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THE POSSIBILITY OF INEFFICIENT CORPORATE CONTRACTS

Ian Ayres*

As in other areas of law, the application of game theory to corporations began with the use of the prisoners dilemma. Several scholars noted that the use of two-tier tender offers might place target shareholders with the dilemma of either tendering their shares at a price below their evaluation or facing a the back end freeze out purchase at an even lower amount.¹ The inroads of the “new learning” in game theory have, until very recently, been rarely applied to corporate law issues.² This “new learning” developed by econo-

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1. See, e.g., Lucian Bebchuk, *Toward Undistorted Choice and Equal Treatment in Corporate Takeovers*, 98 HARV. L. REV. 1693, 1696 (1985); Jonathan R. Macey & Fred S. McChesney, *A Theoretical Analysis of Corporate Greenmail*, 95 YALE L.J. 13, 22 (1985); Ian Ayres, *Playing Games with the Law*, 42 STAN. L. REV. 1291, 1315 (1990).

2. For three excellent examples of recent applications of the new game theoretic techniques to corporate laws, see John C. Coffee, *Unstable Coalitions: Corporate Governance as a Multi-Player Game*, 78 GEO. L.J. 1495 (1990); David Leebron, *Games Corporations Play: A Theory of Tender Offers*, 61 N.Y.U. L. REV. 153 (1986); and Jason S. Johnston, *Opting In and Opting Out: Bargaining for Fiduciary Duties in Cooperative Ventures* (Sept., 1990) (unpublished manuscript).

More generally, this new learning is being applied by law professors and being published in traditional law reviews at a surprisingly rapid rate. While I recently wrote that several substantive, technical and political factors might inhibit the spread of game-theoretic techniques into the legal academy, see Ayres, *supra* note 1, at 1315, the number of published articles and works-in-progress produced in the last six months makes me think that the academy's resistance to this new methodologic virus may be weaker than I expected. Very soon it will be impossible to provide a comprehensive bibliographic footnote in their introduction. Nonetheless, recent works incorporating the new methods of modeling incomplete information include: Douglas Baird & Randy Picker, *A Simple Noncooperative Bargaining Model of Corporate Reorganizations*, 20 J. LEGAL STUD. 311 (1991); Lucian Bebchuk & Chaim Fershtman, *The Effect of Insider Trading on Insider Trading on Insider's Reaction to Opportunities to "Waste" Corporate Value*, HARV. PROGRAM IN L. & ECON., No. 76 (Sept. 1990); Samuel Issacaroff & George Lowenstein, *Second Thought About Summary Judgment*, 100 YALE L.J. 73 (1990); Jason Scott Johnston, *Strategic Bargaining and the Economic Theory of Contract Default Rules*, 100 YALE L.J. 615 (1990); Avery Katz, *Your Terms or Mine: The Duty to Read the Fine Print in Contracts*, 24 RAND J. ECON. 518 (1990); Avery Katz, *The Strategic Structure of Offer and Acceptance: Game Theory and the Law of Contract Formation*, 89 MICH. L. REV. 215 (1990); Alan Schwartz, *The Myth that Promisees Prefer Supracompensatory Remedies: An Analysis of Contracting for Damages Measures*, 100 YALE L.J. 369 (1990); Alan Schwartz, *A Theory of Loan Priorities*, 18 J. LEGAL STUD. 209 (1989); Lucian Bebchuk & Steven Shavell, *Information and the Scope of Liability for Breach of Contract* (April, 1989) (unpublished manuscript on file at Harvard Law School). My apologies in advance to the works that I have undoubtedly overlooked. These include a

mists in the 1970's and 1980's consists largely of theoretical breakthroughs in how to model dynamic games in which "players" have private information.³

For those uninitiated in this new learning, let me suggest three ways to tell when you are reading a game-theory piece that is by-product of this new learning.⁴ First, games will often be depicted with game trees instead of pay-off matrices. Second, the game will specify that there are two (or multiple) types of a particular class of player. And third, there will often be asymmetric information. If you see an article with any one of these attributes, odds are that the author is toiling in this new vineyard.⁵

Not surprisingly, these three shibboleths are related. The use of game trees (what game theorists call extensive form representations) much more adeptly captures informational assumptions and their impact on how the game is played.⁶ And the assumption that there are two types of a particular class of player is often used to generate asymmetric information when other players in the game cannot tell initially what type they are playing with.⁷

The explicit introduction of multiple types of players also represents an important advance in the economic analysis of contractual bodies of law, such as corporations, because if there are heterogeneous types on one side of the contract, then efficient contracting will

vast list of works by economists analyzing legal issues. See, e.g., Philippe Aghion & Benjamin Hermalin, *Legal Restrictions on Private Contracts Can Enhance Efficiency*, 6 J.L. ECON. & ORGANIZATION 381 (1990); Samuel J. Rea, *Arm-Breaking, Consumer Credit and Personal Bankruptcy*, 22 ECON. INQUIRY 188 (1984).

3. See Ayres, *supra* note 1, at 1317.

4. Professor Shubik divided the game-theoretic literature along another dimension regarding the mathematical sophistication of the modeling. See Martin Shubik, *Game Theory, Law, and the Concept of Competition*, 60 U. CIN. L. REV. 285, 298 (1991) (discussing high church, low church, and conversational approaches). All three levels of sophistication have been used by contributors to this new learning literature.

5. The new learning has been almost exclusively concerned with non-cooperative games. For a more detailed discussion of the appropriate use of cooperative and non-cooperative games, see Ian Ayres, *Three Approaches to Modeling Corporate Games: Some Observations*, 60 U. CIN. L. REV. 419 (1991); David Leebron, *A Game Theoretic Approach to the Regulation of Foreign Direct Investment and the Multinational Corporation*, 60 U. CIN. L. REV. 305, 308 (1991); Shubik, *supra* note 4.

6. In contrast, the use of pay-off matrices for the prisoner's dilemma and "battle of the sexes" games is better suited to games of complete information. See ERIC RASMUSEN, *GAMES AND INFORMATION* 27-30, 55 (1989).

7. For example, in contract law, several scholars have modeled the issue of consequential damages in *Hadley v. Baxendale*, 156 Eng. Rep. 145 (Ex. 1854), by positing two types of shippers — one with high consequential damages and another with low consequential damages — and assuming that the carriers initially cannot distinguish between the two. See Ian Ayres & Robert Gertner, *Filling Gaps in Incomplete Contracts, An Economics Theory of Default Rules*, 99 YALE L.J. 87, 101-04 (1989); Johnston, *supra* note 2, at 621-22; Bebchuk & Shavell, *supra* note 2.

often necessitate heterogeneity in the contractual equilibrium. This is a significant departure from what I would call "first generation" law and economic analysis of contracts, which often sought to discover the single legal rule that would maximize the gains from trade for the contracting parties. This is also often the mode of corporate and economic analysis: many articles propose a single legal rule that promotes the efficiency or gains of trade for all corporate contracts. But this "first generation" mode of analysis, in an important sense, proves too much: if the authors have really discovered a rule that enhances efficiency for all contracting types, then one should be agnostic about whether to make the rule mandatory or merely a default that parties can contract around.⁸ Since there is a strong consensus that many corporate and contractual rules should be defaults that parties may contract around,⁹ the new game theory models which generate contractual heterogeneity are much better suited to analyze the three primordial questions of contractual freedom:

- (1) should a particular rule be immutable?
- (2) if not immutable, what is the most appropriate default?, and
- (3) if a default, what are the necessary and sufficient conditions for contracting around the rule?¹⁰

In this piece, I would like to continue a discussion, or more precisely revise an answer that I gave to Dan Fischel a couple of years ago at Chicago's Law and Economics Workshop. Rob Gertner and I were presenting an article about how to choose efficient contractual defaults.¹¹ Among other things, Rob and I argued that contractual parties with private information might strategically refuse to bargain for socially efficient rules in order to protect the returns to their private information.¹² A part of our article suggested that efficiency-minded lawmakers might at times want to promulgate "penalty" defaults that induce the private contracting parties to contract around the undesirable defaults and thereby reveal their private information.¹³ Although this contract article proposed a few applica-

8. This analysis is related to Bernie Black's recent insights, that many mandatory corporate rules are precisely the ones that parties would not want to contract around. See Bernard S. Black, *Is Corporate Law Trivial?: A Political and Economic Analysis*, 84 Nw. U. L. REV. 542, 543-44 (1990).

9. The issue of whether corporate laws should be immutable received extensive and insightful treatment in a recent symposium. Lucian Bebchuk, *Foreward; The Debate on Contractual Freedom in Corporate Law*, in *Contractual Freedom, in Corporate Law: Articles & Comments*, 89 COLUM. L. REV. 1395 (1989).

10. See Ayres & Gertner, *supra* note 7, at 119 n.133 (1989).

11. Ayres & Gertner, *supra* note 7.

12. See Johnston, *supra* note 2, at 621-22.

13. John Coffee has explicitly applied the use of penalty or "information forcing" defaults to corporate issues of managers' fiduciary duties. John Coffee, *The*

tions in the corporate context,¹⁴ Fischel asked at the seminar whether our model had any implications in the corporate context. His interest in the issue is not surprising. Easterbrook and Fischel have forcefully argued that corporate default rules should "duplicate the terms the parties would have selected . . . if they had contracted explicitly."¹⁵ If the possibility of inefficient strategic bargaining in private contracts could be generalized to the corporate context, these new game-theoretic models might limit or qualify this hypothetical contracting norm. Although at the time of that seminar, I told Dan that I thought there were few possibilities for the inefficiencies of strategic bargaining in the corporate context, I am here today to recant in a small way and give a slightly different answer.¹⁶ In particular, my thesis is that strategic interactions may lead to inefficient corporate contracting (a) even in a world where there are numerous shareholder/investors competing to make investments and (b) even when it is costless to contract around a given default.

At first blush, one might argue that game theoretic approaches to modeling the corporate governance contracts of large publicly traded businesses are inappropriate because the cost of contracting around any default rule will be negligible in proportion to the potential effect on corporate value.¹⁷ If either side can costlessly contract around a given default rule, traditional law and economics scholarship would posit that parties would be able to find and include the contractual provisions that maximize the gains from trade.¹⁸

Secondly, the potential for strategic inefficiency might be limited by the sheer number of players that *ex ante* are potentially on the

Mandatory/Enabling Balance in Corporate Law: An Essay on the Judicial Role, in Contractual Freedom in Corporate Law: Articles & Comments, supra note 9, at 1618, 1680; see generally Robert Scott, *A Relational Theory of Default Rules for Commercial Contracts*, 19 J. LEGAL. STUD. 597 (1990) (discussing use of information forcing rules in contract law).

14. Ayres & Gertner, *supra* note 7 at 111, 121 n.148 (discussing promoter liability and restrictions on how to contract around).

15. Frank H. Easterbrook & Daniel R. Fischel, *The Corporate Contract*, 89 COLUM. L. REV. 1416, 1433 (1989). A version of this article also appears in CORPORATE LAW AND ECONOMIC ANALYSIS 182 (Lucian Bebchuk ed., 1990) and FRANK H. EASTERBROOK & DANIEL R. FISCHEL, THE ECONOMIC STRUCTURE OF CORPORATE LAW (forthcoming 1991).

16. John Coffee's work in this area already provides a very important rejection of this hypothetical contract standard. See Coffee, *supra* note 13 at 1634.

17. After all, corporate lawyers can often extract significant rents from transactions without inhibiting corporate participation.

18. In the model of Ayres & Gertner, *supra* note 7, at 109-111, there are positive costs of contracting that play a role in keeping certain parties from contracting around inefficient rules. As shown below, however, general models exist in which inefficient contracting can be generated, even in frictionless contracting settings.

various sides of the corporate contract. Numerosity, after all, undermines strategic interactions in the standard price theory models.¹⁹ This piece argues that neither costless contracting nor the *ex ante* numerosity of potential contracting parties sufficiently ensures efficient contracting. To support this thesis, the article will analyze a model based on a seminal article by Rothschild and Stiglitz²⁰ (and recently updated by Aghion and Hermalin²¹) which demonstrates how asymmetric information and adverse selection can generate inefficient corporate debt contracts even though contracting is costless and there is vigorous competition among numerous lenders. I will then suggest how the results of this corporate debt model could be applied to the inefficient selection of more traditional legal rules. In particular, I'll discuss how attempts at "signaling" can lead to inefficient separation in the equilibrium contractual terms *regardless of the initial default choice*. Fischel and Easterbrook are vindicated in so far as they argue that default choice does not change the equilibrium — but they are wrong in arguing that the equilibrium will necessarily be efficient.

I also briefly discuss types of government intervention that may be successful in improving a strategic problem. Having done all of this, in the final portion I will try to undercut this simple signaling model by discussing how signaling theory does not explain major aspects of current corporate contracting in this age of enabling statutes. In the end, Easterbrook and Fischel's hypothetical contracting norm remains a powerful tool for analyzing default choice. My thesis is not that corporate contracts are inefficient, but that we can't rely on small transaction costs or numerosity to ensure efficiency. To the extent that we retain a belief in the efficiency of the corporate nexus of contracts, this article stimulates us to look further for the structural forces that foster efficiency. In a world in which major financial decisions are best analyzed as signals in models of asymmetric information,²² the possibility for inefficient "excessive" signaling through contractual provisions should remain an important area for further research. Because signaling theories so dominate the portion of the corporate contract relating to financial structure,

19. Wheat farmers, for example, are so numerous, that a single farmer has no incentive to strategically withhold her production because of the *de minimus* impact in price. Hence, the standard competitive assumption of price taking suppliers eliminates game theoretic considerations from price theory.

20. Michael Rothschild & Joseph Stiglitz, *Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information*, 90 Q.J. ECON. 629 (1976).

21. Aghion & Hermalin, *supra* note 2, at 398-401.

22. See, e.g., R. HUBBARD, *ASYMMETRIC INFORMATION, CORPORATE FINANCE AND INVESTMENT* (R. Glenn ed., 1990).

it would be premature to wholly discount the possibility that inefficient signaling has infected the portion of the corporate contract relating to governance structure.

I. ASYMMETRIC INFORMATION MODELS OF INEFFICIENT SIGNALING

The following model of corporate debt financing is derived from the excellent article of Aghion and Hermalin that appeared recently in Yale's *Journal of Law, Economics and Organization*.²³ Consider a class of closed corporations that wants to issue bonds to finance a project. The lenders (and courts) will be able to tell *ex post* whether the project succeeds or fails. Assume that there are both "good" and "bad" projects in the world. Good projects have a higher probability of success (i.e., lower probability of default) than bad projects. Only corporations (its managers, if it is publicly held) know whether their projects are good or bad. These assumptions create a game with asymmetric information — because the corporate borrowers know something that the lenders do not. The assumptions also imply that the success of the project is *contractible*, but the quality of the project is not. This implication appears because the lenders and courts can learn after the fact whether the project succeeded but not whether it had a high probability of success. Because success is contractible, the debt contract can be made contingent on whether the contract succeeds but not on whether the project was good or bad.

Under these assumptions, a debt contract to borrow D dollars can be summarized by the amount that will need be repaid if the project fails or if it succeeds, (P_f and P_s , respectively).²⁴ The model assumes that numerous investors will compete to finance the projects of the closed corporations. Game theory can capture this competition by allowing the corporations to propose take-it-or-leave-it contracts. The power to make the take-it-or-leave-it offer gives the corporations all the gains from trade,²⁵ because they can offer contracts that leave the investor only imperceptibly better off than not investing — this is, of course, the same result as competition.

23. Agion & Hermalin, *supra* note 2, at 383-87.

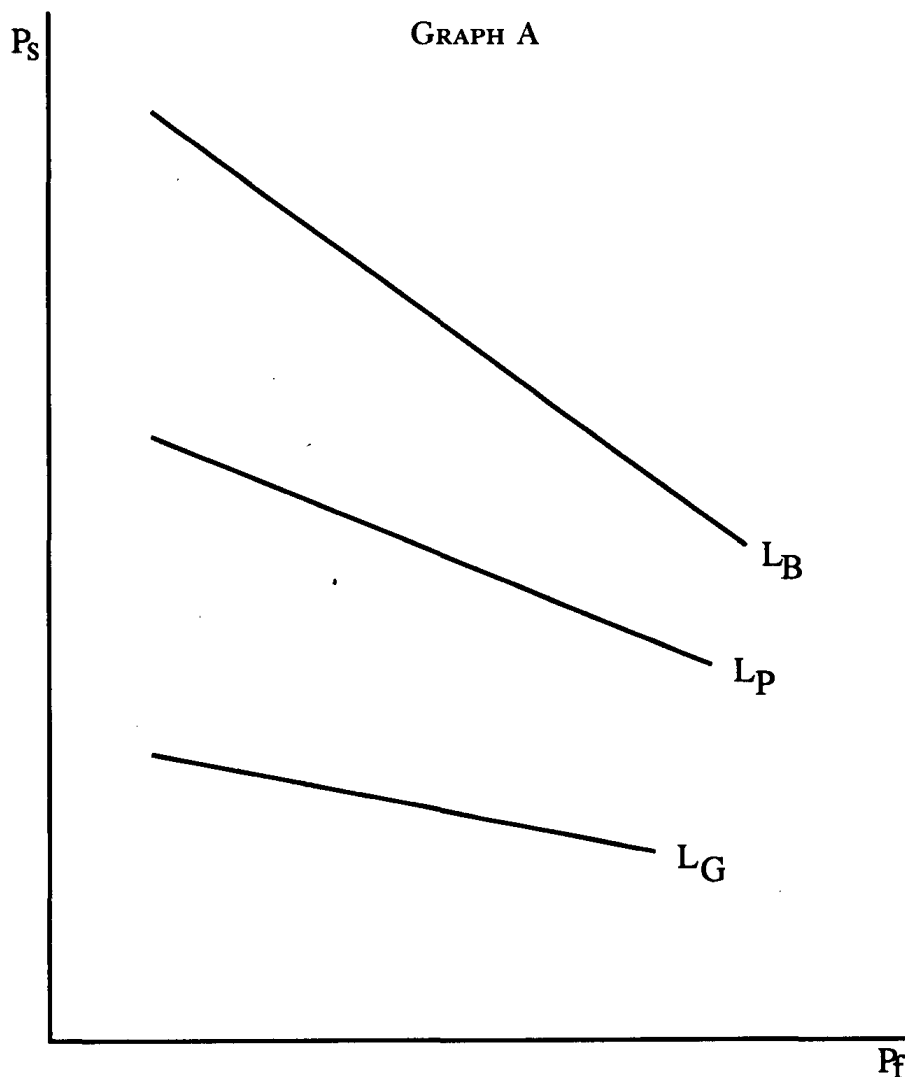
24. If corporate shareholders have limited wealth, there will be situations in which "the promised repayment in the case of success must exceed the amount invested, which in turn must exceed the promised repayment in the case of failure (i.e., $P_s > D > P_f$)". Aghion & Hermalin, *supra* note 2, at 384.

25. The assumption of a take-it-or-leave-it offer is related to Jeff Gordon's discussion, of how the relative "impatience" of the bargainers will determine how the gains from trade are distributed. See Jeffrey Gordon, *Shareholder Initiative and Delegation: A Social Choice and Game Theoretic Approach to Corporate Law*, 60 U. CIN. L. REV. 347, 379-80 (1991).

To digress briefly, it is extremely important in analyzing contracts with asymmetric information to identify the party that has superior bargaining power. When the uninformed party has bargaining power, it will have much greater ability to separate the good from the bad on the other side of the transaction. In other words, the bargaining power of the uninformed can counteract the power conferred by the private information. In the model sketched above, the informed party (the corporation) also has the bargaining power and consequently the uninformed lenders may have more difficulty inducing separation in equilibrium.²⁶

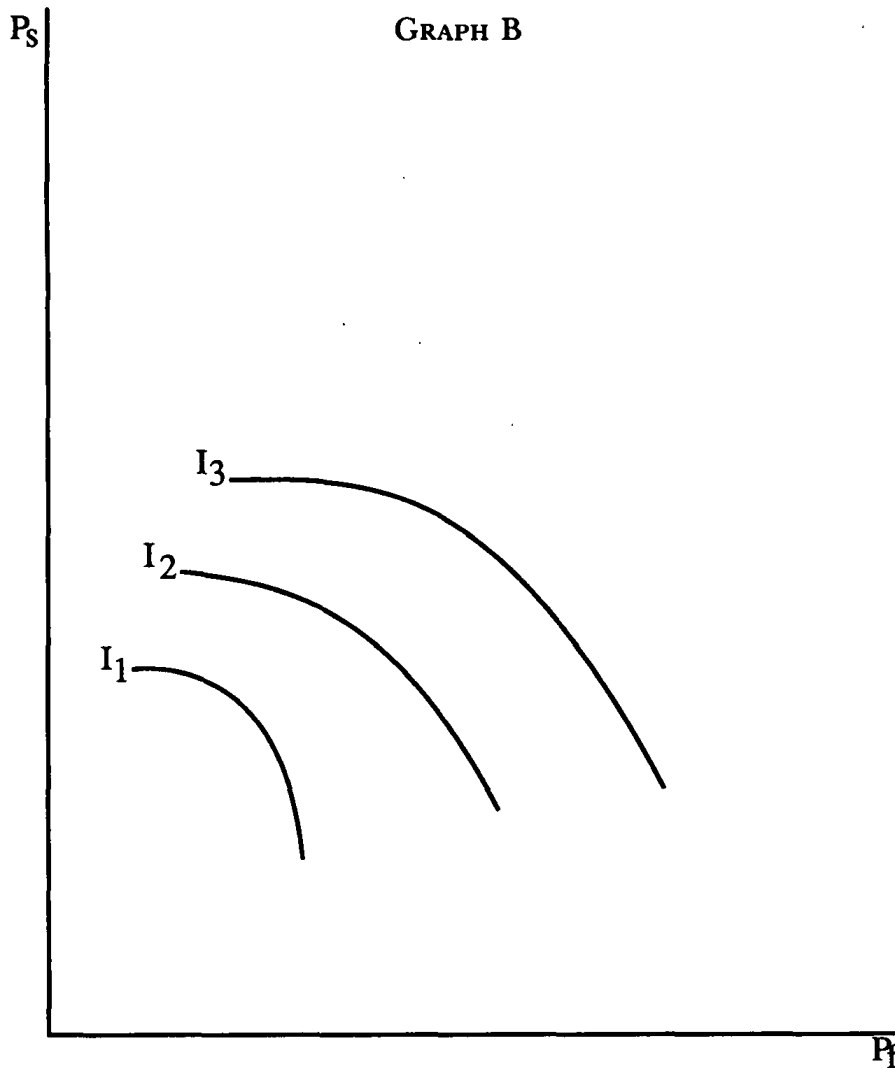
Finally, assume that the shareholders of the corporation are risk-averse (because of undiversifiable human capital) and the lenders are risk-neutral. Under these assumptions, one can graph the set of contracts that the lenders would be willing to accept under conditions of symmetric and asymmetric information. If there is symmetric information, so that in equilibrium the lenders know whether they are funding good or bad projects, they will be willing to lend to bad projects but at higher promises of repayment than for good projects. In Graph A, the set of contracts that lenders would be willing to make with known bad and good corporations are depicted by the straight lines L_b and L_g respectively. Every point on these lines represents a contract (with contingent repayment terms P_f and P_s) that informed lenders would be willing to enter. If, however, the lenders cannot distinguish between the good and the bad projects/corporations and believe that in equilibrium that they are lending to both types, they will be willing to offer lending contracts along the pooled lending line, L_p , that represents a weighted average of the competitive contracts in the symmetric equilibrium. The relative position of this pooled lending line will depend on the lenders' knowledge of the proportion of good and bad projects to be financed.

26. By changing the incidence of bargaining power — who gets to make the take-it-or-leave-it offer — modelers can come to dramatically different results. In the analysis of consequential damages in *Hadley v Baxendale*, 156 Eng. Rep. 145, 147 (Ex. 1854), compare Ayres & Gertner, *supra* note 7, at 102 (assuming shipper market power) with Johnston, *supra* note 2, at 621-22 (assuming carrier market power). See also Ian Ayres & Robert Gertner, *Strategic Contractual Inefficiency*, 104 YALE L.J. (forthcoming 1992). In the original insurance context, compare Rothchild & Stiglitz, *supra* note 20 (assuming insured market power) with Joseph Stiglitz, *Monopoly, Nonlinear Pricing and Imperfect Information: The Insurance Market*, 44 REV. ECON. STUD. 407 (1977) (assuming insurer market power).

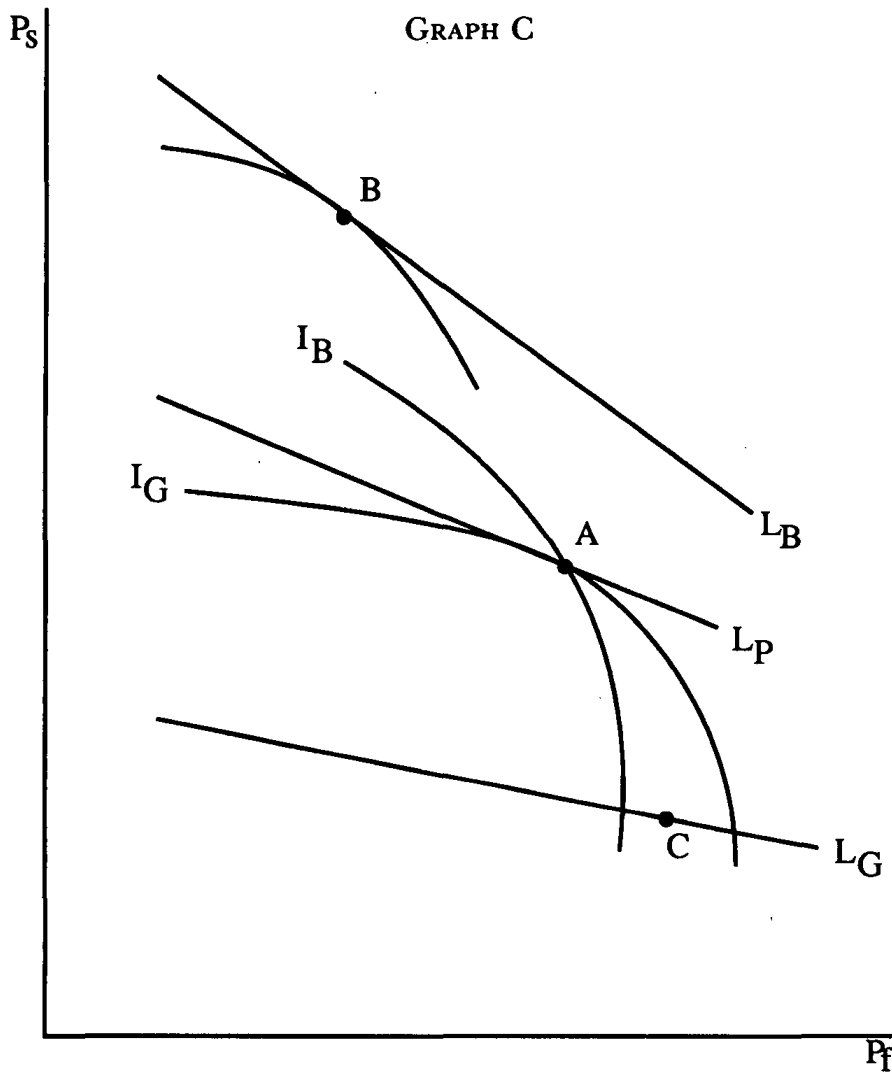


As with most asymmetric information models, it is assumed that even when sellers don't know whether specific projects are good, they do know the proportion of good projects in the economy.

In Graph *B*, the indifference curves of the corporations have a convex curve (because the corporate shareholders are risk-averse) and increasing toward the southwest (because corporations prefer to repay less). A fundamental implication of the corporations' private information about the likelihood of project success is that the indifference curves for the bad project type corporations is more steeply sloped than the indifference curve for the good project corporations.



This is because the bad corporation is more concerned about the size of their repayments when the project fails than is the good corporation and consequently is willing to trade off larger P_s for a given reduction in P_f . This difference in indifference curves is illustrated in Graph C. In this graph, the indifference curves for both good and bad corporations that pass through contract point A are graphed as I_B and I_C .



Point *A* represents the contract point along the pooled lending line that seems to maximize the welfare of the good corporation. This is because a good corporation's indifference curve is tangent to the pooled lending line.²⁷ But point *A* is not an equilibrium because good corporations will have an incentive to try to signal that they have good projects and hence garner lower repayment terms. In Graph *C*, for example, good corporations would deviate from a pooled equilibrium at the contract point *A* by offering, for example, contract point *C*. Because good corporations have flatter indifference curve, moving from contract *A* to contract *C* increases the utility of the good corporations but decreases the utility of the bad

27. Lenders will not accept debt contracts to the southwest of the lending line, and any points on the lending line other than *A*, and any points above the lending line, put good corporations on lower utility indifference curves.

corporations.²⁸ Thus, only good corporations would offer contract *C* relative to contract *A* — and if the bad corporations continued to offer *A* contracts, lenders would be willing to accept *C* contracts, knowing that only good corporations would make this offer (and because *C* contracts lie upon the good corporation lending line).

However, the bad corporations will not be allowed to passively sit by and let the good corporations signal. Once the good corporations offer contract *C*, no lender will be willing to accept contract *A* that the bad corporation offers. Because the good corporations have separated themselves (by signaling their identity with contract *C* offers), lenders will know that only bad corporations will offer *A* contracts. Consequently the lenders would only lend to the passive bad corporations along the bad corporation lending line, L_b . In Graph *C*, if the bad corporations were forced to borrow along this line they would chose the contract at point *B* which maximizes their utility conditional on the lenders knowing their true identity.²⁹

The bad corporations, however, are likely not to sit by passively and allow the good corporations' signaling to reduce their utility (from point *A* to point *B*). They have a counter strategy of sending a false signal and matching the good corporations' contract *C* offers. For although contract *C* represents a fall in utility for bad corporations relative to the pooled lending at point *A*, it represents an increase in utility for bad corporations relative to the separating contractual equilibrium for bad corporations at point *B*. Rather than be found out, the bad corporations will try to send inefficient signals. The process of signaling then is the struggle of good types trying to run away from the bad types, *and* the struggle of the bad types to run after and falsely match the good type's signals. If it is in the bad corporation's interest to falsely match, (i.e. they prefer point *C* to point *A*), then lenders will stop lending to even good corporations at point *C*. Lenders would no longer know whether the a specific corporation making a point *C* contract offer was good or bad and consequently would reject the offer because it lays below the pooled lending line, L_p .

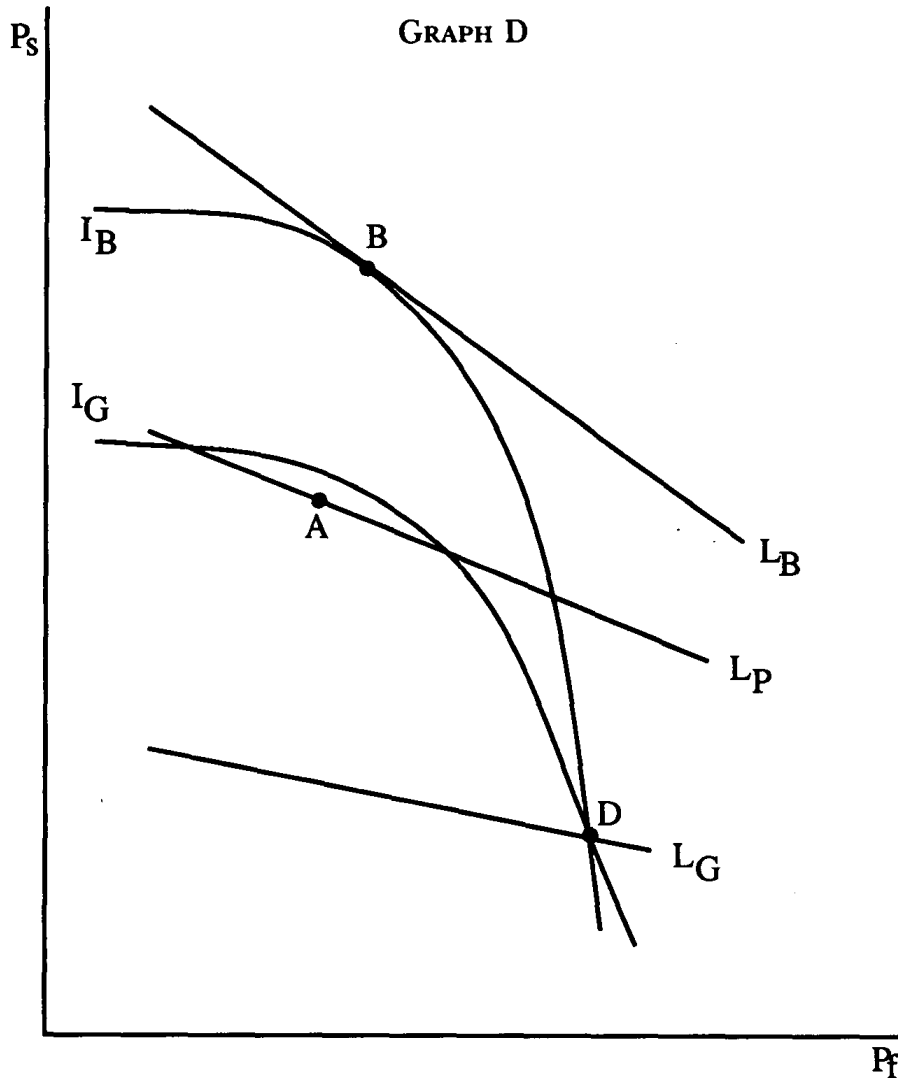
Graph *D* shows the possibility for an equilibrium when signaling does effectively separate the good corporations from the bad corpo-

28. This is because contract *C* lies below the good corporation's indifference curve that goes through contract *A*, but contract *C* lies above the bad corporation's indifference curve that goes through contract *A*.

29. This is what Aghion and Hermalin refer to as a "symmetric information contract" because it represents the contract that bad corporations would enter if information about type were symmetrically known by all parties. Aghion & Hermalin, *supra* note 2, at 388.

rations in the lenders eyes. If the good corporations offer contract D , (or any contracts to the right along the good lending line, L_g), the bad corporations will not be induced to match their signals because the bad corporations will prefer the symmetric information contract B (in which lenders can infer that they are financing bad projects). The good corporations cannot effectively signal by offering contracts to the left of D along the good lending line, because the bad corporations would be induced to match (which consequently would stop the lenders from lending). Thus, under these conditions, the separating equilibrium will have good corporations contracting with lenders at contract point D and bad corporations contracting with lenders at point B . This is the contract point that maximizes the good corporation's utility within the class of signals that deters false matching by the bad corporation.³⁰

30. Technically, the good corporations may need to offer a contract with an arbitrarily small amount to the right along the good lending line, so that the bad corporations are not merely indifferent between sending false signals.



Although this signaling is individually rational, it generates clear social inefficiency. A pooled equilibrium at point *A* is Pareto superior; both good and bad corporations move to higher levels of utility — (in Graph *D*, contract point *A* lies below the equilibrium indifference curves for both good and bad corporations) — and the lenders continue to earn a competitive rate of return. But as argued before, pooling at contract *A* is not a laissez-faire equilibrium; good corporations will have incentives to contract for inefficiently high amounts of repayments if the project fails³¹ in order to stop their cross-subsidi-

31. The higher repayments if the project fails are inefficient because the corporations are risk averse and are bearing inefficiently high risk relative to the risk neutral lenders. The inefficiency of point *D* can be seen in Graph *D* from the fact that the good corporation's indifference curve is not tangent to the good lending line at contract point *D*. Contract point *D* is not the good corporation's symmetric equilibrium contract.

dization of the bad corporations. This inefficiency is generated by a species of externality. The existence of bad corporations and their penchant for false matching or adverse selection imposes an externality on good corporations. The inefficiency of signaling stems not only from the efforts of good corporations to signal but also from the efforts of bad corporations to falsely match those signals which cause the good corporations to run even further away from the efficient contracting point.

The potential inefficiency of signaling was eloquently captured by Doctor Seuss in his parable about the Sneetches.³² High-status Sneetches had stars on their bellies and low-status Sneetches did not. As the tale unfolds, vast inefficiencies are generated as the low-status Sneetches try to match the high-status ones by affixing stars to their bellies and the high-status Sneetches try to further distinguish themselves by then removing their stars. The moral of the story is that finding credible signals may be extremely hard and that the mere attempt to distinguish yourself *whether or not it succeeds* can generate social inefficiencies.³³

This simple example also has important implications for Easterbrook's and Fischel's hypothetical contract thesis. Even if we set the default repayment terms at (what might be the social efficient) contract *A*, the private incentives will lead to inefficient contracting. This inefficiency appears even though it is costless to contract around the default term and even though the lending market to supply finance capital is extremely competitive. Indeed, the costlessness of contracting exacerbates the social inefficiency. If contracting technology or legal intervention increased the costs of moving away from point *A*, a more efficient result might ensue.³⁴ Easterbrook and Fischel may be right that, because transaction costs are low in the corporate context, the choice of corporate governance defaults will not effect the contractual equilibrium.³⁵ This model provides a counterexample, however, to the claim that low transaction costs in-

32. DR. SEUSS, *THE SNEETCHES AND OTHER STORIES* 1-25 (1961).

33. Dr. Seuss seemed to have a more fundamental moral that the status distinction in the Sneetches context was really irrelevant. In many contexts, however, distinguishing among underlying characteristics of a contracting party may have important effects on allocative efficiency.

34. Indeed, this is one of the many powerful insights of Agion & Hermalin, *supra* note 2, and their predecessors. It should be stressed again that this model is largely derivative of this rich genre. See David Besanko, *Monopoly and Quality Distortion: Effects and Remedies*, 102 Q.J. ECON. 743 (1987); Johnston, *supra* note 2; Rothchild & Stiglitz, *supra* note 20; Stiglitz, *supra* note 26; John Wilson, *A Model of Insurance Markets with Incomplete Information*, 16 J. ECON. THEORY 167 (1977).

35. Frank H. Easterbrook and Daniel R. Fischel, *Close Corporations and Agency Costs*, 38 STAN. L. REV. 271, 277-79 (1986).

sure efficient contracting. In this simple reworking of the Rothschild-Stiglitz model of adverse selection, we see that regardless of the default rule, there will be inefficient signaling in a laissez faire contractual equilibrium.

The model suggests that contractual inefficiencies can no longer be laid solely at the door of out-of-pocket transaction costs. For even when contracting is costless, the existence of asymmetric information can induce inefficiencies. For those die-hard transaction cost adherents, there is still a sense in which the inefficiencies can be attributed to costs of contracting. At the beginning of the model, I suggested that the lenders and the courts could not tell after the fact whether a particular project had been good or bad, and thus contracts could only be made contingent on the success or failure of the investment. This assumption, that the project quality was “non-contractible,” could be considered as an assumption that the costs of specifying and proving a quality provision, (making repayment explicitly contingent on project quality), was prohibitively expensive. If quality were *ex post* known and hence *ex ante* contractible, then first best separation could occur without inefficient signaling as the good types simply offered contracts that were explicitly contingent on project quality as well as outcome.

Inefficient contracts are also generated even in the absence of what we would normally think of as “bargaining.”³⁶ The strategic decisions of the privately informed to signal and falsely signal are not limited to bilateral bargaining. This model clearly demonstrates that the inefficiencies of excessive signaling can take place even when large classes of corporations propose take-it-or-leave-it “standard form” type contracts to large classes of those competing for investment opportunities. Thus, numerosity and competition cannot unambiguously eliminate the pathological effects of asymmetric information and adverse selection.

These asymmetric information models argue against Easterbrook’s and Fischel’s unqualified faith in regulating corporations with the default rules that the parties would have contracted for if contracting were costless. The inefficiencies of excessive signaling may, in particular contexts, militate for the use of immutable rules or the strategic choice of defaults — including penalty defaults — that might induce more efficient pooling or separation. In this regard, lawmakers principally have three forms of intervention as an alternative to the hypothetical contract defaults:

- (1) penalty defaults,

36. This point is also recognized by Johnston, *supra* note 2, at 621-22.

- (2) single-sided immutable rules, and
- (3) immutable rules.

Penalty defaults encourage parties to contract around them and thereby may induce more efficient separation.³⁷ Single-sided immutable rules usually allow parties to contract for more fiduciary protection, but prohibit contracting for less than a specified minimum.³⁸ The corporate opportunity doctrine may, for example, represent a single-sided immutable rule. Corporations can contract for higher fiduciary duty not to take corporate opportunities,³⁹ but may not be able *ex ante* to waive the basic fiduciary duty. The immutable ceilings or floors in such single-sided immutable rules might be used by policy makers to induce separation in markets where laissez faire contracting produced inefficient pooling or inefficient separation. Finally, as demonstrated directly in the foregoing model of corporate debt, financing the use of immutable rules to induce a pooled equilibrium can effectively eliminate the debilitating effects of attempts to signal and to signal falsely.

II. REHABILITATING THE HYPOTHETICAL CONTRACT APPROACH

Having argued for the possibility of inefficient corporate contracts, let me now suggest reasons why we do not in practice see the kinds of excessive signaling by those “insiders” who, by definition, have various species of private information to which the market investors are not privy. While asymmetric information models of this kind can generate excessive and inefficient forms of signaling regarding issues of corporate finance and disclosure decisions,⁴⁰ it is more difficult to see how provisions in the corporate charter and by-laws are infected by excessive attempts to signal.

The simple models of asymmetric information set forth above have the good types willing to take on additional liability if things go badly — to signal to the uninformed market that they are good. To be sure there is plenty of asymmetric information in the corporate setting and plenty of good- and bad-type heterogeneity. But the movement of corporate law in recent decades has not been of good

37. See Ayres & Gertner, *supra* note 7, 106-07. Penalty defaults may, however, encourage all parties to contract for a new and inefficient pooled equilibrium.

38. See Ian Ayres, *Analyzing Stock Lock-ups: Do Target Treasury Sales Foreclose or Facilitate Takeover Auctions?*, 90 COLUM. L. REV. 682, 709 (1990).

39. Some corporations, for example, contract for the patent rights to all inventions developed during a job tenure, even if the invention is developed independent of the employment relationship.

40. See generally HUBBARD, *supra* note 22; Ian Ayres, *Back to Basics: Regulating How Corporations Speak to the Market*, 77 VA. L. REV. 945 (1991) (discussing Fraud-on-Market Theory as developed in *Basic Inc. v. Levinson*, 485 U.S. 224 (1988)).

insiders signaling that they are good by taking on additional liability. The legislative race — whether it be to the top or the bottom — has most broadly reduced the fiduciary duties of those very actors who are the most informed. And this legislative movement has not been accompanied by massive efforts by corporations to contract around these duties.

Conceptually, one could tell a story where the investors were willing to waive management liability as a way of signaling managers about some form of investor information. But the realities of the market place and limited liability make it implausible to believe that shareholders in publicly traded corporations possess private information to which the managers are not privy. Thus, the simple signaling model generates “arm-breaking” contracts⁴¹ where insiders would signal their quality by heaping on additional fiduciary duties and higher penalties for breaching these duties. Casual empiricism runs strongly counter to this model’s implication. Why is this so? One answer may be that the inefficient signaling models are artifacts of adverse selection, and in the real world, problems of moral hazard predominate. Rea has shown that trying to control the problems of moral hazard — getting the players to take the right amount of precaution, etc. — might conflict with trying to control the problems of adverse selection.⁴² The possibility that problems of moral hazard dominate the principal-agent context might explain why good corporate agents do not commit to heightened fiduciary duties.

But the rejection of this simple signaling model does not vindicate the Easterbrook and Fischel enterprise completely. Game theorists are just starting to sink their teeth into the complexities of the corporation’s nexus of contracts. An important recent effort by Jason Johnston⁴³ shows that contractual inefficiencies can persist in more detailed models of corporate governance. In the context of closed corporations, Johnston asks whether corporate law should impose a default fiduciary duty upon majority shareholders to discourage majority termination of minority shareholders from participation in the firm. Central to Johnston’s model is double-sided asymmetric information; Johnston assumes that both majority and minority shareholders have private information that is not initially known to the other. Johnston models the double-sided asymmetric information in a way that is a natural extension of our single sided asymmetry. He analyzes the case where there are two types of minority share-

41. See Rea, *supra* note 2, at 196-97.

42. Aghion & Hermalin, *supra* note 2, at 400.

43. Johnston, *supra* note 2.

holders (who manage the corporation), and two types of majority shareholders (who are the entrepreneurs and control the board). Both sides of the contract want to know what type it is dealing with across the table. Suffice it to say that the possibilities for strategic inefficiencies abound in this type of model. It is still important to note, however, that the model is limited to close corporations where double-sided asymmetric information is much more prevalent. The more significant question is whether Easterbrook's and Fishel's hypothetical contract thesis will withstand the game-theoretic challenge as applied to the most important form of business organization — publicly traded corporations.

This article has attempted to argue the more modest claim that hypothetical contract adherents cannot comfortably put their faith in low transaction costs and high numbers of potential contractors. As a practical matter of judicial administration, it is likely that hypothetical standards will continue to be efficient for most legal rules.⁴⁴ But if our faith in efficiency is to have a theoretical as well as an empirical basis,⁴⁵ we must search for other structural bases that would eliminate this possibility of contractual failure. As with a growing number of legal issues, once game-theorists have shown the possibility of strategic inefficiency, the choice of the most efficacious legal rule will devolve to empirical issues instead of *a priori* theory.⁴⁶

44. For an insightful discussion of this point, see Scott, *supra* note 13, at 613-15.

45. It is possible that academics will be satisfied with an empirical assessment that corporate governance provisions are efficient. After all, Posner's common law efficiency hypothesis is supported primarily by his massive empirical effort to demonstrate that the vast majority of common law rules are efficient, even though Posner has been agnostic about providing a theoretic "causal mechanism" for this efficiency. See, e.g., WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF TORT LAW* 14 (1987).

46. See Ayres, *supra* note 1, at 1315-17.