principle, one could extend penalty-default analysis, derived from the *Hadley* case, to a situation where a default rule would punish adherence by a different sort of “high-cost” type than that of the high-value shipper in *Hadley*. This high-cost type would be an unattractive contractual partner not because she would suffer high damages if her counterpart breached, as in *Hadley*, but because she would *impose* high uncompensated damages from her own breach. Any potential contract term that systematically disfavored this high-cost type would be a candidate for a penalty-default rule. Such an extension of penalty-default analysis is possible, but the efficacy of a penalty-default rule would be no easier to determine in that case than in the enriched version of the *Hadley* model. In the extended case, as in the enriched *Hadley* model, a high-cost type might accept the cost of a penalty-default term rather than defect and lose the subsidy associated with the anonymity of a pool. (Little elaboration is required to establish that one likely to injure others would not freely confess this trait.) Thus, reticence to defect would again pertain regardless of transaction costs. And the consequences for a lawmaker of a subsidy from a pool on the penalty-default rule, including the difficulty of multiple equilibria, would replicate those of the enriched *Hadley* model.

Only in the oversimplified standard *Hadley* model can a penalty-default rule transparently banish the subsidy from a pool and with it the real-world problems of information asymmetry. Under circumstances that reach beyond the standard *Hadley* model, the efficacy of a penalty-default rule becomes more difficult to assess. The ascent of *Hadley*, then, from a case in an introductory text to a source of general theory, may have been too high, too fast.

These ideas are explained in detail below. Part I of this article describes penalty-default theory, also known as information-forcing default theory, as it has grown from a standard model of *Hadley v. Baxendale*. Part II seeks to expand penalty-default analysis by applying it more broadly, first to a stochastic-damages model of the *Hadley* case itself, and second to a model of uncompensated damages imposed by a party in breach. The default contract term chosen for the second model is sales exclusivity in franchise agreements, the provision at issue in the well-known case of *Empire Volkswagen v. World Wide Volkswagen Corp.*¹³ These models do not yield a prescription for a return to traditional default theory, but they do illustrate previously unidentified limits to the usefulness of penalty-default rules. Part III places these newly identified limits in the context of earlier penalty-default scholar-

13. 814 F.2d 90 (2d Cir. 1987).

ship. The article concludes with a remark about judicial versus legislative competence in the establishment of default rules and a statement of general skepticism about the use of a penalty-default rule to induce separation of types when other considerations, including the revelation of other information, favor an alternative rule.

I. THE STANDARD MODEL OF *HADLEY V. BAXENDALE*

A default rule properly designed to elicit information from one party to a transaction would penalize the better-informed party for failing to contract around the rule. Such a party would disclose the relevant information to avoid the penalty. Charles Goetz and Robert Scott note this point without labeling it.¹⁴ Ian Ayres and Robert Gertner elaborate on the concept, which they call “penalty” default or “information-forcing” default, and incorporate it into a market equilibrium analysis,¹⁵ as do Lucian Bebchuk and Steven Shavell.¹⁶

However identified, the analysis of penalty-default rules begins with a case familiar to all first-year law students, *Hadley v. Baxendale*.¹⁷ In *Hadley*, a miller hired a carrier to transport a crankshaft essential to running his mill. The carrier delayed the transport and the miller sued him for substantial consequential damages of lost profits while the mill stood idle. The court denied the miller’s claim, reasoning that the carrier was not liable because he could not reasonably have foreseen that the miller would lose such profits from delay.

In the simplest model of the case, carriers operate in a competitive industry. When suppliers compete, in equilibrium, they charge their customers just the costs of operation. Any net value from a transaction is passed through to customers. As a result, given the assumption of carrier competition, shippers such as the miller in *Hadley* benefit from or bear the consequences of the legal rules that govern transactions between carriers and shippers. For this standard model, assume also that shippers are of two types, high-value and low-value. Each shipper is risk neutral and knows her own circumstances as well as the legal rules. A shipper may defect from a default rule but must incur a transaction cost to do so. A high-value shipper will suffer a high level of consequential damages if her package is not delivered. Therefore, it would be efficient for a carrier to take a high level of precaution against loss of a high-value package. A low-value shipper will suffer a low

14. See Goetz & Scott, *Enforcing Promises*, *supra* note 3, at 1299-1300.

15. See Ayres & Gertner, *supra* note 3, at 91-95.

16. See Bebchuk & Shavell, *supra* note 3; see also Eric Posner, *Contract Remedies*, in *ENCYCLOPEDIA OF LAW AND ECONOMICS* (Boudewijn Bouckaert & Gerrit De Geest eds.) (forthcoming).

17. 156 Eng. Rep. 145 (Ex. Ch. 1854).

level of consequential damages if her package is not delivered. Therefore, it would be inefficient for a carrier to take a high level of precaution against loss of a low-value package. The value of shipment to either shipper type exceeds the cost of a high-value shipment. Therefore, all packages will be shipped. The model supposes that carriers have limited knowledge. Although each carrier knows the aggregate characteristics of shippers as a pool as well as the relevant legal rules, no carrier can identify a shipper as high-value or low-value from a mere observation of the shipper or her package.

A court within this model, faced with a claim from the loss of a high-value package and a contract silent on damages, would have to choose between expansive and limited liability as the default rule. Choice of the former would provide the shipper with full compensation while choice of the latter would deny full compensation. Traditional default-rule theory recommends that a lawmaker provide the term for which the parties would have contracted explicitly.¹⁸ Adoption of such a term would relieve the parties of the transaction costs necessary to consider in advance and contract for contingencies about which they may lack information at the time of contract formation.¹⁹ In the absence of contract transaction costs, the parties, if fully informed at the time of contract, would have chosen expansive liability so that the carrier would have the proper incentive to avoid shipment loss,²⁰ the *ex post* consequences of which the carrier would bear. The carrier would charge for the appropriate precaution and it would be in the interest of the shipper to pay for this. Under these circumstances, then, traditional theory would have the judge award full damages. Traditional theory notwithstanding, the *Hadley* rule of the standard model would deny damages for the excess of high-value over low-value loss if high-value shipments were unusual. That is, the model treats the loss of unusually high value as unforeseeable unless the high-value shipper explicitly communicated the risk of such loss to the carrier.²¹

An efficiency analysis can, under certain circumstances, support the rule in *Hadley* as modeled. Given the parties' information asymmetry, anticipation of the alternative, expansive-liability rule could cause high-value ship-

18. *See* note 7 *supra*.

19. *See* note 8 *supra*.

20. It is assumed that carrier liability is necessary to induce efficient precaution because it is assumed that precaution itself is not contractible. That such liability might include shipper moral hazard is beyond the scope of this and subsequent models described in this article.

21. One might argue that the *Hadley* rule, properly interpreted, would exclude all consequential damages, regardless of shipper type, or include all consequential damages, regardless of shipper type. This argument rests on the conclusion that *Hadley* treats the type of *damages*, not the type of breach victim, as either unforeseeable or foreseeable. Thus, lost profits, for example, would either be unforeseeable and not awarded at all or foreseeable and awarded in their entirety. Nevertheless, a limitation on damages by amount, based on shipper type, is the interpretation of *Hadley* employed by the standard model described in the text. The merits of the competing interpretations are discussed below. *See* notes 40-44 *infra* and accompanying text.

pers strategically to conceal their type at the time of contract. Such strategic behavior could yield an inefficient pooling equilibrium. To see this, assume that there are many more low- than high-value shippers, such that the blended price for all shipments entitled to expansive liability would not be substantially above what shippers would pay for limited liability.²² If the carriers offered this blended price, the low-value shippers might prefer to contract for limited liability and the lower price. Yet communicating a desire for such a contract would cost something. If the transaction costs of this communication exceeded the savings from a lower price, the low-value shippers would not contract for limited liability but would ship anyway if the blended price were not greater than the benefit of shipment.²³ The high-value shippers would then receive the protection of expansive liability without paying the full cost.

As a consequence of pooling on an expansive-liability rule, the industry would waste resources, with carriers taking slightly too much precaution for low-value shipments and too little precaution for high-value shipments,²⁴ while some high-value shipments would be needlessly delayed or lost. (Another cost of a pool on expansive liability—inefficiently low demand by low-value types and inefficiently high demand by high-value types—is avoided in the model by the assumption that each shipper of either type will ship in a pool or in separation.²⁵) These costs of an inefficient pooling equilibrium are

22. The price would blend because of the carriers' inability to take the correct precaution for, and charge the right price for, each shipment. The carriers would rationally respond to ignorance by charging every shipper for the average precaution and average expected loss of the pool. If there were many more low- than high-value shippers in the pool, the risk of loss from the high-value shipments would have only a small effect on the average.

23. The term "communication costs" to describe the transaction costs of defection from a default rule is from Bebchuk & Shavell, *supra* note 3, at 285.

24. Whether carriers would in fact take more than low-value precaution for each shipment, which in a pooling equilibrium would have some small probability of being high-value, would depend on whether the possible levels of precaution are continuous or discrete. See Ayres & Gertner, *supra* note 3, at 110 n.106. It is assumed here that possible levels are continuous.

25. If the model permitted types to vary on a continuum, the blended price from a pool on expansive liability, inflated to low-value shippers, would discourage those shipments that are only marginally worthwhile when priced at true cost. This result is relatively straightforward. It takes a bit more imagination to see how such a blended price, deflated to high-value shippers, could increase demand for shipments. At first glance it might seem that no high-value shipment would be forgone in separation while a shipment of lower value occurs. And if no shipment is forgone in separation, then a pool can encourage no shipment. The solution to this puzzle lies in a deconstruction of "value" as used in the simple model. Assume that an item has a value of \$100 in a shipper's hands and a value of \$110 if it arrives safely at its destination. If shipment of this package has more than a \$10 minimum combined cost of precaution and expected loss given precaution, shipment should not occur and will not in separation. But now assume that this package will be in an expansive-liability pool with another package that has a value of \$5 in the shipper's hands and a value of \$10 if it arrives safely at its destination. This latter item could be worth shipping even at a low level of precaution and with a chance of loss that would be economically unacceptable for the more valuable item. If the two items are pooled, the lower blended price for shipment of the high-value item might induce the owner of that item to ship, with full insurance, despite the inefficiency of such

not ordinary contracting transaction costs. In this shippers' pool, there would be *no* such cost attributable to the liability question—no one would opt-out of the expansive-liability default rule. Counterintuitively, a potentially more efficient default rule, the *Hadley* rule of limited liability, could *increase* contracting transaction costs. Under the *Hadley* rule, a high-value shipper must communicate her desire for expansive liability or accept limited liability. If high-value shippers contracted for expansive liability, they would incur communication costs that a shippers' pool would not impose. The result of high-value shipper communication, however, would be that carriers would take more appropriate, less expensive precautions with low-value shipments and properly protect high-value shipments with extra precaution.

The efficacy of the *Hadley* rule, therefore, depends here on whether high-value shippers would defect from a limited-liability default rule and thus separate the shippers' pool.²⁶ In the standard model, separation depends on transaction cost: A high-value shipper would contract for expansive liability unless the costs of communicating her preference for such liability were prohibitive. The alternative would be the shipment of high-value packages under pool-average precaution without insurance for the true value of the package. By hypothesis, a high-value shipper would value extra precaution more than such precaution costs. If transaction costs permitted, high-value shippers would contract around the *Hadley* rule and thus produce a state of complete or partial separation, depending on whether all or some shippers affordably could communicate their preference.²⁷ Consequently, as a group, shippers would save all or some pooling inefficiency costs for the expense the few high-value shippers would incur by contracting around the default rule.²⁸

shipment. For simplicity, the standard *Hadley* model ignores the effects of a pool on marginal shippers, as do the models presented below. Analysis of the subsequent models makes passing reference to this issue. Other consequences of the two-type assumption are discussed in note 27 *infra*.

26. For the sake of precision, it should be noted that this is strictly true only because it is assumed that the quantity of shipments does not vary with the default rule. *See id.* and accompanying text.

27. The standard model could, more realistically, include a continuum of types rather than just two types. In this case any damages limitation that induced defection by only higher-cost types would leave some pooling among the types that declined to defect from the default rule. Moreover, some of the lowest-cost types might defect to achieve an even lower limitation. Nevertheless, the basic insights of the two-type standard model would be applicable to the relationship between any one type and any amalgam of other types. At least as long as the distribution of types is not perfectly symmetric, one might reasonably refer to the thinner tail of the distribution as the exceptional type, the high-value shippers in this model. Thus, the two-type standard model purports to illustrate the incentives of parties even in a multiple-type model. *See* Bebchuk & Shavell, *supra* note 3, at 308 (“[W]e would come to the same general conclusions, but with some variation in detail.”).

28. *See id.* at 302; *see also* Ayres & Gertner, *supra* note 3, at 101-04 (describing efficient separation); Bishop, *supra* note 3, at 254-60 (discussing *Hadley* and the transfer of information); Goetz & Scott, *Liquidated Damages*, *supra* note 3, at 578-79 (discussing the efficiency of liquidated-damages clauses).

This said, a limited-liability default rule would not *necessarily* be superior to an expansive-liability default. Separation will not occur at all if transaction costs of defection are prohibitive. Lucian Bebchuk and Steven Shavell observe that, in this case, a pool on expansive liability would enhance social welfare. This is so because under expansive liability carriers would take precaution to reflect the actual aggregate value of shipments in the pool, while under a limited-liability default, carriers would have limited responsibility for loss and would thus account only for the value calculated as if all shipments were low-value shipments. A limited-liability rule, therefore, would yield an unnecessary underinvestment in precaution.²⁹ Bebchuk and Shavell also make the more subtle observation that a limited-liability default can be suboptimal even where transaction costs are not prohibitive and the default *does* induce separation by high-value shippers. They show that the communication costs for the high-value shippers might exceed the pooling inefficiency costs from blended precaution in a pool on expansive liability.³⁰ Put simply, in the standard *Hadley* model, limited liability puts high-value shippers to the choice between low precaution from the pool and full precaution from defection. This difference in value between low and full precaution might exceed the high-value shippers' transaction costs, and they would defect. From a social welfare perspective, however, the difference between appropriate precaution for each shipment under a limited-liability rule and the blended precaution for all shipments under an expansive-liability rule might not justify the transaction costs that the former rule would induce the high-value shippers to bear. A pool on expansive liability, if possible, would thus be superior.³¹ Nonetheless, if transaction costs are low and the appropriate precaution for a few high-value packages is significantly different from the appropriate precaution for many low-value packages, and thus significantly different from the blended precaution, separation would maximize social welfare.³²

In sum, the *Hadley* limited-liability rule may yield greater wealth than an expansive-liability rule because the *Hadley* rule, unlike the alternative, can induce all or some high-value shippers to identify themselves as such. Once a carrier can distinguish high-value from low-value shippers, he can take the

29. See Bebchuk & Shavell, *supra* note 3, at 296.

30. *Id.* at 291.

31. *Id.* at 290. Bebchuk and Shavell make additional points not discussed in the text. For example, they describe a situation in which the limited-liability default rule is superior to the expansive-liability default rule even where there will be no separation. This is the case where the low-value types would defect from, and thus destroy, an optimal pool on expansive liability. See *id.* at 302-03. In this case, a limited-liability default, though superior to the alternative, would not serve a penalty function, the main topic of this article, but would more traditionally minimize transaction costs. Consequently, for the sake of exposition, I leave further analysis of this and related circumstances to the excellent work of Bebchuk and Shavell.

32. See Ayres & Gertner, *supra* note 3, at 108-18.

appropriate precaution for each package and charge each shipper for that precaution. Thus, the most efficient default rule need not be the one that provides parties the terms for which they would have contracted explicitly. The *Hadley* default rule can be efficient because it *does not* provide high-value shippers the rule for which they would have contracted. And an efficient default rule need not be one that minimizes aggregate transaction costs of contracting. The *Hadley* limited-liability default can be efficient even though the expansive-liability default would *eliminate all* transaction costs. Thus, under specified assumptions, the *Hadley* rule is superior to expansive liability not because it helps parties avoid ordinary contracting costs, but because it forces the disclosure of information.³³

II. TOWARD A GENERAL THEORY

The elegant simplicity of the standard *Hadley* model suggests not only that the rule in *Hadley* could have been correct for that case, but that the rule might easily be generalized to form a broad penalty-default theory. Ian Ayres and Robert Gertner claim as much in their exposition of the case.³⁴ After all, there is nothing apparently special about carriers and shippers, or even about rules on damages. Whatever the content of a contract term, one might imagine a systematic difference in parties' relative attraction to that term. Given such systematic difference, a court or legislature might heed the lesson of *Hadley*, as modeled above, and set the default rule on a term disfavored by the type of party who seeks to benefit from the anonymity of a pool with other types. If the cost of a disfavored term is sufficiently large, the party that disfavors the default term might contract for a more appropriate one and efficiently separate the pool. Thus, the generalization of the standard *Hadley* model seems straightforward.

Appearances can be deceiving, however. By hypothesis, a penalty-default rule induces separation of good types, or "low-cost" contract partners, from bad types, or "high-cost" contract partners. In the standard *Hadley* model, a high-value shipper is a high-cost type because she would suffer unusually high damages if the carrier breached, damages the carrier would be responsible for under a rule of expansive liability. In the standard model, it is assumed that these damages would be suffered with certainty in the event of breach. But this assumption is deceptively strong. Recall that the damages at issue in *Hadley* were consequential: A miller lost substantial business profits from the failed delivery of his package. The court believed that these consequential damages were unforeseeable. In reality, though not in the standard *Hadley* model, consequential damages may be uncertain as well as unforeseeable. A lost package may or may not cause lost profits de-

33. For a rigorous presentation of this model, see generally Bebchuk & Shavell, *supra* note 3.

34. See Ayres & Gertner, *supra* note 3, at 101-04.

pending on a number of contingencies in the business that relied on the delivery. Imagine, for example, that the miller in *Hadley* had a mechanic working on the mill while the crankshaft was in transit. In that case, whether or to what extent failure of delivery caused consequential damages would depend on the chance of the mechanic's success. This would be the case even if the carrier knew of the potential damages and treated them as ordinary. That is, even foreseeable damages may be stochastic, not certain as assumed in the standard *Hadley* model.³⁵ A party who is unusually likely to suffer consequential damages is a high-cost type even if the level of any such damages would be ordinary. The standard *Hadley* model does not capture this observation.

A party who suffers unusually from breach, moreover, is not the only one properly characterized as a high-cost type for the purposes of general penalty-default theory. One who is unusually likely to breach where there is a chance she will leave a damages claim unpaid, or one who is unusually likely to leave a damages claim unpaid, is a high-cost type, all else equal. The greater the expected deficiency in compensation from breach, the more costly that party is as a contractual partner. Thus, just as a party can be a high-cost type if she is unusual in the probability that she will suffer damages or in the extent of those damages, a party can be a high-cost type if she is unusual in the probability that she will *impose* uncompensated damages or in the extent of those damages. The standard *Hadley* model does not capture this observation either.

As a general theory, penalty-default analysis must account for these additional variants of high-cost type. Considered below, first, is an enriched model of the *Hadley* case where a high-cost type is unusual not merely in the high-level of damages that she might suffer but in the high probability that she will suffer at least ordinary damages. Considered second, based on the well-known case of *Empire Volkswagen v. World Wide Volkswagen Corp.*,³⁶ is a model in which it is assumed that a high-cost type presents an unusual risk of breach or an unusual risk of insolvency that would make full compensation for that breach impossible. The *Empire Volkswagen* model is potentially important, as it offers a hypothetical example of significant transaction costs. Where transaction costs are high, the aggregate costs of defection from a penalty-default rule by the minority high-cost types will be significantly less than the aggregate cost of defection from an alternative rule by the majority low-cost type. Consequently, the potential value of a penalty-default rule is high. The model is probably fanciful, however. Its very im-

35. Richard Craswell and Alan Schwartz note that uncertainty complicates the determination of foreseeability itself. See RICHARD CRASWELL & ALAN SCHWARTZ, FOUNDATIONS OF CONTRACT LAW 77-78 (1994). But analysis of this complication is inapposite to the discussion here.

36. 814 F.2d 90 (2d Cir. 1987).

probability illustrates obstacles to general penalty-default theory where separation of types is the goal.

In each new model, unlike in the standard *Hadley* model, high-cost types would benefit from a pool on a penalty-default rule. More than in the standard *Hadley* model, a lawmaker would find it difficult to determine equilibria and to predict whether the parties would reach any identifiable equilibrium.

A. *Hadley Enriched*

The enriched model of *Hadley* shares most assumptions with the standard model. Like the standard model, the enriched model includes an assumption that carriers operate in a competitive industry thereby requiring all consequences of legal rules to fall on the customers (i.e. shippers such as the miller in *Hadley*). Again, shippers are of two risk-neutral, self-knowledgeable, legally sophisticated types: high-value and low-value.³⁷ As in the standard model, a shipper may defect from a default rule but must incur a transaction cost to do so. Again it is assumed to be efficient for high-value, but not low-value, shippers to obtain high precaution for their packages. And again, each shipper will participate in the market regardless of the rule. As in the standard model, although each carrier knows the relevant legal rules and characteristics of shippers as a pool, no carrier can casually distinguish a high-value shipper from a low-value shipper at the time of contract.

In addition to these assumptions, in the enriched model high-value shippers are, from a carrier's perspective, high-cost contractual partners not because they are certain to suffer a high *level* of damages in the event of breach but because they are more *likely* than low-value shippers to suffer at least *any* level of consequential damages in the event of breach.³⁸ It is further sup-

37. Like the standard *Hadley* model, the enriched *Hadley* model could, more realistically, reflect a continuum of shipper types. See notes 25-27 *supra*. Like the two-type standard model, however, the two-type enriched model illustrates the relationship between any one type and any amalgam of other types. See *id.* The distinction between the standard and enriched models, described below, is in the nature of that relationship.

38. A more detailed model would specify damage distributions by type, such that a high-cost and a low-cost shipper would have continuous distributions with different means. The Appendix formally presents such distributions. The examples described in the text, and the full illustration in the Appendix, are simpler in that they use a product of probability and level to define expected damages by type. This simplified presentation fully captures the model's essence and permits analysis that is easier to follow. Also for the sake of exposition, the assumptions described in the text ignore the role of variance in damages distributions. A high-cost and a low-cost shipper could have distributions that differ not only in mean but also in variance. Where the default rule limited damages, systematic differences in variance by type would affect precautions taken as well as pooling and separating conditions. Thus, if variance of damages distributions were correlated positively or negatively with the means of those distributions, a limited-liability default rule could fail to induce or induce separation even where such a rule would yield a different result under the as-

posed that carriers cannot discover a shipper's type from any level of damages actually suffered.

These additional assumptions can be illustrated with a simple example. Suppose that in the event of a failed delivery, in addition to any direct damages, a low-value shipper has a sixty percent chance of suffering one hundred dollars in consequential damages, while a high-value shipper has a ninety percent chance of suffering two hundred dollars in consequential damages. The first hundred dollars in damages would be likely for either type of shipper, though more likely for the high-value shipper. The second hundred dollars in damages could be suffered only by a high-value shipper and would be highly likely. To make this illustration concrete, imagine that a high-value shipper runs a business that cannot easily mitigate a failed delivery because alternative sources of the shipped item are scarce. Thus, a carrier's breach would often cause a substantial loss of profits in addition to the direct costs of replacement. Imagine in contrast that a low-value shipper can mitigate relatively easily because, for that shipper, alternative sources are more plentiful and thus a carrier's breach would less often cause a loss of profits, which would in any case be less significant.³⁹

A proper analysis of the *Hadley* rule in this enriched model requires an enriched characterization of the rule itself. The standard model treats the rule as a cap on damages set at the worth of a low-value package. Yet the *Hadley* case disallowed lost-profit damages as a *category* of harm because such damages were unforeseeable. The court imposed neither a limit on direct damages, such as the market value of a lost shipment, nor an allowance for any lost-profit damages.⁴⁰ One might criticize the standard model, then, on the ground that it is unfaithful to the law it purports to assess.⁴¹ In response to such criticism, the cap in the standard model could be conceptualized to represent direct loss, common to low- and high-value shippers, with consequential loss a possibility only for high-value shippers. This charac-

sumption that variance is the same for each type. Incorporation of this observation into the enriched model would further complicate the lawmaker's analysis. Given this, one might criticize the assumptions of the enriched model on the same ground that this article criticizes the assumptions of the standard model: oversimplification. But the main insight to be derived from the enriched model is revelation of a more complex relationship between limited liability and separation than the standard model presents. Incorporation of variance differences would in no way detract from that insight.

39. For simplicity, shipper moral hazard is ignored. See note 20 *supra*.

40. See generally *Hadley v. Baxendale*, 156 Eng. Rep. 145 (Ex. Ch. 1854).

41. Cf. Johnston, *supra* note 12, at 642 (disputing the standard characterization of the *Hadley* rule as a cap on damages). Johnston also discusses whether communication of special circumstances alone is sufficient to establish expansive liability, as assumed in the economic models, or whether the recipient of the communication is not liable except to the extent he at least tacitly agrees. See *id.* at 620. For simplicity, this nuance is ignored until the Conclusion *infra*. See note 93 *infra* and accompanying text.

terization would fit the case but would not well reflect reality, as all shippers face some probability of consequential loss.

The enriched model treats the *Hadley* rule as a cap on consequential damages. Although this treatment is at odds with the *Hadley* case itself, *Hadley*'s progeny has at times differed from the progenitor. First, even a court that allows or disallows damages by category will sometimes subdivide consequential damages for the purposes of allowance or disallowance. Such subcategorization may in practice differ little from a cap on the amount of damages. For example, one court interpreted the *Hadley* rule to permit damages for lost profits from ordinary but not unusual sources, the former alone deemed foreseeable.⁴² Thus, a retailer might be permitted to collect damages from lost consumer sales, but not lost sales to other retailers.⁴³ This rule could be translated as an allowance of damages for, say, fifty but not one hundred lost sales. If so, the fact that the limit would be in terms of the lost customers' identities, rather than in terms of a ceiling by dollar amount, would be of no consequence. Second, some courts apply the *Hadley* rule to consequential—as opposed to direct—damages not by category, as in *Hadley* itself, but as a ceiling set at the level of an ordinary victim's loss from breach.⁴⁴ The Uniform Commercial Code applies essentially this rule to a

42. In *Florafax Int'l., Inc. v. GTE Mkt. Resources, Inc.*, 933 P.2d 282 (Okla. 1997), *Florafax*, a floral wire service provider sued GTE, a telemarketer, for lost profits from breach of a service contract. The plaintiff claimed damages from two sources: lost sales directly to consumers and lost sales indirectly through an association with another wire service that was to use the telemarketer's contracted-for services. The Supreme Court of Oklahoma interpreted the *Hadley* rule to provide that "(1) where no special circumstances distinguish the contract involved from the great mass of contracts of the same kind, the damages recoverable are those as would naturally and generally result from the breach according to the usual course of things, and (2) where there are special circumstances in the contract, damages which result in consequence of the special circumstances are recoverable, if, and only if, the special circumstances were communicated to or known by both parties to the contract at the time they entered the contract." *Id.* at 292 (citing 22 AM. JUR. 2D *Damages* § 464 (1988)). The Court went on to award damages that included the indirect lost sales, but only because "GTE knew it would be providing services not only directly for *Florafax*, but for others on behalf of *Florafax*." *Id.* at 293.

43. *See id.*

44. *See, e.g., Drews Co., Inc. v. Ledwith-Wolfe Assocs., Inc.*, 371 S.E.2d 532, 536 (S.C. 1988) (noting in discussion of *Hadley* rule that "means of proving prospective profits include . . . 'yardstick' method of comparison with profit performance of business similar in size, nature, and location"); *Manouchehri v. Heim*, 941 P.2d 978, 984 (N.M. Ct. App. 1997) (noting in discussion of *Hadley* rule that "court may limit damages for foreseeable loss 'in order to avoid disproportionate compensation,'" (quoting RESTATEMENT (SECOND) CONTRACTS § 351(3) (1981))); *Victoria Laundry ("Windsor") Ltd. v. Newman Indus. Ltd.*, 2 K.B. 528 (Eng. C.A. 1949) (limiting lost profits to "normal" damages); *see also* Melvin Aron Eisenberg, *The Principle of Hadley v. Baxendale*, 80 CAL. L. REV. 563, 566 (1992) ("[A]lthough the principle is often characterized as a 'foreseeability doctrine,' the principle as traditionally formulated and applied cuts off most foreseeable damages"). *But see, e.g., H. Parsons (Livestock) Ltd. v. Uttley Ingham & Co.*, 1 Q.B. 791, 805 (Eng. C.A. 1977) (finding that *Hadley* limits the type, not quantum of damages), cited in Eisenberg, *supra*, at 590. Suffice it to say that the rule in *Hadley* is frequently interpreted as a cap on consequential damages.

buyer's consequential damages.⁴⁵ Interpretation of the *Hadley* rule as a cap on damages, then, may fairly be applied to the enriched model's description of consequential damages. In any case, the attributes of the *Hadley* rule as a cap on damages deserve attention, whether such a rule is actual or merely a theoretical conception.

1. *Application of the Hadley rule.*

As a cap on consequential damages, which are *stochastic*, the *Hadley* rule in the enriched model creates incentives that differ from those described by the standard model. Consider the above illustration, where a low-value shipper is sixty percent likely to suffer one hundred dollars in consequential damages and a high-value shipper is ninety percent likely to suffer two hundred dollars in such damages. The first hundred dollars of damages would be foreseeable for either type,⁴⁶ and would thus be allowed for either under the cap. The second hundred dollars, however, which only a high-value type could suffer, would not be deemed foreseeable absent the shipper's pre-contract communication of type.⁴⁷ From a carrier's perspective, even under a rule that limited an award to foreseeable damages, an undisclosed high-value shipper would be a high-cost shipper. This is because a high-value shipper would be more likely than a low-value—and thus low-cost—shipper to claim even limited damages, one hundred dollars in the example. The high-value shipper would simply decline to claim or document damages in excess of the cap and would thus conceal her identity.⁴⁸

As in the standard *Hadley* model, the enriched model presents the possibility of pooling on a rule of expansive liability. There may be many more low- than high-cost shippers, such that the blended price for expansive liability would not be substantially above what low-cost shippers would pay for limited liability. If the carriers offered this blended price, the low-cost shippers might prefer to contract for limited liability and the slightly lower

45. See U.C.C. § 2-715(2) ("Consequential damages resulting from the seller's breach include any loss resulting from general or particular requirements and needs which the seller at the time of contracting had reason to know . . .").

46. It is assumed that as long as some damages of a type—like lost profits—are likely damages of that type are foreseeable unless they are extraordinary in amount. See authorities cited in note 44 *supra*.

47. See authorities cited in note 44 *supra*.

48. The assumptions of this model notwithstanding, it may be possible, in principle, to determine shipper type ex post with ex post investigation of each claim. In practice, however, to avoid essentially random results, such investigation might impose extensive costs on shippers and could not be eliminated in equilibrium, as any no-investigation equilibrium would encourage nondisclosure by high-cost shippers. Consequently, the cost of such determination may fairly be considered prohibitive.

price.⁴⁹ But communicating a desire for such a contract would cost something. If the transaction costs of contracting exceeded the slight savings from a lower price, the low-cost shippers would not contract for limited liability.⁵⁰ The high-cost shippers would then receive the protection of expansive liability without paying the full cost of such protection. As in the standard *Hadley* model, the result would be a blended precaution taken for every package, rather than the appropriate precaution for each package.

As an alternative to a pool on expansive liability, a limited-liability penalty-default rule could be more efficient here, as it potentially was in the standard *Hadley* model. Yet the efficacy of a penalty-default rule is more difficult to assess in this enriched model than in the standard model. The difference is that here, unlike in the standard model, a high-cost shipper would pay a price, *in addition to transaction costs*, if she communicated her desire for expansive liability.⁵¹ This is because a low-cost shipper would not benefit from or contract for expansive liability.⁵² Thus, a carrier would treat such communication as a type of confession and *fully* charge the high-cost shipper for the expansive liability she requested. The high-cost shipper would certainly accept this charge were it limited to reflect protection of her excess *level* of expected consequential damages, the amount over what a low-cost shipper would expect to suffer. For under limited liability, the

49. As the paragraphs that follow in the text explain, it is possible in this enriched model for a pool to form on a limited-liability rule. Thus, the incentive of a low-cost shipper to defect from an expansive-liability default may be less clear than in the standard model, as conditions could exist where the high-cost types would defect as well. Elaboration of this point, which can be ignored without loss of generality, would add little to the discussion. Cf. ERIC RASMUSEN, GAMES AND INFORMATION 205-19 (2d ed. 1994) (discussing signaling games).

50. More precisely, it may be an equilibrium for all low-cost shippers to accept the default term. One might also imagine multiple equilibria, all accept or all defect, for example. These equilibria could coexist if a single low-cost defection would not substantially reduce the defector's price of shipping while the sole remaining low-cost shipper's defection would so reduce the price. Cf. notes 61-66 *infra* and accompanying text. For simplicity, this complication is ignored.

51. A more sophisticated illustration, with a continuous and unbounded distribution of potential damages would present an additional implication. A cap on an award of damages that can have any value will necessarily lead to expected undercompensation of the victim. Therefore, when actual damages are potentially limitless, a limitation on a damages award will lead to insufficient precaution against breach. This said, if a limitation on liability is set so that it will almost certainly exceed a low-cost, but not a high-cost, shipper's damages, the low-cost shipper's expected uninsured loss as well as the consequent precaution shortfall could well be unimportant. Thus, while necessary undercompensation from a damages limitation diminishes the potential value of the rule in *Hadley*, little would be gained from elaboration of this obvious and limited point.

52. In a more sophisticated illustration, where a low-cost shipper could suffer unlimited damages, even a low-cost shipper could have a preference for expansive over limited liability because limited liability would lead to insufficient precaution. But a cap on damages could be set so that its effect on low-cost shippers would be trivial. So this qualification is ignored in the text, though it supports the thesis of this article. *See id.* Apart from a disregard of low-cost damages in excess of limitation, the assumption that no low-cost shipper will defect from a limited-liability default rests on a conjecture that a carrier will not interpret such defection as a signal of low-cost type. Cf. Rasmussen, *supra* note 49, at 205-08. The assumption is conservative, in any case, given the thesis of this article.

high-cost shipper could not protect excess value from performance unless she paid the price to do so. However, some of the price a carrier would charge a known high-cost shipper would include the extra expense associated with that shipper's higher *probability* of even low-level consequential damages. The high-cost shipper can largely avoid this extra expense if she remains in the pool with low-cost shippers. That is, if a high-cost shipper accepts limited liability she will pay only the lower, blended price for precaution to prevent, and insurance for,⁵³ the ordinary level of consequential damages.⁵⁴ Thus, for each high-cost shipper, a decision to contract for expansive liability is complicated: She must weigh the net benefits of added precaution for extraordinary value, on the one hand, against the pool's subsidy for the protection of ordinary value, on the other. Separation, then, is not inevitable in the enriched *Hadley* model even where it would be in the standard model.

The tradeoff that high-cost shippers, and thus carriers, must contemplate in this enriched *Hadley* model should give an efficiency-minded judge or legislator reason to pause before adopting a limited-liability penalty-default rule. If a lawmaker were to adopt such a rule the penalty could be inefficiently borne, rather than avoided, because high-cost shippers would be attracted to the subsidized insurance for the portion of their damages that are ordinary, even at the expense of inefficient precaution for their shipments. If a lawmaker instead adopted an expansive-liability default rule, the high-cost shippers would not be put to this choice. A pool might form on the expansive-liability default, and carriers would provide a blended precaution for each package in the pool. Although no blended precaution can be ideal, because under expansive liability such precaution would account for the full aggregate value at risk, not just the aggregate up to a liability cap, an expansive-liability pool would be socially superior to an otherwise identical limited-liability pool. (Although, in a model that permitted heterogeneity of shipment value within a type, such pools would not in fact be otherwise identical—because the greater subsidy in the expansive-liability pool would yield fewer shipments by low-cost types and more by high-cost types—the differences in quality and quantity of shipments within the pools would not necessarily be significant.⁵⁵) Thus, an expansive-liability pool could be optimal given the applicable constraints.

In the enriched *Hadley* model, therefore, the potential inefficiency of a limited-liability default is not merely the potential inefficiency of the stan-

53. See note 20 *supra*.

54. This assumes that the low-cost shippers will not defect from the default rule and decline liability even for ordinary damages. Such defection could occur if the blended price were high enough. The prospect of such a situation further complicates the choice of default rule. But the complication described in the text is sufficient to support the general thesis of this article.

55. The significance of these effects would depend on the elasticities of demand for the shipment of packages. For a similar qualification of the standard model, see note 25 *supra* and accompanying text.

dard model, where in equilibrium separation might not occur because of prohibitive transaction costs or might occur through expenditure of transaction costs unjustified by the savings from appropriate precaution.⁵⁶ In the enriched model, there is also a concern that in equilibrium separation might not occur *despite* an efficiency gain *sufficient* to justify those transaction costs.⁵⁷ To determine whether separation would occur in equilibrium, a lawmaker within the enriched model would need more than information about the level of damages from breach and transaction costs. The lawmaker would need to know in addition, for each shipper type, the probability that a shipper would suffer any level of damages. In the above illustration, probability attached to only a single level of damages for each type. In reality, every shipper would be subject to a potentially infinite range of potential damages.⁵⁸ The entire range would be relevant to the low-cost shippers' subsidy and thus to a determination of whether a limited-liability default would induce separation.⁵⁹ A lawmaker, who would likely not have the same incentives and resources as carriers and shippers, could find it difficult to acquire and analyze this information⁶⁰—more difficult than estimation of actual damages in an individual case.

There is yet another difficulty presented by the enriched, but not by the standard, *Hadley* model. That difficulty arises from the interdependent nature of equilibrium in the enriched model. In the standard model, the presence of high-value shippers in a pool on limited liability does not affect the carriers' costs of service to that pool. Consequently, the equilibrium price carriers would charge each shipper in a limited-liability pool would not vary with the number of high-cost shippers. Each high-cost shipper in a homogeneous group, then, would be expected to make the same decision: either to

56. See notes 29-31 *supra* and accompanying text.

57. For a rigorous presentation of this result in the enriched *Hadley* model, see the Appendix *infra*.

58. See note 38 *supra* and the Appendix *infra*.

59. A lawmaker would also need such information to determine whether an expansive-liability default would induce high-cost shipper defection. See note 31 *supra*. Faced with the problem of an intractable pool, a court or legislature could, in theory, limit liability to only a fraction of damages even a low-cost shipper might suffer. If this fraction were precisely chosen, the high-cost shippers alone might defect from the default rule because they would suffer from uninsured loss more acutely than would the low-cost shippers. But separation would come at a perhaps substantial cost of insufficient precaution for the ordinary value of low-cost shipments. Cf. note 54 *supra*. The cost of such inefficient precaution would have to be weighed in the balance.

60. One might imagine that a lawmaker could estimate the variance of a damages distribution as easily as the average of such distribution, each from a random sample of actual damages in individual cases. Even if this were so, there would be two dimensions, rather than one, on which an ultimate determination could be inaccurate. In any case, it seems plausible that one might casually form an accurate impression of a distribution's mean without knowledge of its variance. If this is so, an estimate of variance would require greater effort and would be prone to greater error. For example, Americans asked to guess the average height of an American man might come close to the correct answer. Perhaps few, however, would have any idea what portion of such men exceeded, say, six-foot-five-inches.

accept or to defect from the default rule, regardless of what each believed about the decisions of the other high-cost shippers.⁶¹ Decisions would not be as simple in the enriched *Hadley* model, where the equilibrium limited-liability pool price depends on the number of high-cost shippers in the pool. To understand this, note that the greater the number of high-cost shippers who defect from a pool, the more closely the average pool member resembles a low-cost shipper. And the more closely the average pool member resembles a low-cost shipper, the lower price each pool member—including each high-cost nondefector—need pay for protection against an ordinary loss. Any such reduction in price would be an increase in subsidy. To be sure, as a result of defection, the blended precaution taken for each shipment that remained subject to limited liability would decline, and that decline would be costly to a high-cost shipper. But this cost could be less than the increased subsidy. A carrier in a competitive industry would have to keep these factors in mind when he set the price for shipments under the limited-liability default rule. The higher the price, the greater the rate of high-cost shipper defection.⁶² But the greater the rate of defection, the less attractive defection may become. Equilibrium may be reached in the balance.⁶³

If an equilibrium price is based on a rate of defection between zero and one—that is, if the price is not such that either all or no high-cost shippers would defect—it becomes problematic to predict shipper behavior. To see why, assume that shipper decisions are simultaneous. This assumption reflects reality inasmuch as dispersed shippers who contract with dispersed carriers cannot readily observe the terms of contracts by others. Within the constraints of the simultaneity assumption, the enriched *Hadley* model might show, for example, that defection by two-thirds of high-cost shippers is an equilibrium. Yet the model offers no way to identify *which* two-thirds will defect, because it does not distinguish among shippers of a single type. Expressed another way, the model offers no reason to conclude that *any* of these shippers would, or would not, defect at the supposed equilibrium price, to which each shipper is indifferent by hypothesis. Consequently, even seemingly insignificant unmodeled factors could yield results at substantial variance with equilibrium in the model narrowly considered.⁶⁴ Prices would

61. If the standard model were altered to permit heterogeneous transaction costs, partial separation from a pool on limited liability would be possible in that model. See Ayres & Gertner, *supra* note 3, at 113. But such heterogeneity could not affect the equilibrium price offered to a limited-liability pool in the standard model, as such price would be independent of whether, or to what extent, transaction costs discouraged defection. Consequently, shippers' decisions would be independent, and even a partially separating equilibrium would be unique. Compare the potential for multiple equilibria in the enriched model, discussed in the text immediately below.

62. It is assumed that there would be no low-cost shipper defection. See note 52 *supra*.

63. For a more precise description of a partially separating equilibrium, see the Appendix *infra*.

64. Imagine that *A* and *B* are placed in the center of separate rooms. Each is told to walk either to the front or the back of her room. Further, each is told that she will be given a substantial

be set and contracts would be entered, of course. But carriers would be unsure of their ultimate costs and could not easily set an equilibrium price. In any period, therefore, prices might be set too high or too low, with precaution (and, in a more realistic model, demand)⁶⁵ further from efficiency than would result in equilibrium.⁶⁶ Put plainly, the prospect of multiple, partially separating equilibria in the enriched *Hadley* model demonstrates that the model is not rich enough. A lawmaker might well lack the detailed information on shipper idiosyncrasies necessary to enrich the model further. A lawmaker, therefore, could be unable to choose with confidence the correct default rule.

These difficulties in analysis, however vexing, are not a prescription for return to traditional default-rule theory. In the enriched *Hadley* model, every shipper of either type could suffer any level of damages. The types differ only in the probability of damages. To protect the full value of her shipment, every shipper would contract for expansive liability if carrier and shipper were fully informed. A return to traditional theory, therefore, would be nothing more than adoption of an expansive-liability default rule. The en-

prize if she walks to the same side of the room that the other chooses. *A* and *B* are not permitted to communicate. "Both at the front" is an equilibrium, as is "both at the back." But unless *A* and *B* know one another's idiosyncratic tastes and thought processes, random chance suggests that they are as likely to forfeit the prize as they are to collect it. (Frustration at the discovery that virtually every driver has taken the same detour among essentially equivalent alternatives around an accident is another, real-world, example of this phenomenon.) If the rules of the game were different, such that each of *A* and *B* were told that she would collect a prize if they both walked to the front, for example, the significance of idiosyncratic tastes and thought processes might fade to insignificance. Absent unusual phobias or the like, it could be a weakly dominant strategy for each to walk to the front. The former game may be analogous to the enriched *Hadley* model, the latter to the standard *Hadley* model.

65. See note 25 *supra* and accompanying text.

66. This is in essence an argument that equilibrium choice is difficult when there are multiple equilibria in a simultaneous game. It may seem attractive to assume that each low-cost shipper would employ a randomization device to decide whether or not to defect. Mutual use of such a device would achieve equilibrium under the assumption that a carrier would set price accordingly, so that each high-cost dealer would be indifferent among the use of the device, defection with certainty, and adherence to the default rule with certainty. But calculation of the device would be an unnatural and costly way for a shipper to conduct business, particularly because once she created the device the shipper would be indifferent to its use. Rather than rely on shippers' use of an actual randomization device, each carrier might, in principle, design a price at or near the equilibrium price such that when shippers calculate payoffs their minor random errors will lead them, as a group, to behave as if each used a randomization device. Cf. JOHN C. HARSANYI & REINHARD SELTEN, A GENERAL THEORY OF EQUILIBRIUM SELECTION IN GAMES (1988). But it would be difficult accurately to anticipate the errors in the shippers' calculations, and the result could be significant disequilibrium, with many more or many fewer defections than a carrier anticipated. More generally, impulse to unmodeled and perhaps unobservable factors could have a substantial effect on outcome. For an example of a perhaps unobservable factor, consider heterogeneous transaction costs. Such heterogeneity might seem an obvious inducement to equilibrium. Yet if variance in the transaction costs were small, even a minor error in a carrier's calculation of such costs could lead to substantial disequilibrium. It is risky business, for a party or a lawmaker, to predict equilibria induced by factors that cannot be accurately estimated. Cf. note 64 *supra*.

riched *Hadley* model shows that an expansive-liability default is more broadly preferable than previously understood. But an expansive-liability default will not always be superior to a limited-liability default. Thus, the enriched model demonstrates limitations on and complications with penalty-default rules, but offers no easy solution. Even a difficult potential solution, then, warrants attention.

2. *Case-invariant liquidated damages.*

The enriched model presents the problem that the limited-liability rule in *Hadley* may not yield separation in equilibrium even where separation would be efficient. This is so because stochastic damages can confound such separation. In response to the difficulty of stochastic damages, a creative lawmaker could attempt an alternative to limited liability. Rather than establish a cap on damages as a default rule, a lawmaker could establish a case-invariant liquidated-damages default. The liquidated amount could equal the average damages a low-cost shipper would expect to suffer from breach. In the event of carrier breach, a shipper subject to the default rule would receive the liquidated amount, regardless of actual damages. Awards, therefore, would sometimes undercompensate and sometimes overcompensate shippers. By hypothesis compensation would equal expected loss for a low-cost shipper, and a carrier would take the appropriate precautions to avoid such loss. For a high-cost shipper subject to the same damages term, however, compensation would be systematically low, and a carrier's precaution would be insufficient. Significantly, no high-cost shipper would receive any subsidy from the pool under a liquidated-damages default rule, because a high-cost shipper in such pool would receive the same award from breach as a low-cost shipper. (A high-cost shipper would remain more likely to suffer ordinary damages, but actual damages would be irrelevant to the damages awarded.) Because it would create no subsidy, a liquidated-damages default could induce high-cost shippers to defect in a unique, completely separating equilibrium, just as these shippers would defect as a response to limited liability in the standard *Hadley* model. This would be so even if separation would not occur were damages subject to a cap. Thus, despite the presence of actual stochastic damages, a liquidated-damages default can, in principle, both induce carriers to take appropriate precaution for low-cost shipments and impel high-cost shippers to contract explicitly for extra precaution.

A liquidated-damages default would be no panacea, however. By their very nature, liquidated damages create variance between an award from breach and the expected value of performance. Consequently, at the time of performance one party or another may have an incentive to behave strategically. There are numerous reported court cases in which a party against whom market price has moved attempts to cancel a contract based on a fabri-

cated or exaggerated claim that the other party has breached.⁶⁷ A general liquidated-damages default rule could create a rash of similar cases whereby a party who would gain little from performance on a contract—and would thus expect little in an *actual* damages award in the event of breach—could attempt to capture a liquidated award with a fabricated or exaggerated claim of an inadvertent breach. In the *Hadley* context, even a low-cost shipment could require substantial liquidated damages. In this case, a shipper in pursuit of such damages might falsely claim that a carrier's minor error in delivery was a material breach of its contract.⁶⁸ Such pursuit, analogous to rent seeking,⁶⁹ would waste resources of all involved.

In a different circumstance, the anticipated payment of liquidated damages, even to an uninjured party, could dissuade intentional breach where termination of the contract would be efficient. If this occurred, a party who would benefit from cancellation of the contract and the party who would receive a liquidated-damages award from breach—for example, a carrier whose costs have increased and a low-cost shipper, respectively—might expend resources on a negotiated termination of their relationship or permit wasteful performance.⁷⁰

These unnecessary costs might not be offset with the savings that one might ordinarily associate with a liquidated-damages term. Savings from a case-invariant liquidated-damages rule could be small indeed, or nonexistent. In each case subject to such a rule a court would have to classify a low-cost type and determine that class's average damages. Although this process might become simplified with repetition in an industry, the court's task would not be as simple as reading an explicit agreement between parties for case-specific liquidated damages. Excess *ex post* costs would count against the efficiency of a liquidated-damages default rule.

If parties to a contract are risk averse, a possibility despite the simplifying risk-neutrality assumption of the *Hadley* models, liquidated damages can be costly also simply because they impose a risk of undercompensation from

67. *See, e.g.*, *Continental Grain Co. v. Simpson Feed Co.*, 102 F. Supp. 354 (E.D. Ark. 1951) (holding that a two-day delay in the sending of shipping instructions is insufficient justification for contract repudiation).

68. The presence of *trivial* liquidated-damages clauses in actual contracts for the shipment of letters and the like may suggest that the risk of strategic behavior is unimportant when the average value of an ordinary package is too small to justify sustained conflict. Such clauses, however, are not inconsistent with the notion that *substantial* liquidated-damages clauses could prove problematic.

69. Rent seeking refers to the expenditure of real resources in an attempt to acquire a transfer from government. *See, e.g.*, Gordon Tullock, *The Welfare Costs of Tariffs, Monopolies and Theft*, 5 W. ECON. J. 224, 230 (1967); *cf.* Kenneth W. Clarkson, Roger L. Miller & Timothy J. Muris, *Liquidated Damages v. Penalties: Sense or Nonsense?*, 1978 WIS. L. REV. 351.

70. It is a standard observation of game theory that negotiation and litigation can be costly if information is asymmetric. *See, e.g.*, SHAWN HARGREAVES HEAP & YANIS VAROUFAKIS, *GAME THEORY: A CRITICAL INTRODUCTION* (1997).

breach. This risk is not present to the extent an award reflects actual damages.⁷¹ When a breaching party must pay actual damages that party bears the entire risk of loss. To be sure, in some settings, there may be no advantage to placing such risk on the breaching party. In others, however, the breaching party may be better suited to bear risk, which he may have an opportunity to eliminate through internal diversification or the purchase of insurance. The carriers in the *Hadley* models, for example, can diversify risk of actual loss through the shipment of many packages. In contrast, some low-cost shippers subject to a case-invariant liquidated-damages rule might be only occasional market participants who would be unable to diversify risk internally. These shippers could not easily rely on external insurance either, even if the purchase of such insurance entailed little transaction cost, because the presence of an insurance pool would attract high-cost types and undermine the separation that motivated a liquidated-damages rule in the first instance.

3. *The enriched Hadley model in sum.*

The analysis of *Hadley*, in sum, demonstrates that evaluation of a limited-liability default rule is more complicated than previously understood. A question remains, however, whether penalty-default rules in other contexts are or would be plagued with the same difficulties. This question is of particular importance for the default rules of contract terms that are more costly to adopt explicitly than are damages terms. For such rules, all else equal, it is of course more important for a lawmaker to get the default rule right. An attempt at generalization follows.

B. Empire Volkswagen

An essential step in the formation of a general penalty-default theory is analysis of how a penalty-default rule affects parties who are not expected to incur, but to *impose*, uncompensated damages. If a party to a contract is unusually likely to breach and will, with some probability, be unable to pay full damages, or if a party is unusually unlikely to pay damages even where the chance of breach is ordinary, that party is a high-cost party with whom to contract. Like any high-cost type, she would prefer to conceal her identity and enter a contract on terms more appropriate for a low-cost type. If providers of performance under contract are competitive, low-cost types would bear the cost of deception by high-cost types, and would welcome a default rule that induced the high-cost types to reveal themselves. If a particular term in the contract would be more costly to a high-cost than to a low-cost

71. A limited-liability default rule would also fail to reflect fully actual damages. But a limited-liability cap at the upper range of potential loss for a type might have only trivial direct consequences for that type. See note 51 *supra*.

type, adoption of that term as a default might induce separation of the types. This could be so for high-cost types who would impose harm, just as adoption of the *Hadley* rule might cause separation of high-cost types who would incur harm.

In the abstract, then, penalty-default analysis can be generalized beyond the *Hadley* case. Abstractions aside,⁷² however, there appears to be no sustained description of, or fully described proposal for, a penalty-default rule that might induce efficient separation other than the rule in *Hadley*. Thus, there is no clear exemplar for a penalty-default rule that would operate on a high-cost type who would impose harm. Put plainly, it is difficult to think of a contract term, other than one for damages, that might significantly and systematically disadvantage any one type of party to a contract. This alone may suggest that a generalization of penalty-default analysis beyond *Hadley* is likely to bear little fruit. But limited imagination is not the proof of a null set. So such generalization remains a theoretical possibility.

Even if one accepts the theoretical extension of penalty-default analysis to a rule that would induce separation by a high-cost type who would impose harm, there remains reason to doubt that penalty-default rules can be generally useful. As noted, it is possible to modify and extend the *Hadley* model so that it applies to high-cost types who would impose harm. Yet, upon examination, such a model reveals that the power of a penalty-default rule in the new setting is limited in exactly the same way that the *Hadley* rule, properly modeled, is limited. That is, while a penalty-default rule can in principle create some incentive for a high-cost type to separate, the rule may not *eliminate*—as opposed to counterbalance—the incentive of a high-cost type to pool. In the standard *Hadley* model, a penalty-default rule necessarily eliminates the incentive to pool. But that result is merely an artifact of simplistic assumptions in the standard model.⁷³ Incentives are muddier in the enriched *Hadley* model. And they are muddier for precisely the same reasons in a model of a penalty-default rule designed to induce separation by high-cost types who would impose harm.

72. See Ayres & Gertner, *supra* note 3, at 108 (“The prior analysis of *Hadley* can be embedded in a more general model of default choice.”); see also Letsou & Ribstein, *supra* note 5, at 26-27 (describing a default rule that they contend is designed to encourage the disclosure of controlling limited partners).

73. In the enriched *Hadley* model, unlike in the standard model, a penalty-default rule will not *necessarily* eliminate the incentive to pool. Even in the enriched model, however, a penalty-default rule *may* eliminate the incentive in a special case, where the variances of consequential damages by type differ sufficiently. See note 38 *supra*. This qualification does not in the least undermine the point that in the realistic enriched model net incentives may be difficult to determine.

1. *A cost imposition model.*

This point can be illustrated with a specific example, speculative though it may be. Consider *Empire Volkswagen v. World Wide Volkswagen Corp.*⁷⁴ The case is about a franchise contract between a manufacturer, Volkswagen, and an independent dealer, Empire. The contract granted Volkswagen the right to prescribe standards for Empire's showroom layout but was silent on whether Empire was required to sell Volkswagen automobiles exclusively, or was instead permitted to sell the products of other manufacturers as well. Empire sold Fords, automobiles from another manufacturer, as well as Volkswagens. Volkswagen terminated the relationship and Empire sued, claiming that dual dealership was not grounds for termination of the contract. The court disagreed and held that Volkswagen's right to control the showroom included the right to require an exclusive dealership.⁷⁵ Nothing in the *Empire Volkswagen* opinion suggests that the court even noted the potential for its decision to induce disclosure in other franchise relationships. One can entertain such a conjecture, however.

Imagine that manufacturers compete with one another to enter franchise agreements under which a manufacturer, as franchisor, will provide finance, equipment, inventory, and service to a dealer with unique skills and opportunities. Assume no manufacturer has assets specialized to the needs of any dealer *pre-contract*. Assume also that dealers, all of whom are risk neutral, self-knowledgeable, and legally sophisticated, are of two types: high quality and low quality.⁷⁶ A high-quality dealer has excellent opportunities that are not likely to vary significantly with the economy as a whole, while a low-quality dealer has fair opportunities subject to significant loss from a poor economy. A high-quality dealer is, from a franchisor's perspective, also a low-cost dealer because she is more likely than a low-quality dealer to repay loans made by the franchisor. Conversely, a low-quality dealer is a high-cost dealer because she is less likely than a high-quality dealer to repay loans made by the franchisor. Assume that franchisors know the pool characteristics of dealers and the law, but cannot distinguish a high-quality from a low-quality dealer through casual observation.

To motivate the penalty-default rule analysis in this model, suppose that a dealer of either type will consider reservation of an option to sell cars from manufacturers other than her franchisor. This "dual-dealership" option is an alternative to an "exclusive-dealership" arrangement. Assume that it is inef-

74. 814 F.2d 90 (2d Cir. 1987).

75. *Id.* at 96. For an extended discussion of franchising and contract issues, see generally Gillian K. Hadfield, *Problematic Relations: Franchising and the Law of Incomplete Contracts*, 42 STAN. L. REV. 927 (1990).

76. In reality, types would be on a continuum. The two-type assumption merely facilitates exposition. *Cf.* notes 25-27 *supra*.

ficient for any dealer to have an *absolute* rule on dual or exclusive dealership. Therefore, a sensible dual-dealership “rule” is, in fact, a standard that permits the sale of nonfranchisor products unless economic conditions are good, while a sensible exclusive-dealership “rule” is, in fact, a standard that prohibits the sale of nonfranchisor products unless economic conditions are dire. Further, imagine that the definitions of “good” and “dire” may be the subject of potentially costly negotiation or litigation,⁷⁷ either at the time of contract or after conflict arises, unless the parties accept the default rule.⁷⁸ The acceptance of the default rule would not be similarly costly because the terms of the rule are provided by a court or legislature and are clarified for any later conflicts by the judicial precedent of early conflicts.⁷⁹ Suppose that a dual-dealership option is costly to either dealer type for reasons independent of credit risk. Specifically, assume that a dealer’s reservation of the option reduces the franchisor’s willingness to make dealer-specific investments because other manufacturers would likely benefit from such investments.⁸⁰ Assume that a dual-dealership option carries a benefit as well because such option protects against slack from decreased demand for any individual franchisor’s product in the event of a general economic downturn.⁸¹ Suppose,

77. These costs are an amalgam. See generally Hart & Holmström, *supra* note 8 (describing the anticipation of future contingencies, bargaining over outcomes, drafting a clear and unambiguous contract, and enforcing the contract).

78. See, e.g., Ian Ayres, *Making a Difference: The Contractual Contributions of Easterbrook and Fischel*, 59 U. CHI. L. REV. 1391, 1418 (1992) (book review) (noting that the costs of contracting for a standard can exceed the costs of contracting for a rule).

79. A more elaborate model could include an intermediate type dealer who would be indifferent to default-rule alternatives. The presence of such a dealer type could help explain why any default rule, rather than the favored rule of the plurality, would attract judicial clarification. For a rich general discussion about rules and standards, beyond the scope of this article, see Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557 (1992). See also Ian Ayres, *Preliminary Thoughts on Optimal Tailoring of Contractual Rules*, 3 S. CAL. INTERDISC. L.J. 1 (1994).

80. For completeness, assume that such investment is noncontractible so that a dealer cannot simply purchase the investment, the cost of which the franchisor expects to recoup through its share of dealer sales subject to the franchise agreement. See generally Robert Crawford, Armen Alchian & Benjamin Klein, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 J.L. & ECON. 297 (1978) (describing incentives in long-term contracts). One might assume that the parties could dispense with the exclusive-dealership term and permit the franchisor to take a percentage of a dealer’s sales from any manufacturer. But monitoring this arrangement could be expensive, as a franchisor would not know how many cars another manufacturer provided the dealer. See generally LYNN M. LOPUCKI & ELIZABETH WARREN, *SECURED CREDIT: A SYSTEMS APPROACH* 297-316 (1998) (describing difficulties in inventory monitoring). In any case, the details of this particular hypothetical are not essential to the general penalty-default analysis described in the text.

81. A dealer might accept an exclusive-dealership term to obtain dealer-specific investment and then negotiate with her franchisor to lift the restriction if the need arose. But such negotiation, which would be in the face of a bilateral monopoly and, perhaps, asymmetric information, could be expensive. Cf. notes 70 & 77 *supra* and accompanying text. Retention of the dual-dealership option at the outset would avoid this cost of renegotiation. These details are not central to the argument in the text. See note 80 *supra*.

finally, that a comparison of these costs to the relative benefits reveals that a dual-dealership option is inefficient for a low-cost dealer, who can count on relatively strong demand under any economic conditions, and efficient for a high-cost dealer, who will suffer weak demand under poor economic conditions.⁸²

A court or legislator within this model could be presented with the question of whether a dealer should be permitted to operate a dual dealership over the objection of a franchisor where a franchise agreement is silent on the issue. That is, a lawmaker could have to choose between an exclusive-dealership and dual-dealership default rule.

2. *Isomorphic to the enriched Hadley model.*

A penalty-default analysis applied to this model tracks the analysis applied to the *Hadley* models. There is a possibility of a pooling equilibrium under a default rule favored by the high-cost type, in this instance the dual-dealership default. To see this, note that there may be many more low- than high-cost dealers, such that the blended finance charge for all dealers would be only slightly above what a low-cost dealer would pay if she could identify herself as such through a request for an exclusive-dealership rule. If a franchisor offered this blended price, a low-cost dealer might prefer to contract for the exclusive-dealership rule, which could earn her both the slightly lower finance charge and the more efficient term given her type. But transacting for this could be too costly for a low-cost dealer to justify, even if high-cost dealers would not mimic such defection. (Given the assumptions about negotiation for alternative standards, rather than a simple rule,⁸³ these costs could be more substantial than would be plausible for analogous costs in the *Hadley* models.⁸⁴) If the transaction costs of contracting exceeded the savings from a lower finance charge and a more efficient dealership rule, the low-cost dealers would not contract for an exclusive-dealership rule. The high-cost dealers would thus receive the benefits of the dual-dealership rule they prefer without paying in full for finance. The result of this pool and blended finance charge would be underinvestment by low-cost dealers—who

82. As compared with a low-cost dealer, the high-cost dealer might both benefit less from dealer-specific investment and benefit more from the dual-dealership option. The assumption is that, but for credit and transaction costs, each high-cost dealer would separate from the low-cost dealers even if pooling on an exclusive-dealership term would induce a franchisor to provide the high-cost dealer with uncompensated dealer-specific investment.

83. See note 78 *supra* and accompanying text.

84. The transaction costs of an explicit limited-liability term could be low at least because the party to bear liability could adopt a schedule of insurable amounts and prices, a schedule from which the other party could select with a check mark on a form. This point is made in Eisenberg, *supra* note 44, for example. In the alternative, each party to bear liability could have a single level of insurance and single price, with variance among liability bearers on these terms (though it might be significantly inefficient for any individual party to so limit its contractual counterparts).

would pay too much for their dealerships—and overinvestment by high-cost dealers—who would pay too little for theirs.

As an alternative to pooling on a dual-dealership rule, an exclusive-dealership penalty-default rule could be more efficient here, as the limited-liability default was potentially more efficient than the alternative in the *Hadley* models. However, as in the enriched *Hadley* model, the efficacy of a penalty-default rule may be difficult to assess for, as in the enriched *Hadley* model, the high-cost type would pay a price, *in addition to transaction costs*, if she defected from the penalty-default rule. This is because a franchisor would treat defection as a confession of low quality and would upwardly adjust the finance charge to the dealer. Such adjustment is the very purpose of a penalty default. The high-cost dealer, however, can avoid this adjustment if she remains in the pool with low-cost dealers. That is, if she accepts the exclusive-dealership default, she will pay only the lower, blended price for finance from her franchisor. Thus, for each high-cost dealer, a decision on whether to contract for a dual-dealership option is complicated. The dealer must weigh the benefits of that option, on the one hand, against the higher price for finance and the costs of contracting for the option, on the other. Separation, then, would not be inevitable, even if high-cost dealers faced transaction costs that were low relative to the benefit of the option considered in isolation.

The trade-off that high-cost dealers must make in this model, like the trade-off in the enriched *Hadley* model, should give a judge or legislator reason to pause before she adopted a penalty-default rule. To the extent the penalty is borne, rather than avoided, there may be a loss in social welfare. This is because high-cost dealers would be attracted to subsidized finance, even at the expense of an inefficient dealership rule. Under a dual-dealership rule, the high-cost dealers would not be put to this choice. If the low-cost dealers would accept the dual-dealership default rather than incur the transaction costs to defect, the high-cost dealers could retain the dual-dealership option, efficient to them, and obtain a subsidy as well. This would, of course, leave the low-cost dealers subject to a rule suboptimal for them. Whether an inevitable pool would be more efficient under an exclusive-dealership or a dual-dealership default rule would depend on the relative benefits the appropriate rule afforded dealers of each type. If low-cost dealers are nearly indifferent to the alternative dealership rules, while high-cost dealers benefit substantially from a dual-dealership option, then a dual-dealership default could be the more efficient rule.⁸⁵ Thus, even where high-

85. A dual-dealership default could be more efficient, moreover, even where an exclusive-dealership pool would be superior to a dual-dealership pool. This would be so if defection from an exclusive-dealership default would not be socially optimal but would occur anyway. In this case, an exclusive-dealership default would waste transaction costs. See Bebchuk & Shavell, *supra* note 3, at 302-03 (making an analogous point); *cf.* note 31 *supra*.

cost dealer transaction costs are not prohibitive, a penalty-default rule could fail to do its work and be inferior to the alternative.⁸⁶

This model presents another complication. In equilibrium, the size of the subsidy a high-cost dealer would receive from inclusion in a pool on the exclusive-dealership default would depend on the number of high-cost dealers that defected. As in the enriched *Hadley* model, the greater the number of high-cost types that defect from a pool, the more closely the average pool member resembles a low-cost type. And the more closely the average pool member resembles a low-cost type, the lower price each pool member—including each high-cost non-defector—need pay. Consequently, when a franchisor in a competitive industry considers a finance price under the exclusive-dealership default rule, she must account for the number of high-cost dealers who would defect at that price. The higher the price, the greater the rate of defection. Yet the greater the rate of defection, the less attractive defection becomes. Equilibrium may be reached in the balance. If an equilibrium price is based on a rate of defection between zero and one, there will be multiple equilibria, and it becomes problematic to assume that the parties will reach any equilibrium derived from the model. Consequently, as in the enriched *Hadley* model, an efficiency-minded lawmaker might simply be unable to refine the model so that she could confidently adopt a penalty-default rule.

Also like the enriched *Hadley* model, the *Empire Volkswagen* model offers no simple solution to the problems described. A court might consider traditional default-rule analysis and attempt to apply the term the parties would have adopted explicitly. But this approach likely would be to no avail, as it would be unlikely that the court would be more able than a franchisor to distinguish a high-cost dealer, who would prefer a dual-dealership option, from a low-cost dealer, who would prefer an exclusive-dealership term. Even if a court could determine dealer types *ex post*, there would be no necessary advantage to the traditional provision of a default rule. If a franchisor were uncertain of a dealer's type, *ex ante*, and thus uncertain what term would apply to that dealer, the franchisor would treat the dealer as the pool average type and would provide blended dealer-specific investment as well a blended finance charge.⁸⁷ This outcome might be superior to that produced by adoption of an exclusive-dealership penalty-default rule. But it might be inferior. The comparison, like the comparison with a dual-dealership default, would depend on the difficult to assess affects of the penalty-default rule.

86. As the text suggests, the essence of this model is that of the enriched *Hadley* model, described above, see notes 38-71 *supra* and accompanying text, and presented formally in the Appendix *infra*.

87. *Cf.* note 82 *supra*.

III. GENERAL LIMITATIONS

As may be plain from the above discussion, the analysis of the enriched *Hadley* model forms a blueprint that the analysis of the *Empire Volkswagen* model closely follows. This is so despite fundamental differences between respective types in the two models. In the *Hadley* model, the high-cost type suffers damages, while in the *Empire Volkswagen* model the high-cost type imposes damages. Nonetheless, the high-cost type in each model share a salient trait: potential attraction to a pool on the penalty-default rule. In each case, it is this attraction, assumed away in the standard *Hadley* model, that may blunt the force of the applicable rule. This common potential attraction, moreover, permits general observations on penalty-default theory.

A. *Unobservable or Unverifiable Characteristics that Matter*

In simple terms, a penalty-default rule of the kind discussed in this article is designed to induce separation of high-cost contractual parties from their low-cost counterparts. In richer terms, what constitutes a high-cost party can vary by circumstance. In the standard *Hadley* model, a high-cost party is one who will suffer a high level of damages if she is a victim of breach. In the enriched *Hadley* model, a party can be a high-cost type as well if she is highly likely to suffer damages, even ordinary damages, in the event of breach. In either case, the person with whom she contracts is exposed to high expected liability from breach. In the *Empire Volkswagen* model, a high-cost party is one who may herself breach and impose uncompensated damages on the person with whom she contracts. She can be high-cost if either the probability of her breach or the amount of uncompensated injury she will impose is high.

In its myopic focus on a single kind of high-cost type, the standard *Hadley* model neatly sidesteps the tangle of the richer models. In the standard *Hadley* model, a pool on the limited-liability rule is no lure to a high-value shipper—who differs from a low-value shipper only in the level of injury from a failed delivery. Though such difference is not observable *ex ante*, and would not be verifiable *ex post*, the difference is *irrelevant* to a carrier, who remains liable under the rule without regard to such difference and is assumed to compete for shipper contracts. There is, therefore, no reason for a high-cost shipper to conceal her type. Separation may easily be predicted by a comparison of each high-value shipper's communication costs with her gain from defection. It may be straightforward to conclude that such separation is efficient as efficiency requires only that transaction costs for the high-value shippers who defect are, in the aggregate, low compared to the gains from the appropriate precaution separation allows.

These results are *too* neat to be generally useful. Through the assumption of stochastic damages, the enriched *Hadley* model introduces a party who is a high-cost type for a reason that is neither observable nor verifiable, but that *matters* under the penalty-default rule. Because a high-cost shipper's ordinary consequential damages are indistinguishable *ex post* from a low-cost shipper's ordinary consequential damages, even though the *ex ante* probability of such damages is not the same, the high-cost shipper may wish to pool no matter how low the transaction costs of defection. Similarly, the *Empire Volkswagen* model introduces a party type who is high-cost for an *ex ante* unobservable reason that matters under the penalty-default rule. A party unusually likely to breach while insolvent may wish to pool with parties of ordinary type regardless of how low the transaction costs of defection, and regardless of whether her type is verifiable *ex post* (as insolvency makes unenforceable any obligation linked to *ex post* type revelation). Thus, whether a party is a high-cost type under a penalty-default rule because damages are stochastic, or because there is a risk of insolvency, there can be a subsidy from the pool that the party will weigh against the cost of a penalty. In either case, the presence of a subsidy provides an extra dimension in the analysis of whether a penalty default will yield separation in equilibrium, and in the analysis of whether the rule is efficient. Moreover, because the size of any subsidy varies with the rate of defection by high-cost types, equilibria are possible where some, but not all, identical high-cost parties defect from a penalty-default rule. A determination of which individuals will defect in equilibrium—or a determination of whether the parties will reach an equilibrium derived from a model—requires still other dimensions of analysis.

B. *A Quagmire for Lawmakers*

In a careful and broad critique of default-rule theory, Alan Schwartz addresses the wisdom of rules designed to penalize adherence by a high-cost type: “[A penalty] default is unlikely to increase welfare when parties are asymmetrically informed.”⁸⁸ This is so, according to Schwartz, because the proper analysis of a penalty-default rule requires detailed knowledge of factors likely to be beyond the ken of lawmakers.⁸⁹ As an example of the difficulties lawmakers face, Schwartz invokes yet another model of the *Hadley* case, one that relaxes the no-carrier-market-power assumption of the models presented here. In recent scholarship, Jason Johnston,⁹⁰ as well as Ayres and Gertner,⁹¹ assume carriers are not part of a competitive industry, but instead

88. See Schwartz, *supra* note 12, at 406. In the quoted passage, Schwartz uses “equilibrium-inducing default” instead of “penalty-default.” Schwartz’s term is useful to distinguish forms of information forcing defaults not at issue in this article.

89. See *id.* at 409.

90. See generally Johnston, *supra* note 12.

91. See generally Ayres & Gertner, *supra* note 12.

possess market power. Given this assumption, high-value shippers are less anxious than in the standard *Hadley* model to reveal their type in response to a penalty-default rule because the carrier would use such revelation as a basis for price discrimination. That is, in the carrier-market-power version of the *Hadley* model, a pool offers attraction to high-value shippers even under a penalty-default rule. Consequently, in such a model, a simple comparison of contracting transaction costs to efficient precaution yields neither a prediction about separation nor a conclusion on the efficiency of the penalty default. The attraction of the pool in the carrier-market-power model so complicates matters, Ayres and Gertner have concluded, there may be “small hope that lawmakers will be able to divine the efficient rule in practice.”⁹²

Until now, however, despite the problems of penalty-default analysis demonstrated by the market-power model of *Hadley*, the standard *Hadley* model stood in contrast as a seemingly plausible example of relative simplicity. So, while Schwartz’s general skepticism of penalty-default rules might have seemed sound where high-cost types lack bargaining power, until now the standard *Hadley* model represented the possibility that practical penalty-default analysis may otherwise be easily manageable. The results of this article support general skepticism, inasmuch as they demonstrate that the attraction of a pool on a penalty-default rule can be a pervasive problem, not limited to cases where a high-cost type lacks bargaining power. Thus, under any market power assumption, and whether a party is a high-cost type because she will suffer extraordinary damages or because she will impose extraordinary damages, the efficacy of a penalty-default rule depends on a complex analysis that may greatly challenge any judge or legislator.

CONCLUSION

It is, of course, not a condemnation of penalty-default analysis that penalty-default rules will only sometimes succeed. Despite the previously unrecognized potential for attraction to a pool on a penalty-default rule, conditions can exist such that a lawmaker’s best course is to adopt such a rule. This article demonstrates that it may be harder than once believed to determine whether such conditions exist. Yet the difficulty of a decision is not a reason to abdicate responsibility for that decision. So to a large extent the contribution of this article is a refinement of standard penalty-default analysis, not a rejection of that analysis. Nonetheless, this article is also a caution to a judge or legislator. A judge, in particular, might feel ill equipped to adopt the appropriate rule. Perhaps a legislature, with greater investigative resources than the courts, should strive to fill contractual gaps where separation of parties by type is the goal. Moreover, any lawmaker properly skepti-

92. *Id.* at 733.

cal of her ability to choose the correct default rule based on an analysis of pooling and separating equilibria might appropriately weight more heavily any other relevant consideration.

The potential advantage of lawmaker skepticism can be clarified with an example that reflects the uncertainty inherent in legal disputes, the simplifying assumptions of economic models notwithstanding. Consider *Hadley* one more time. Imagine that a judge in that case is confronted with the loss of a highly valuable shipment and a writing silent on damages. The carrier contends that he was unaware of the shipment's value. The shipper argues otherwise, or that she assumed she would be entitled to recover her actual damages, and asserts that the price reflects insurance for the full value of the shipment. The court is unsure.

The judge might be inclined to resolve the issue in favor of the shipper and award full damages. This would induce carriers in the future to take adequate precaution with shipments the carrier knows or can presume to be valuable, even if a shipper's ignorance of the rule or oversight in documentation meant that later the carrier could plausibly deny the true nature of the bargain. The judge might be less concerned that a carrier, a repeat player in the shipping business, would be uninformed about the rule or would neglect to document a shipper's communication of a desire for limited liability were the default rule expansive liability. Put plainly, if carriers but not shippers are knowledgeable of default rules and the requirements for defection therefrom, expansive liability would protect shippers from carrier strategic behavior. Such behavior is impossible in a competitive carrier market if shippers are fully informed, as is usually assumed in the *Hadley* models. In the usual models, therefore, the limited-liability rule alone is thought of as a penalty default. But in the context of this illustration, *expansive liability* can be characterized as a sort of penalty, a punishment to a carrier who chooses to rely on the rule rather than contract explicitly for an alternative.⁹³ Where shippers are uninformed, such a penalty could be efficient.⁹⁴

Nevertheless, a judge versed in all aspects of penalty-default theory might shy away from full liability. She would realize that an award of full damages could undermine the potential for separation possible under a limited-liability default where shippers are knowledgeable. The lesson of this

93. Cf. note 6 *infra* and accompanying text.

94. More precisely, suppose that every shipper assumes an expansive-liability default whatever the actual rule. It follows that the default rule can have no effect on the revelation of shipper type. Under either rule, regardless of whether low-cost shippers communicate their type, no high-cost shipper will. (Or if, as the text suggests, there is a step beyond communication required for defection from the default rule, no high-cost shipper will take the necessary step.) Under a limited-liability default, the carriers will provide inadequate precaution for high-cost shipments. Under an expansive-liability default, the carriers will provide appropriate precaution for each shipment if the low-cost shippers defect, and blended precaution (calculated without limitation by amount) for all shipments otherwise. Cf. note 29 *supra* and accompanying text.

article is that even under the information assumptions in the usual *Hadley* models, the judge should be less confident of separation than standard penalty-default theory suggests. A judge should, therefore, weigh in her decision the heightened probability that a full award would yield the best available incentives however she resolves any uncertainty about the parties' knowledge.

Lawmakers should not ignore the teachings of penalty-default theory as derived from *Hadley*. The contributions of these teachings are redoubtable. Still, penalty-default analysis is more difficult than it first appears. Consequently, default-rule issues require more thorough analysis, and greater reservation, than a simple interpretation of a single case might suggest.

APPENDIX

The Nature of Stochastic Damages: Let $f(x)$ be a normal distribution of damages, x , for a low-cost shipper; let $g(x)$ be a normal distribution of damages, x , for a high-cost shipper. (For simplicity of exposition, the complication is ignored that in fact damages cannot be less than zero.) Let $f(x)$ differ from $g(x)$ only in its mean.

The respective means of $f(x)$ and $g(x)$ are:

$$\int x \cdot f(x) dx \quad \text{and} \quad \int x \cdot g(x) dx.$$

Assume that:

$$\int x \cdot f(x) dx < \int x \cdot g(x) dx.$$

Now consider a cap on damages, c , chosen anywhere within the range $-\infty$ to ∞ , such that the expected damages awards, a_l and a_h , for low-cost and high-cost shippers, respectively, are:

$$\int_0^c x \cdot f(x) dx + c \int_c^\infty f(x) dx \quad \text{and} \quad \int_0^c x \cdot g(x) dx + c \int_c^\infty g(x) dx.$$

It is true for any c that:

$$\int_0^c x \cdot f(x) dx + c \int_c^\infty f(x) dx < \int_0^c x \cdot g(x) dx + c \int_c^\infty g(x) dx.$$

Thus, for low-cost and high-cost shippers in a pool subject to any damages cap, $a_l < a_h$, and the high-cost shippers will receive a subsidy from low-cost shippers for insurance against damages up to the cap.

An Illustration: The following illustration is designed to demonstrate the range of conditions under which a penalty-default rule can be *inefficient* or difficult to assess. For ease of exposition, the damages functions are defined to be discrete, as in the text, not continuous, as above in this Appendix. For this illustration note the assumptions in the text, and assume as well that for

any equilibrium, a carrier will take some precaution with each shipment. Assume also that direct value is zero in all cases. These assumptions permit clear statements, uncluttered by trivial or obvious qualifications.

Let:

- n = the number of shippers;
- p = percent of low-cost shippers;
- x = units of carrier precaution;
- $c(x)$ = cost of precaution as an increasing, convex function of x ;
- $p(x)$ = probability of performance as an increasing, strictly concave function of x ;
- v_h^l = high-cost shipper's low consequential value of performance;
- v_h^h = high-cost shipper's high consequential value of performance;
- v_l^l = low-cost shipper's low consequential value of performance;
- v_l^h = low-cost shipper's high consequential value of performance;
- π_h^l = high-cost shipper's probability of low value;
- π_h^h = high-cost shipper's probability of high value;
- π_l^l = low-cost shipper's probability of low value;
- π_l^h = low-cost shipper's probability of high value;
- t = contract transaction cost of defection from a default rule.

Assume v_h^h and v_l^h are greater than v_h^l and v_l^l , respectively. Assume also that $v_h^l \geq v_l^l$, while $v_h^h \geq v_l^h$. And assume that $\pi_h^l = (1 - \pi_h^h) < \pi_l^l = (1 - \pi_l^h)$.

It can be derived from the above that the average, or expected, value of performance for a low-cost shipment is:

$$v_l^a = \pi_l^l v_l^l + \pi_l^h v_l^h;$$

while the average, or expected, value of performance for a high-cost shipment is:

$$v_h^a = \pi_h^l v_h^l + \pi_h^h v_h^h.$$

Assuming no costs other than those described above, the price a carrier would charge for each shipment in a pool of all shipments subject to an expansive-liability rule is:

$$r^E = (1 - p(x))(pv_l^a + (1 - p)v_h^a) + c(x)$$

where x is chosen to minimize r^E .

The price a carrier would charge for a known low-cost shipment subject to a liability rule that permitted an award of v_l^h is:

$$r_l^L = (1 - p(x))v_l^a + c(x)$$

where x is chosen to minimize r_l^L .

A pool on an expansive-liability default is an equilibrium, therefore, if:

$$t > r^E - r_l^L.$$

Assuming that such an equilibrium exists, the aggregate value of contracts in a pool on an expansive-liability default rule is:

$$V^E = n(p(x)(pv_l^a + (1 - p)v_h^a) - c(x)).$$

Turning to an alternative default rule, the price a carrier would charge for each shipment in a pool of all shipments subject to a limited-liability rule (such that damages awarded cannot exceed v_l^h) is:

$$r^L = (1 - p(x))(pv_l^a + (1 - p)(\pi_h^l v_h^l + \pi_h^h v_l^h)) + c(x)$$

where x is chosen to minimize r^L .

In such a pool, a high-cost shipper would bear the cost of an uncompensated loss:

$$c_h^U = (1 - p(x))\pi_h^h(v_h^h - v_l^h).$$

Thus, the effective price (i.e., the expected amount less than v_h^a) that a high-cost shipper would pay in a complete pool on limited liability is:

$$r_h^L = r^L + c_h^U.$$

The price a carrier would charge for a known high-cost shipment subject to an expansive-liability rule, in contrast, is:

$$r_h^E = (1 - p(x))v_h^a + c(x)$$

where x is chosen to minimize r_h^E .

A pool on limited liability can be an equilibrium, therefore, if:

$$t > r_h^L - r_h^E.$$

Critically, because $v_h^h > v_l^h$, the high-cost shipper defection price, r_h^E , includes a component that would be spread among all shippers, despite limited liability. Consequently, neither r_h^L nor r_h^E fully reflects even the *insured* value of a high-cost shipment. Where v_h^h is not greatly in excess of v_l^h , a high-cost shipper's uncompensated loss, c_h^U , will not be great, and it may be that $r_h^E > r_h^L$. Thus, it is possible for $t > r_h^L - r_h^E$, even where $t = 0$.

Assuming that a pooling equilibrium on limited liability exists, the aggregate value of contracts in such a pool is:

$$V^L = n(p(x)(pv_l^a + (1 - p)v_h^a) - c(x))$$

where x is chosen to minimize r^L , *not* to maximize V^L . Put in other terms, given a pool on limited liability, a carrier will choose x to maximize a notional aggregate value of contracts:

$$V^{L'} = n(p(x)(pv_l^a + (1 - p)v_h^{a'}) - c(x))$$

where $v_h^{a'}$ is calculated under the assumption that $v_h^h = v_l^h$, and is thus less than v_h^a (unless in fact $v_h^h = v_l^h$). The x that maximizes $V^{L'}$ will be the x that establishes V^L .

In a comparison between a complete pool on expansive liability and a complete pool on limited liability, it should be observed that expansive liability is optimal if x is chosen to minimize r^E , as would be the case. When a carrier minimizes r^E he accounts for the full value of all shipments and thus produces the maximum possible value of all shipments given the constraints of the model. A limited-liability pool will be inferior if it reflects a different x , inasmuch as V^E differs from V^L only in the level of x chosen. Analysis reveals that a limited-liability pool is inferior if $v_h^h > v_l^h$ because it

will in this circumstance reflect a lower x than will an expansive-liability pool. To see this, note that the description of V^E differs from that of V^L only in the multiplicand for $p(x)$. The multiplicand is calculated with v_h^a for V^E , and with the presumed smaller $v_h^{a'}$ for V^L . Therefore, the x that maximizes V^E is greater than the x that maximizes V^L , given the described nature of the functions $p(x)$ and $c(x)$. It follows that $V^E > V^L$.

A complete pooling equilibrium will exist for either default rule if:

$$t > r^E - r_l^L \text{ and } t > r_h^L - r_h^E.$$

As p becomes arbitrarily large r^E approaches r_l^L , and these conditions may be satisfied even if t is small, given that r_h^L need not be greater than r_h^E , as noted. Thus, conditions can exist under which an expansive-liability default rule is superior to a limited-liability default rule, whatever the transaction costs of defection.

The discussion thus far has assumed that the limited-liability default rule limits awarded damages to v_l^h yet a lower limitation is possible and can be efficient. As an award limitation falls below v_l^h , the amount a high-cost shipper expects to suffer from an uncompensated loss, c_h^U , increases by more than r^L declines, because x declines to ever more inefficient levels. And because $v_h^h > v_l^h$, the increase in c_h^U will exceed the increase in corresponding expected loss by low-value shippers, a loss that can be labeled c_l^U . Consequently, reduction in the damage limit below v_l^h can induce separation from a pool on a limited-liability default rule. Such separation need not be socially optimal, however, because the reduction in liability necessary for such separation also imposes c_l^U for each low-cost shipper, and $pn c_l^U$ in the aggregate for such shippers. The excess of this cost over the cost of forgone efficient precaution is unnecessary under either an expansive-liability rule or a rule that limits liability only to v_l^h .

A reduction in the limit of liability also serves to illustrate the possibility of multiple, partially separating equilibria. Imagine that liability is limited to an amount that induces defection of at least one high-cost shipper in a pool on limited liability. Despite this limitation, it need not be an equilibrium for all high-cost shippers to defect.

To see this, recall that a high-cost shipper will defect if:

$$r_h^L > r_h^E + t.$$

Assume that this condition is satisfied and that a portion of high-cost shippers defects. It may be an equilibrium for the remainder of the high-cost

shippers to accept the limited-liability default, because the defection of some shippers will decrease r_h^L unless the decrease in r^L induced by a decrease in the pool's p is offset by an increase in c_h^U induced by a decrease in x . Where the difference between v_h^h and the limit of liability is not great, despite conditions that induce at least one high-cost shipper defection, then c_h^U will not be great and there can be equilibria of partial separation.