

3-4-2003

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Kent Greenfield

Boston College Law School, kent.greenfield@bc.edu

Peter Kostant

Visiting Professor, University of Iowa College of Law

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Recommended Citation

Kent Greenfield and Peter Kostant. "An Experimental Test of Fairness Under Agency and Profit Constraints (With Notes on Implications for Corporate Governance)." *George Washington Law Review* 71, (2003): 983-1024.

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BOSTON COLLEGE LAW SCHOOL

PUBLIC LAW AND LEGAL THEORY

RESEARCH PAPER SERIES

RESEARCH PAPER NO. 05

March 3, 2003

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Kent Greenfield

Associate Professor, Boston College Law School

Peter Kostant

Visiting Professor, University of Iowa College of Law



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An Experimental Test of Fairness
Under Agency and Profit Constraints
(With Notes on Implications for Corporate Law)[†]

Kent Greenfield*
Peter Kostant[#]

I. Introduction

Much of economic theory is driven by the belief that individuals make rational decisions based on maximizing their individual utility.¹ Nothing in conventional economics strictly requires defining self-interest so “myopically” that other regarding preferences are ignored. Nevertheless, that is how most traditional economics has viewed rational choice. This largely egoistic or selfish view of rationality applies even more strongly to much of law and economics, a discipline which Robert Frank has described as “Posnerian,” and “skeptical of non-material

[†] © 2002 Kent Greenfield and Peter Kostant. Working draft of March 4, 2003. Please do not cite without authors’ permission. The authors would like to thank Gregory Dow, Larry Mitchell, Tom Tyler, Christine Jolls, and the participants in the 2002 Sloan Summer Institute for the Study of Business in Society for helpful comments and suggestions. Many thanks also to Will Lowe, research fellow at Center for Basic Research in the Social Sciences, Harvard University, for very helpful and sophisticated statistical analysis.

* Associate Professor of Law, Boston College Law School; J.D., University of Chicago; A.B., Brown University.

[#] Visiting Professor of Law, University of Iowa College of Law; J.D., Fordham University; M.A., Washington University in St. Louis; B.A., Yale University.

¹ Robert B. Thompson, *Teaching Business Associations: Norms, Economics and Cognitive Learning*, 34 GEORGIA L. REV. 997, 1000 (2000) (explaining that “economics ...assumes choices based on maximizing individual utility.”)

motives.”² In fact, Posner has rejected “woolly legal notions like ‘fairness’ and ‘justice’ as ‘terms which have no content.’”³

Most legal scholars have come to (or always did) recognize the limitations of traditional law and economics, because of its obtuseness in failing to recognize that most individuals in fact do not act as if they were solely self-interested.⁴ More and more legal scholars are thus using behavioral psychology to obtain a richer understanding of individuals’ economic and legal behavior. “Behavioral economics,” or “behavioral law and economics (BLE),” offers new and intriguing tools for legal scholars. While adopting some of the conventional premises of law and economics, such as the belief that legal rules affect behavior, BLE distances itself from many of the traditional assumptions of law and economics, such as a dependence on individual economic “rationality” as the sole determinant of behavior. BLE does this in part by using insights from psychology, which provide an account of human behavior that is more sophisticated than typically used in economics. BLE scholars have given scholarly weight to the common sense insight that individuals make decisions and act in the world on many different bases, only some of which can be described as economic. Utility maximization is only one rationale for action; certain behaviors are much more readily explained by psychological and behavioral phenomena that have little to do with personal utility maximization.

In particular, behavioral scholars have done much to advance the understanding of other-regarding preferences (“ORPs”), the notion that individuals act in part based on preferences that take into account the interests, desires, preferences, and needs of others. As BLE scholars have become more sophisticated, it has become easier – and more pressing – to examine the implications for law of consistent and patterned deviations from rational choice predictions. ORPs constitute an important group of these deviations.⁵

² ROBERT H. FRANK, *PASSIONS WITHIN REASON* (1998) at 163.

³ *Id.*

⁴ As one scholar has aptly observed, “People behave rationally. Except, apparently, when they don’t.” Owen D. Jones, *Time-Shifted Rationality and the Law of Law’s Leverage: Behavioral Economics Meets Behavioral Biology*, 95 N.W. U. L. REV. 1141,1141 (2001).

⁵ *Id.* at 1142.

One of the remaining bastions of traditional law and economics is corporate law scholarship,⁶ in which the corporation is viewed as a nexus of express and implied contracts entered into by rational, utility maximizing constituencies. Though this model continues to dominate the pedagogy and scholarship of corporate law in the United States, it largely ignores the possibility that actors within the corporation are affected by complex norms of behavior that take into account ORPs and other non-utilitarian motivations.

This failure of the traditional, law and economics view of corporate law has both descriptive and normative implications.⁷ For example, as a descriptive matter, an acknowledgement of the possibility of ORPs among corporate managers could help explain why the black-letter requirement of profit maximization is mitigated by the business judgment rule and, in most states, stakeholder statutes. Both give managers more ability to act on the basis of ORPs to take into account the interests of non-shareholder constituencies than a strict profit rule would allow. Indeed, the presence of ORPs among managers could help explain why the profit rule exists in the first place. Absent the rule, shareholders might worry that the managers' ORPs for shareholders might be outweighed by their ORPs for other constituencies. More generally, an understanding of the presence of any systematic "irrational" motivation such as a taste for fairness could help in developing a counter-narrative to that of corporations composed of constituencies that optimally determine their mutual rights and obligations by contract.⁸ An important part of developing this alternative story is to examine how the interaction of ORPs and current norms of corporate behavior affect corporations.⁹

⁶ See JENNIFER ARLEN ET AL., ENDOWMENT EFFECTS WITHIN CORPORATE AGENCY RELATIONSHIPS (USC CLEO, Research Paper No. C01-1, 2001, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=276110 at 1 (noting that behavioral economics raises "fundamental doubts" about traditional law-and-economics approach to business law). See also Kent Greenfield & John E. Nilsson, *Gradgrind's Education: Using Dickens and Aristotle to Understand (and Replace?) the Business Judgment Rule*, 63 BROOKLYN L. REV. 799 (1998) (arguing that corporate law is the "closest living relative" of classic utilitarianism).

⁷ See Lynn A. Stout, *In Praise of Procedure: An Economic and Behavioral Defense of Smith v. Van Gorkom and the Business Judgment Rule*, 96 N.W. L. REV. 675 (2002) (discussing ORPs as a partial basis for directors taking due care notwithstanding the low probability of liability for acting without due care).

⁸ Thompson, *supra* n. ___, at 1003. See also Larry Mitchell, *Trust and Team Production*, 24 J. of Corp. L. 869 (1999).

⁹ Arlen, et al. *supra*, n. 6, at 2.

Normatively, an acknowledgement of the presence and power of ORPs among corporate managers could provide an argument for a permissive rule of corporate management (such as that exemplified by the business judgment rule and stakeholder statutes), if one believes that ORPs are to be encouraged. On the other hand, one could use the presence of ORPs to argue that managers should be held to a strict norm of profit maximization in order to guard against the managers' urges to use corporate assets to benefit non-shareholder constituencies.

Much could turn, therefore, on a more sophisticated understanding of the role played by ORPs within corporations and corporate law. In this study, we begin to explore the strength of one particular ORP, which we call "fairness." In this context, what we mean by "fairness" is simply a belief that people should share a given set of assets. Of course, all people do not believe they should share, and even the most generous person may not share at all times. But studies do indeed show that most people hold robust and fairly consistent beliefs about the importance of sharing in given contexts.¹⁰ What we do in this study is to test these norms in a principal-agent context, which can be analogized to that of a firm.

We focus on an analysis of ORPs in a principal-agent context because directors are generally considered agents for the corporation.¹¹ How can we understand the behavior of directors? They are bound by largely aspirational fiduciary duties,¹² and they are driven by a norm requiring them to act to maximize shareholder wealth.¹³ Some eminent scholars even argue that this norm has become so powerful and pervasive that it represents the "end of corporate law" as a field containing competing paradigms.¹⁴ Yet little is known about the interaction of ORPs with the legal and market-driven norms that otherwise affect the decisions of corporate directors. To date, little work has been done on exploring ORPs in the principal-agent context.¹⁵ We

¹⁰ See studies cited *infra* at n. ____.

¹¹ ROBERT C. CLARK, CORPORATE LAW § -- at -- (1986).

¹² Melvin A. Eisenberg, *Corporate Law and Social Norms*, 99 COLUM. L. REV. 1253 (1999).

¹³ *Id.* at ____.

¹⁴ Henry Hansmann & Reinier Kraakman, *The End of History for Corporate Law*, 89 GEO. L. J. 439 (2001).

¹⁵ The most relevant study to date is that of Jennifer Arlen, et al., *supra* n. 7. Their study indicates that the agency relationship may dampen ORPs. As discussed *infra*, our findings are consistent in some ways, and differ in some respects. Arlen, et al., however, seek to measure ORPs between agency and principal; our study examines the effect of an agency-principal relationship on the agent's ORPs vis-à-vis third parties. For other studies concerning

believe our study to be the first to examine the effect of an agency relationship on the agent's ORPs vis-à-vis others.

Our findings are dramatic. Our study indicates a significant decrease in a concern for fairness when a participant in a market transaction acts as an agent for another and owes a duty to maximize the return to the principal. We find no such decrease when the agent is acting without the explicit duty to maximize return to the principal. These findings were made in the context of a modified "ultimatum game," a classic one round, non-cooperative "fairness" experiment which isolates out both the impact of reputation and learning from repeat playing.¹⁶ We believe it is important to examine carefully any norm for agents that may increase unfairness to third parties. While recognizing the risks of extrapolating from our experiments to actual practice, one could suggest that our findings indicate that existing corporate law may indeed provide incentives to director/agents to act unfairly toward non-shareholder stakeholders when the directors attempt to serve the interests of the shareholders.¹⁷

This paper proceeds thusly. Part II describes ultimatum games, how they have been used to date in exploring the strength of fairness norms in market exchanges, and how ultimatum games have been used to date in legal scholarship. Part III provides a more in-depth description of the theoretical justification for the experiments we conducted. Part IV describes the

behavior within principal/agent contexts, see, e.g., Werner Güth, Wolfgang Klose, Manfred Königstein and Joachim Schwalbach, *An Experimental Study of a Dynamic Principal – Agent Relationship*, 19 *MANAGE. DECIS. ECON.* 327 (1998) (examining principal's trust and agent's reciprocity in principal-agent relationship); Ernest Fehr, Simon Gächter and George Kirchsteiger, *Reciprocity as a Contract Enforcement Device: Experimental Evidence*, 65 *ECONOMETRICA* 833 (1997) (examining reciprocity in similar context).

¹⁶ One theoretical reason to examine the impact of behavioral norms in the Ultimatum Game is provided in the work of Ken Binmore, a scholar skeptical of claims that the game establishes continued fairness over time. KEN BINMORE, *GAME THEORY AND THE SOCIAL CONTRACT, VOLUME 2: JUST PLAYING* (1998) at 29-37. Binmore nevertheless believes that the fairness observed in players is consistent with what he calls a "homo sociologicus" model in which the laboratory experiment "triggers a fairness norm in the heads of the participating subjects, who then simply 'play fair.'" *Id.* at 36-37.

¹⁷ Moreover, these cognitive biases may exacerbate certain existing but unfortunate aspects of fiduciary duty. An extreme example is the traditional view that lawyers, as fiduciaries for clients in an adversarial legal system, must behave unfairly. A famous practitioner, Charles P. Curtis, explained that he had an ethical duty to breach an oral contract, not legally binding because of the statute of frauds, in order to accept a better offer for his client. Curtis observed that he heartily agreed that he was behaving like "a son of a bitch to do it." Charles P. Curtis, "The Advocate" from *IT'S YOUR LAW* (1954) excerpted in JOHN NOONAN AND RICHARD PAINTER, *PROFESSIONAL AND PERSONAL RESPONSIBILITIES OF THE LAWYER* (1996) at 52. Recent findings in cognitive psychology are showing just how pernicious such a review of fiduciary duty may be.

experiments as we conducted them, and Part V sets out the findings. Part VI concludes by sketching out some of the potential implications for the dramatic findings of our study.

II. Ultimatum Games in Legal Scholarship

A. Basics of the Ultimatum Game

The ultimatum game is an experiment that is typically played with two parties.¹⁸ The experimenter gives the first person, the proposer, a pot of real or fictional money. The proposer must propose an allocation of the money between herself and the other party, the responder. The proposer can keep all the money for herself, give the responder a little, or give the responder a lot. In response, the responder can only make one move. She can either accept or reject the deal. If the responder accepts the deal each party will receive the amount the proposer allocates to her. If the responder rejects the deal, neither party will receive anything. Typically, neither party knows the identity of her counterpart, and the parties play the game against each other only once, so reputational effects and the possibility of retaliation are eliminated as factors.

According to traditional economic theory, there is only one rational outcome for the game. Whatever the proposer offers, as long as it is greater than nothing, it is rational for the responder to accept the deal. The economically rational offer for the proposer to make is the smallest unit of currency available because it is expected that the responder will accept any offer greater than zero. But “[t]his turns out to be a very bad prediction about how the game is actually played.”¹⁹ The numbers vary, but it is quite common for responders to reject offers of less than twenty percent of the total amount available. In fact, the average minimum amount that responders say they would accept is between 20% and 30% of the total sum.²⁰ In other words,

¹⁸ The scholarship on ultimatum games is extensive. The Jolls, Sunstein, and Thaler article cited above is probably among the most accessible introductions for the legal scholar. Jolls et al., *Behavioral Approach*. Also, there are numerous articles with more rigorous descriptions and analyses from an economic perspective. See, e.g., Gary E. Bolton, *Anonymity versus Punishment in Ultimatum Bargaining*, 10 GAMES & ECON. BEHAV. 95 (1995); Rachel T.A. Croson, *Information in Ultimatum Games: An Experimental Study*, 30 J. ECON. BEHAV. & ORG. 197 (1996); David Dickinson, *Ultimatum Decision-Making: A Test of Reciprocal Kindness*, 48 THEORY & DECISION 151 (2000); Glenn W. Harrison & Kevin A. McCabe, *Expectations and Fairness in a Simple Bargaining Experiment*, 25 INT’L J. GAME THEORY 303 (1996); Vesna Prasnikar & Alvin E. Roth, *Considerations of Fairness and Strategy: Experimental Data from Sequential Games*, Q.J. ECON. 865 (Aug. 1992); Ramzi Suleiman, *Expectations and Fairness in a Modified Ultimatum Game*, 17 J. ECON. PSYCH. 531 (1996).

¹⁹ Jolls et al., *Behavioral Approach*, at 1490.

²⁰ *Id.* Fehr and Gächter summarize the major studies saying that “proposals that give the Responder less than 30 percent of the available sum are rejected with a very high probability.” FEHR & GÄCHTER, at 5.

responders would sometimes prefer no deal rather than an unfair one, even if the unfair deal would make them better off financially.²¹

Interestingly, proposers tend to offer somewhere between 40% and 50% of the pot to the responders.²² This effect could be based on a belief that the responder is not a rational economic actor, so the amount the proposer offered reflects a judgment about what the responder's reservation price is likely to be. On the other hand, the proposer's offer might be based on an altruistic motive. The proposer may suggest an allocation based not on a rational judgment about what the proposer would likely accept, but on the basis of what would be a fair amount to allocate to the responder. The latter explanation gains credence from data showing that participants' behavior is affected by their relationships with the other parties in the game. If the participants know and care about the other players of the game, their bargaining behavior is more likely to be "fair" than economically "rational."²³

Note the presence of "good" behavior as well as "bad" or spiteful behavior. The proposer offers more than she needs to offer, but the responder rejects deals that would benefit both parties if the offer is too unfair. The issue, of course, is what is "fair." In the context of ultimatum games, "[p]eople judge outcomes to be 'unfair' if they depart substantially from the terms of a 'reference transaction' – a transaction that defines the benchmark for the parties' interactions."²⁴ If parties are dividing an amount of money that neither party is more entitled to than the other, such as when the experimenter in the game provided the money, the reference

²¹ Fehr and Gächter report that this kind of "negative" reciprocity "is observed in a wide variety of cultures, and high monetary stakes do not change or have only a minor impact on these experimental results." *Id.*

²² Jolls et al., *Behavioral Approach*, at 1490.

²³ See Jason F. Shogren, *Fairness in Bargaining Requires a Context*, 31 *ECON. LETTERS* 319, 322 (1989) ("A bargainer will be fair to the group with whom his loyalties lie."); Richard Thaler, *The Ultimatum Game*, 2 *J. ECON. PERSP.* 195, 205 (1988) (noting that more generous offers in ultimatum game were made between bargainers within same group, while least generous offers were made across groups); cf. Roy Radner & Andrew Schutter, *The Sealed-Bid Mechanism: An Experimental Study*, 48 *J. ECON. THEORY* 179, 209-10 (1989) (describing non-ultimatum game bargaining experiment and noting success of face-to-face bargaining in achieving transactions, but noting high variance in prices formed, suggesting that "while the face-to-face mechanism may exhibit high efficiency levels, it may be lacking in terms of equity").

²⁴ Jolls et al., *Behavioral Approach*, at 1496 (citing Daniel Kahneman et al., *Fairness as a Constraint on Profit Seeking: Entitlements in the Market*, 76 *AM. ECON. REV.* 728, 729-30 (1986)).

transaction is typically an even split among the parties, or close to it.²⁵ If there is some reason both parties consider one party to be more entitled to the money, then the reference transaction favors the person the parties see as having a greater entitlement.

B. Applications of the Ultimatum Game in Legal Scholarship

Legal scholars have employed ultimatum game bargaining experiment results to examine the role that ORPs such as fairness can play in a large number of different legal settings. These results have been used as evidence of the importance fairness considerations in legal fields such as contracts,²⁶ negotiations,²⁷ property,²⁸ product liability,²⁹ corporate bankruptcy,³⁰ and corporate governance.³¹ Ultimatum game bargaining experiments have been widely discussed in the expanding law and behavioral economics literature.³²

Because the results of the Ultimatum Game so clearly indicate systematic consideration of fairness at variance with any conventional definition of rational utility maximization, the game has stimulated much interesting scholarship. Tom Ulen has written about how the research findings of BLE, including the ultimatum game, will require a re-thinking of rational choice theory.³³ For example, a workhorse of law and economics is the Coase Theorem, which provides

²⁵ *Id.*

²⁶ Thomas S. Ulen, *Firmly Grounded: Economics in the Future of the Law*, 1997 WISC. L. REV. 433 (1997).

²⁷ See Richard Birke & Craig R. Fox, *Psychological Principles in Negotiating Civil Settlements*, 4 HVN L. R. 1 (1999); Peter H. Huang, *Reasons Within Passions: Emotions and Intentions in Property Rights Bargaining*, 79 OR. L. REV. 435 (2000); Russell Korobkin, *A Positive Theory of Legal Negotiation*, 88 GEO. L. J. 1789 (2000).

²⁸ See Daphna Lewinsohn-Zamir, *The Choice between Property Rules and Liability Rules Revisited; Critical Observations from Behavioral Studies*, 80 TEX L. REV. 219(2001).

²⁹ See Jon. D. Hanson & Douglas A. Kysar, *Taking Behaviorism Seriously: The Problem of Market Manipulation*, 74 N.Y.U.L. REV. 630 (1999).

³⁰ See Susan Block-Lieb, *The Logic and Limits of Contract Bankruptcy*, 2001 U. ILL. L. REV. 503 (2001).

³¹ See Kent Greenfield, *Using Behavioral Economics to Show the Power and Efficiency of Corporate Law as Regulatory Tool*, 35 U.C. DAVIS L. REV. 581 (2002). For a more detailed description of the possible implications of ultimatum game experiments on corporate law scholarship, see *infra* text at notes ___. Other corporate law scholars have used behavioral insights to analyze a range of corporate governance issues. [add cites: Cunningham, Langevoort, Stout, Arlen, etc]

³² See. e.g., Ulen, *supra* n. __.

³³ *Id.* at 458-59.

that when transaction costs are low, the market enables parties to bargain to divide a cooperative surplus without the need for legal supplementation. As Ulen has written “the results of the ultimatum bargaining game experiments point out that there may be circumstances in which a bargain will not occur even though, on Coasian grounds . . . we should expect a bargain to take place. Therefore, we may wish to be less sanguine about the scope of unregulated behavior and more aggressive about legal intervention in order to prevent over-reaching in bargaining situations.”³⁴ Ulen suggests that this problem with the applicability of the Coase Theorem may also require a “rethinking” of the view that contract law is a “set of off-the-shelf default rules.”³⁵

Ulen has also suggested that the weakness of the Coase Theorem may have important implications for property law and bargaining.³⁶ “[T]he Calabrese and Melamed suggestion for choosing between property and liability rules solely on the basis of transaction costs may need to be amended in light of the results of the ultimatum bargaining game experiments.”³⁷ On the other hand, Daphna Lewinsohn-Zamir has used the results of ultimatum game bargaining experiments to suggest that the original conclusion of Calabrese and Melamed that property rules (equitable relief) should be preferred over liability rules (compensatory money damages) whenever transaction costs are low is indeed correct.³⁸

Lewisohn-Zamir questions the accuracy of recent suggestions of scholars such as Ayers and Talley, and Kaplow and Shavel that liability rules are preferable because property rules enable entitlement owners to behave greedily to capture all gains. She argues instead that the results of ultimatum game bargaining experiments underscore the existence of fairness preferences. Moreover, she compares bargaining in the shadow of potentially coercive liability

³⁴ *Id.* at 459.

³⁵ Cite.

³⁶ *Id.* at ____.

³⁷ Ulen, *supra* note __, at 459.

³⁸ Daphna Lewinsohn-Zamir, *The Choice between Property Rules and Liability Rules Revisited: Critical Observations from Behavior Studies*, 80 TEX. L. REV. 219 (2001).

rules to the Dictator Game which consistently generates results that are systematically less fair than those of the Ultimatum Game.³⁹

Owen Jones has discussed the Ultimatum Game in particular, and the experimental results of BLE in general, in the context of suggesting a theoretical model for the entire field based upon evolutionary biology.⁴⁰ Jones explains while the Ultimatum Game does not generate a consistent maximum return, seemingly inefficient preferences for fairness and spite may have a rational basis in behavioral biology. Even if these preferences no longer seem “rational,” they may have been evolutionarily favored because fairness helped to foster necessary cooperation, and “it is adaptive to identify cheaters, and to be identified as a non-sucker – someone not easily exploited. Consequently, the predisposition to act spitefully when being unfairly exploited by a stingy cooperator may be a time-shifted rationality, underpinning seemingly irrational behavior in modern contexts.⁴¹

In a thoughtful critique of BLE, Kyron Huigens provides a philosophically informed discussion of the Ultimatum Game.⁴² Huigens suggests that the importance of fairness must be viewed deontologically within virtue ethics and not as part of a consequentialist economic analysis.⁴³ The experiments indicate the existence and power of fairness as a value, but Huigens argues that BLE’s attempt to reduce concerns about this value to a preference for other’s welfare that can be treated like any other utility function is doomed to failure. “Fairness recognizes irreducible, context-dependent and incommensurable values.”⁴⁴ Recognition of humane values beyond the humane values of the marketplace remains important, but economics is not equipped to address them.⁴⁵

³⁹ *Id.* In the Dictator Game the responder has no power to reject the allocation and must accept whatever is proposed. The results from this game are much less egalitarian than in the Ultimatum Game. *Id.* at 240.

⁴⁰ Jones, *supra* n. __, at __.

⁴¹ *Id.* at 1183.

⁴² Kyron Huigens, *Law, Economics, and the Skeleton of Value Fallacy*, 89 CALIF. L. REV. 537 (2001).

⁴³ *Id.* at 560.

⁴⁴ *Id.* at 561

⁴⁵ *Id.* at 568. For another deontological discussion of the Ultimatum Game see Alan Strudler, *Moral Complexity in the Law of Non-Disclosure*, 45 UCLA L. REV. 337, 374 (1997) (arguing that the deserved advantage principle is established by Ultimatum Game results and should be regarded as deontological).

Our projects seeks to add to this important scholarship by using a modified ultimatum game to analyze the strength of fairness norms in a context of an agent’s behavior when acting alternatively with and without a duty to maximize the return to the principal. As set out below, our findings thus far indicate that the agency relationship alone does not materially affect behavior, but that a wealth maximization norm, added to the agency relation, has a robust impact by reducing behavior responding to fairness norms.⁴⁶ The next Part explores more in depth the theoretical underpinning of our project within corporate law and scholarship.

III. Theoretical Justification for Study

A. The Potential Implications of Behavioral Economics on Corporate Law

The contributions of BLE to scholarship are already significant, mostly in bringing into question the canonical assumption, which drives many areas of the law, that individuals maximize utility. The potential impact of BLE is particularly striking in corporate law, traditionally an intellectual bastion of economic conventionalism.⁴⁷ The dominant contemporary view of corporate law is contractarian, meaning that corporate constituencies are assumed to be best able to determine their mutual rights and obligations by way of voluntary arrangement.⁴⁸ Law should not dictate the details of the obligations among the parties because each party is assumed to know her own interests and to protect them best through bargaining and exchange.

This view of corporate law, then, depends fundamentally on the notion that the participants in the corporate contract are economically rational actors. If they do not know their best interests, or do not act so as to maximize their utility, the arrangement will differ, perhaps substantially, from what would be efficient. In certain circumstances, such divergence from efficiency is an important and serious public policy problem. Accordingly, one important potential contribution of BLE to corporate law is to help predict in what contexts individuals’

⁴⁶ The norm of shareholder wealth maximization is widely accepted, but as Jeffrey Gordon has recently suggested, there is not, as yet, any empirical evidence that shareholder wealth maximization is beneficial to corporations (cite).

⁴⁷ See Arlen, et al., *supra* n. 7, at 1. See also Kent Greenfield & John E. Nilsson, *Gradgrind’s Education: Using Dickens and Aristotle to Understand (and Replace?) the Business Judgment Rule*, 63 BROOKLYN L. REV. 799 (1998) (arguing that corporate law is the “closest living relative” of classic utilitarianism).

⁴⁸ See generally FRANK H. EASTERBROOK & DANIEL R. FISCHEL, *THE ECONOMIC STRUCTURE OF CORPORATE LAW* (1991).

behavior diverge from what is conventionally termed an efficient outcome and to suggest ways for law to correct for such biases in some way.

Perhaps the most important area of potential BLE contribution to corporate law is within the debate about the role of corporations in society, and whether corporate governance should include consideration of interests other than those of shareholders. If a corporation's stakeholders prefer to make decisions on the basis of values other than utility maximization, the normative justifications for an efficiency-focused corporate law become more difficult to make.

Moreover, BLE could help weaken the contractarian arguments against legal and regulatory intervention to protect various stakeholders in the firm. Under contractarian theory, because everyone is assumed to be able and willing to protect their own interests, the role of government is understandably minimized. And, more profoundly, when government seeks to help participants in the corporate enterprise, contractarian analysis supposes that such efforts are in fact harmful to the intended beneficiaries of the government protection. Whichever party to the contract has superior bargaining power will simply force other parties to the contract to pay for whatever regulatory benefit bestowed upon them.

Insights from BLE could provide some answers to these anti-regulation contractarian arguments. First, it might be the case that people do not know their interests well at all, and government regulation could help protect those interests nevertheless or help individuals learn what their own interests are.⁴⁹ Second, if there is some "stickiness" in bargaining terms because of endowment effects or some other cognitive bias toward the status quo, government intervention on behalf of one party to the corporate contract might indeed provide real benefits to that party because it will be difficult for other elements of the contract to be adjusted to compensate.⁵⁰ Third, if BLE indicates that people (even people within corporations) concern themselves with principles other than, or in addition to, efficiency, then government regulation in furtherance of those other principles or to encourage behavior based on those other principles might not cause a renegotiation of unrelated terms in the corporate contract.

⁴⁹ See CASS R. SUNSTEIN, *FREE MARKETS AND SOCIAL JUSTICE*, 326-30 (1997) (discussing value of information as tool to help people learn what their interests in fact are).

⁵⁰ See Russell Korobkin, *The Status Quo Bias and Contract Default Rules*, 83 *CORNELL L. REV.* 608 (1998) (status quo bias prevents contracting parties from bargaining around default rules, even when doing so is in their best interests); Ian Ayres & Robert Gertner, *Strategic Contractual Inefficiency and the Optimal Choice of Legal Rules*, 101 *YALE L. J.* 729, 746-59 (1991) (discussing legal implications of high costs of contracting around default rules).

BLE analysis of corporate law also adds to the normative arguments in favor of a stakeholder view of corporate governance. One of us has used results from various behavioral experiments to argue that by changing corporate governance in the United States, one can efficiently attain “certain preferred policy outcomes, such as an increase in the wages of working people and a decrease in income inequality.”⁵¹ Basic to this argument that a change in corporate governance would be beneficial is that, at present, legal structures and the norms they embody – such as the duty to maximize shareholder return – constrain corporate directors from behaving in ways that they themselves would consider fair or just.⁵² They are required by law and practice to concern themselves with fairness only vis-à-vis the shareholders, and to discount or disregard their concerns for fair treatment of any constituency other than shareholders. If, however, directors were less constrained by shareholder primacy, they would be able to take into account the concerns of stakeholders other than shareholders. They would tend to act with more fairness toward other constituencies, and such fairness would be revealed in salary and wage decisions and perhaps in any number of additional ways.⁵³ In this view, corporate directors are likened to proposers in a complex ultimatum game in which their main goal is to allocate the resources in such a way that no stakeholder withdraws from the game. The claim is that, freed from the duty to maximize shareholder return, directors would act similarly to typical proposers in ultimatum games and consider fairness as one of the touchstones of their decision making.

Some states have indeed weakened the shareholder primacy norm by adopting “stakeholder statutes” that permit corporate directors to take into account the interests of non-shareholder constituencies when making important corporate decisions.⁵⁴ Many corporate scholars believe that a weakening of the obligation to maximize profit, whether through stakeholder statutes or some other change in corporate governance, would not inure to the benefit

⁵¹ Greenfield, *supra*, note 33, at at ____.

⁵² See Greenfield & Nilsson, *supra*; Lawrence E. Mitchell, *Cooperation and Constraint in the Modern Corporation: An Inquiry into the Causes of Corporate Immorality*, 73 TEX. L. REV. 477 (1995).

⁵³ The presence of a stakeholder statute would not remove completely the influence of the shareholder primacy norm, because of the still-extant legal and commercial infrastructure that support the norm even for companies governed by stakeholder statutes. Thus one might expect some greater ability on the part of directors to act on the basis of fairness norms, but fairness norms would of course not be the directors’ only basis for action.

⁵⁴ [Cites.] One state, Connecticut, *requires* directors to take non-shareholder interests into account in certain circumstances. [Cite.]

of non-shareholder stakeholders.⁵⁵ The management, these scholars argue, would simply use their greater discretion to benefit themselves.

Other scholars (including one of us) argue that stakeholder statutes – or other methods of weakening the profit-maximization norm – could provide measurable benefits to workers and other non-shareholder stakeholders.⁵⁶ One mechanism by which this would occur would be for the directors’ beliefs about fairness to influence them to distribute more of the corporate surplus to workers or other contributors to the corporate enterprise. Such a distribution would normally produce specific, preferred public policy outcomes, such as a decrease in income inequality and an increase in hourly wages.⁵⁷ This assertion is supported by a recent study by Marianne Bertrand and Sendhil Mullainathan, who studied the impact of state anti-takeover legislation on wages.⁵⁸ They reasoned that anti-takeover legislation passed in many states during the 1980s decreased the threat of takeovers and thus expanded managerial discretion. Using firm-level data, Bertrand and Mullainathan found that these laws increased wages 1% to 2%, or about \$500 per year.⁵⁹ This study thus bolsters the proposition that managers, if given more legal discretion to allocate the firm’s surplus without fear of legal challenge, would allocate more of it to labor.

The potential implications of BLE for corporate law and scholarship are thus significant. BLE may not only bring into question the fundamental premises of economic rationality that underlie the contemporary view of corporate law but may also provide a foundation for positive arguments in favor of what might replace conventional corporate law theory.

B. Purpose and Nature of Current Project

We believe that ultimatum game experiments offer one method to test the possible efficacy of changes in corporate governance, by testing whether people act differently in market transactions when they are constrained by an agency relationship and by an obligation to

⁵⁵ [Cites.]

⁵⁶ See Greenfield, *supra*.

⁵⁷ Greenfield, *supra* n. 33, at 636.

⁵⁸ Marianne Bertrand and Sendhil Mullainathan, *Is There Discretion in Wage Setting? A Test Using Takeover Legislation*, 30 RAND J. OF ECON. 535 (1999).

⁵⁹ *Id.* at 535.

maximize the return from the game to the principal.⁶⁰ As described in Part II, ultimatum game experiments are discussed routinely in psychological, behavioral economics, and legal scholarship. They seek to learn whether people act only in ways that maximize their economic well-being or whether other principles influence their behavior. If they act differently when they are acting on their own behalf than when they are acting under constraints that are analogous to constraints imposed by corporate law, then such findings might have implications for corporate governance scholarship.

We modified the traditional form of the ultimatum game for use in a classroom setting and then conducted two sets of experiments. The experiments were designed to test: (1) whether individuals' concerns for fairness are dampened when they act as agents for a third party; and (2) whether individuals' concerns for fairness are dampened when the agency relation is supplemented with an obligation to maximize the return to the third party. These tests are relevant to the issues in the corporate governance scholarship with regard to whether corporate directors should be considered agents of shareholders, and whether corporate directors should be held to a duty to maximize shareholder profit. To our knowledge, ultimatum tests have not yet been used specifically to test the traditional assumptions underlying corporate law theory and doctrine in the United States. Thus, we believe our experiments to be the first that use some version of the ultimatum game to test different modes of corporate governance.

⁶⁰ The proposition that a fiduciary duty to one party weakens the ability to be fair to other parties has not been widely tested in experimental settings. One relevant test was conducted a number of years ago by Helmut Lamm. See Helmut Lamm, *Group Related Influences on Negotiation Behavior: Two-Person Negotiation as a Function of Representation and Election*, in BARGAINING BEHAVIOR 284 (Heinz Sauermaun, ed., 1978). Lamm conducted experiments testing how negotiation behavior would be affected when both negotiators acted for others as representatives rather than acting only for themselves. Lamm reported that "elected representatives, as compared to non-representatives, negotiated with greater toughness but less success: negotiations were broken off more frequently, less profit was obtained, and (own) satisfaction was lower. Thus, social role demands, while presumably creating pressure for superior outcomes, had the 'ironic' effect of inferior outcomes." *Id.* at 284. Our results are consistent in significant ways with Lamm's results. We also find that agents, acting under a duty to maximize the return to their principals, showed less willingness to share a pot of money with third parties. In an ultimatum game context, this resulted in fewer "deals" being successful. See *infra*.

IV. Design of Experiments⁶¹

A. Basic Design Elements

Two sets of ultimatum games were conducted, both among first-year law students in constitutional law classes taught by colleagues at Boston College Law School. Neither of the authors had visited or participated in the class before the day of the experiment. The experiments were conducted immediately following their regularly-scheduled class, and the students' participation was totally voluntary. In both classes, approximately a third of the students in the course stayed to participate.⁶² In the first set of experiments, conducted on April 26, 2002, a total of 38 students participated. In the second set of experiments, conducted on May 7, 2002, a total 34 students participated.⁶³ A total of 72 students participated in the experiments. All students were at the end of their first year of law school at Boston College. All of the students in each class were in the same first-year section and thus had shared most of the same courses over the year. The familiarity among the students was thus high.

Because the reliability of results is considered greater when real money is at stake, we devised a method by which students would act as though real money was at stake even though we did not have the funds to have every student play with real money.⁶⁴ In both sets of experiments, a significant portion of the students were randomly selected after the completion of the experiment to have their "deals" consummated using real money. In the first experiment, a total of 10 pairs of students, over half of the students who participated, were selected to have one of their bargains consummated. Of these 10 pairs, 7 pairs had reached a "deal," and \$350 was allocated. In the second experiment, a total of 12 pairs of students, or 71% of the students in the experiment, had their bargains consummated. Of these 12 pairs, seven had reached a "deal," and

⁶¹ We are extremely interested in the feedback of readers with regard to the design of these experiments. We conducted these experiments with funds received as part of a small grant from Boston College. We hope to receive more funding from other sources in the near future, which will give us further opportunities to expand and adjust our experiments.

⁶² Because participation was voluntary, and because not everyone who participated were assured of receiving money, the self-selection of the group may have skewed the experiment toward more "altruistic" results.

⁶³ The authors also conducted several pilots of these experiments. Money was used in only one of these pilots. The results of the pilots, however, are largely consistent with the results of the experiments described in the text.

⁶⁴ We are grateful to Tom Tyler for his assistance in this part of the experimental design.

again \$350 was allocated. The ex ante likelihood that the bargains would be consummated was quite high in both experiments, which means that it is likely that the students in the experiment indicated their real preferences during the experiments.

We also faced issues of confidentiality. We believed that the results would be more reliable if the test subjects were not concerned about reputation effects. We dealt with this concern in several ways. First, each student was given a unique identification number, and the students were told that their answers would be identified only by their number in any report of results. We told them that there would be no way for the authors to link them to their answers. We also informed students that their answers would remain confidential from any other person involved in the experiment, including the student with whom they were paired in the ultimatum game.

There were two ways, however, that the confidentiality of results might be considered compromised. In both experiments, the students were informed with whom they were paired at some point during the experiment. This was necessary because one of the things we wanted to test was whether there would be a difference between the offering and reservation prices under alternating conditions of anonymity and knowledge. In order to inform each student whom they were paired with, we asked each pair of students, identified by their numbers only, to raise their hands so that they could see with whom they were paired. Because we were in the room during this process, the students might have been concerned that we could have taken note of which student was which. We made a point of not doing so, but a student concerned about confidentiality might nevertheless have felt her anonymity was compromised by this design.

The second way the anonymity was compromised occurred in the first experiment only. In order to allocate the cash payments at the completion of the entire experiment, ten pairs of students were randomly selected by having students choose index cards each marked with an identification number. In the second iteration of the first experiment, as described below, the proposers were acting as agents for another student in the room, who was identified only on an index card within a sealed envelope held by each proposer. For the pairs chosen to have their deal consummated for the second turn, the agents were instructed to open their envelopes and read the identification number of the student for whom they were acting. The students whose cards were picked left the room, in pairs, along with the author conducting the experiment and, for the second turn, the student for whom the proposer was acting. The answers were then

revealed and the money allocated. Thus in these cases, the answers were revealed, after the experiment, to the author and to the other student(s) involved.

This breach in confidentiality was solved in the second experiment. After randomly determining the students whose deals would be consummated and announcing the identification numbers, the authors asked *all* the students to leave the room. The authors then read the answers of the still-anonymous students, allocated the money (if the deals were successful), and put the money in envelopes marked with the identification numbers only. The students were instructed that they could re-enter the room and claim their envelopes after the authors had left.

B. The First Experiment

In the first experiment, on April 26, the ultimatum game was conducted twice. Professor Greenfield conducted this experiment alone. After reading consent forms and listening to a description of the experiment, the students were randomly divided into two groups. The groups were asked to sit on opposite ends of the classroom, so as to minimize communication between subjects in the two groups. The students were also instructed not to discuss their answers with anyone, even those in their own group, during the course of the experiment. One group was told that they would be proposers, and one group was told they would be responders. The students were informed that the experiment would be performed two times, and that five pairs of students from each turn – a total of twenty students – would have their bargain consummated. Each student filled out a simple demographic sheet, stating their sex, age, and year in law school (all were 1Ls in these experiments). Each student received an identification number, to ensure that their answers could not be identified with them afterwards. The proposers received identification numbers P101 through P119, and the responders received identification numbers R101 through R119. The record sheets for the first experiment appear below as Appendix A.

1. The first iteration (the “paired” condition).

In the first iteration of the game, the students were told that they would be engaging in an ultimatum game with a student in the other group. The students were then informed of the student with whom they were paired. This was done by asking P101 and R101 to raise their hands. This was continued for all nineteen pairs.

The proposers were then asked to imagine that they each were given \$50. The proposers were asked to write on a simple form how much of that amount they proposed to keep and how much they proposed to offer to the responder. The responders were

instructed to write on their answer sheets the lowest amount they would accept, their “reservation amount.” The students were also informed that if the proposer offered the responder an amount equal to or greater than the responder’s reservation amount, the transaction would be deemed to have been completed, and both parties would receive the amount proposed by the proposer. The students were also informed that if the responder’s reservation amount was greater than the amount the proposer offered to the responder, the transaction would be deemed to have not been completed, and neither party would receive anything.⁶⁵

2. The second iteration (the “agency” condition)

In the second iteration of the first experiment, an agency relationship was created on the part of the proposers. Each proposer was asked to write her identification number on an index card and seal them in envelopes. The envelopes were then gathered, shuffled, and redistributed among the proposers. The proposers were told:

“In this turn the basic rules for the experiment will remain the same with one exception. Instead of acting on their own behalf, the proposers will be acting on behalf of someone else. The responders will continue to act on their own behalf.

“Each proposer will find an envelope in your packet with a blank index card inside. Please write on the paper your “subject ID.” Once you have done this, place the paper back into the envelope and seal it.

[The envelopes were then redistributed to other proposers.]

“Please do not open the envelope. Write your proposer number on the outside.

“In this turn, the proposers are not acting on their own behalf but on behalf of the person who is identified by the paper within their envelope.

“Please imagine that I am now giving each of the proposers \$50. Each proposer will propose an allocation of that \$50 between the party for whom he or she is acting and the responder with whom he or she is paired.”

“Remember that if the responder rejects the proposed allocation the deal will fail and neither party will receive anything.”

⁶⁵ Examples of the answer sheets used in the two experiments appear in the appendix.

Note that the instructions created an agency relationship in that each proposer was not acting on her own behalf but on behalf of one of the other proposers, who would remain anonymous. The instructions, however, did not inform the proposers what rule of behavior, if any, they should apply in acting on behalf of the person who was identified in their envelope.

C. The Second Experiment

In the second experiment, on May 7, the ultimatum game was conducted three times. Both authors were present. As in the first experiment, the students read and signed consent forms, listened to a description of the experiment, and then were randomly divided into two groups. The groups were asked to sit on opposite sides of the classroom, so as to minimize communication between subjects in the two groups. The students were also instructed not to discuss their answers with anyone, even those in their own group, during the course of the experiment. One group was told that they would be proposers, and one group was told they would be responders. The students were informed that the experiment would be performed three times, and that four pairs of students from each turn – a total of twenty-four students – would have their bargain consummated. As in the first experiment, each student filled out a simple demographic sheet, stating their sex, age, and year in law school (all were 1Ls in these experiments). Each student received an identification number, to ensure that their answers could not be identified with them afterwards. The proposers received identification numbers P101 through P117, and the responders received identification numbers R101 through R117. The form record sheets for the second experiment appear below as Appendix B.

1. The first iteration (the “anonymous paired” condition).

In the first iteration of the game, the students were told that they would be engaging in a game with a student in the other group, but that they would not know specifically with whom they were paired. The ultimatum game was then conducted as in the first experiment, using \$50 as the transaction amount. The students were also reminded that four pairs of them would have their bargains actually completed for this round.

2. The second iteration (the “paired” condition)

In the second iteration of the experiment, the students were then informed of the student with whom they were paired. This was done by asking P101 and R101 to raise their hands. This was continued for all nineteen pairs. This iteration thus mirrored the conditions of the first

iteration of the first experiment. Thus, in this iteration both players in each pair knew with whom they were playing, and both of them were acting on their own behalf.

3. The third iteration (the “agency/fiduciary duty” condition)⁶⁶

In the third iteration of the first experiment, we created an agency relationship on the part of the proposers. Each proposer was asked to write her identification number on an index card and seal them in envelopes provided. The envelopes were then gathered, shuffled, and redistributed. The proposers were then told:

“In this turn, the proposers are not acting on their own behalf but on behalf of the person who is identified by the paper within their envelope. The rules of the experiment for this turn are that the proposers should consider themselves bound by an obligation to attempt to maximize the return that the third party will receive from the transaction. Use your judgment to get the biggest actual return for the party for whom you are working. There is no way for us to enforce this requirement. In fact, because of the confidential nature of your answers, we will not know who you are. But it is important that all of you really do your best to maximize the return for the person identified in your envelope.”

“Please imagine that I am now giving each of the proposers \$50. Each proposer will propose an allocation of that \$50 between the party for whom he or she is acting and the responder with whom he or she is paired.”

“Remember that if the responder rejects the proposed allocation the deal will fail and neither party will receive anything.”

Note that the instructions created an agency relationship, in that each proposer was not acting on her own behalf but on behalf of one of the other proposers, who would remain anonymous. The difference between this iteration and the second iteration from the first experiment was that here, the proposers were given a rule of behavior, a norm, to apply in acting on behalf of the person who was identified in their envelope.

⁶⁶ Here and throughout, we use the term “fiduciary duty” to describe the requirement to maximize the return to the party for whom the player was acting. We recognize that this term is somewhat a term of art, and may or may not include a duty to maximize in a given legal context. Because of the potential confusion, we did not use this term in describing the game to the players. We use it now for convenience.

V. Preliminary Findings

Because the number of students in each experiment was small, and because of possible imperfections in the research design relating to confidentiality, our results should be considered preliminary only. Nevertheless, the results are striking and indicate further study is worthwhile. The results from both experiments appear as spreadsheets in Appendices C.

A. First Experiment (April 26)

The results for the two iterations of the first experiment are summarized in Tables 1 and 2. In the first iteration (the “paired” condition), the proposers offered allocations from a “pot” of \$50 that ranged from \$10 to \$30, with a mean of \$22.05. Responders had reservation amounts ranging from \$1 to \$30, with a mean reservation amount of \$17.58. Eleven of the 19 deals (58%) were successful, meaning that the proposed allocation from the proposer was greater than or equal to the responder’s reservation amount..

In the second iteration, (the “agency” condition), the proposers offered allocations that ranged from \$5 to \$35, with a mean offer of \$22.84. Responders had reservation amounts that ranged from \$0 to \$35, with a mean reservation amount of \$17.05. Again, 11 of the 19 deals (58%) were successful.

The results from the two iterations are summarized in the following chart. The mean proposal amounts in the first and second iterations of the experiment are extremely close, and a oneway analysis of variance confirms that they are not significantly different.⁶⁷ $F(1,18) = 0.261$ $p = .616$. There are also no discernable gender or age effects.

⁶⁷ A oneway analysis of variance compares two possibilities about the provenance of the data: the first is that all the data has come from the same normal distribution. A single mean and variance for this distribution is fit to the data on this assumption. The second is that the factor - here with values “First” and “Second” - describes different normal distributions. Then two means and a shared variance are fit to the data on this assumption. The data will make one of these assumptions more likely (in the statistical sense that one of them makes the observed data more probable than the other). A comparison is done by computing a ratio of the likelihoods under each assumption. The test statistic F is the ratio and it is larger the more likely the multiple distribution assumption seems in the light of the data. Here, $F=0.261$, lower than 1 (a balanced ratio). The numbers 1 and 18 reflect how many data points went into the test statistic, and the p value indicates that it is unlikely that the multiple distribution assumption is true for these data.

Table 1: Mean Proposal Amounts in First Experiment Under Two Conditions⁶⁸

Condition	Mean	SD	SE
First (paired)	22.0526	4.8244	1.1068
Second (agency)	22.8421	5.8335	1.3383

Similar results hold for the reservation amounts. The table below describes the mean reserve amount by condition. The means are not significantly different. $F(1,18) = 0.179$ $p=0.677$. Moreover, Gender does not appear to have any effect on reservation amount. $F(3,15)=0.60$ $p=.98$.

Table 2: Mean Reservation Amounts in First Experiment Under Two Conditions

Condition	Mean	SD	SE
First (paired)	17.5789	10.5847	2.4283
Second (agency)	17.0526	11.4962	2.6374

Interestingly, the age of the proposer just misses significance in both iterations. Our assistant fit a regression model to see whether there is any significant linear relation between the reservation amount and the proposer and responder's ages. The fitted coefficients are shown below.

Table 3: Effects of Age on Reservation Amount

	Estimate	SE ⁶⁹	Stand.	Sig.	
Co.	-25.3405	28.2399	-0.8973	0.1889	
PA1	1.7961	1.2076	1.4873	0.0745	
RA1	0.0004	0.7600	0.0005	0.4998	
PA2	1.9598	1.2076	1.6229	0.0583	?
RA2	-0.1695	0.7600	-0.2231	0.4126	

“Co.” represents a baseline amount, and PA1 represents a measurement of the effect of a one-year increase in the proposer’s age on the reservation price in turn one, while RA1 represents the a measurement of the effect of a one-year increase in the responder’s age on the reservation amount in turn one. PA2 and RA2 represent the same measurement in turn two. The age of the proposer come close to statistical significance at the 0.05 (*) level in both turns. The

⁶⁸ “Condition” refers to the conditions in each iteration; “Mean” is the mean value of the proposed allocations under each condition; “SD” is standard deviation; “SE” is the standard error, a margin of error for the mean estimate.

estimates suggest that adding a year to the age of the proposer in both conditions adds about \$1.80 and \$1.95 to the reservation amount respectively. In other words, there is some indication that a responder dealing with an older proposer will require a greater percentage of the allocation than one dealing with a younger proposer.

Other than the possible age effects, what is striking about the results from this experiment is that there was so little change between the two turns. The mean amount the proposers chose to allocate to the responders did not meaningfully change (an increase of \$0.79), and only nine of the 19 subjects changed their answer at all between turns one and two. Six of those nine increased the amount they were willing to allocate to the responders, and three decreased. The responders also had little change in their responses from turn one to turn two. The mean fell by 53 cents, and only eight of nineteen changed their reservation amounts. Four of that eight increased their reservation amount and four decreased.

It is worth exploring further why these values did not change between turns one and two, despite the creation of the agency relation. The striking nature of the lack of change between the two turns is accented further when compared to the significant results in the second experiment below.

B. Second Experiment (May 7)

The second experiment contained three iterations: one with the “anonymous paired” condition, the second with the “paired” condition, and the last with the “agency/fiduciary duty” condition. The results are summarized in Tables 4 and 6 below.

In the first iteration, in which the players were not aware with whom they were paired, proposers produced offers ranging from \$10 to \$26, with a mean offer of \$19.76. Responders claimed reservation amounts ranging from \$1 to \$25, with a mean of \$15.82. Twelve of 17 deals (71%) were successful. In the second iteration, when both players knew with whom they were paired, proposers’ mean offer went up to \$21.47, an increase of \$1.71. The proposers offered allocations ranging from \$10 to \$35. Responders’ claimed reservation amounts ranging from \$1 to \$25, with the mean reservation amount

⁶⁹Again, “SE” indicates a margin of error. 99% confidence intervals, or “error bars,” for parameter estimates can be approximated by +/- twice the SE.

fell \$1.24 to \$14.59. Fourteen of 17 deals (82%) were successful.⁷⁰ Finally, in the third iteration, in which proposers were acting on behalf of another and were asked to seek to maximize return to that other person, the change in proposed allocations was dramatic. Proposers’ mean offer fell to \$16.94, a decrease of over \$4.50. (The proposed offers ranged from \$10 to \$30.) The change in responders’ reservation amounts was much less dramatic, falling to \$14.00. Only 9 of 17 deals (53%) were successful.

The May experiment generated a number of effects worth considering carefully. These effects include the result that the rules of the third iteration affected the proposal amount significantly, and that gender and age may have affected the results in significant ways.

1. Effects of Conditions on Proposal Amounts

The proposal amounts are summarized in the table below.

Table 4: Mean Proposal Amounts in Second Experiment Under Three Conditions⁷¹

Condition	Mean	SD	SE
First (anonymous/paired)	19.7647	5.5060	1.3354
Second (paired, no agency)	21.4706	6.2761	1.5222
Third (agency/fid duty)	16.9412	5.4253	1.3158

When the means are compared across conditions, a oneway analysis of variance shows they are significantly different. $F(2,32)=4.457$ $p<.05$. The table above shows that the third condition is lower than the first and second.

As noted above, a oneway analysis of variance compares two possibilities about the provenance of the data: the first is that all the data has come from the same normal distribution. A single mean and variance for this distribution is fit to the data on this assumption. The second is that the factor – here with values “First,” “Second” and “Third” – describes different normal distributions (there may be more than three). Then three means and a shared variance are fit to the data on this assumption. The data will make one of these assumptions more likely (in the

⁷⁰ Note that the conditions of this second iteration were the same as the first turn in the first experiment. The results were quite similar for the proposers but not for the responders: in the first experiment the proposed amount was \$22.05; in the second experiment it was \$21.47. The responders’ reservation amount in the first experiment was \$17.58; in the second it was \$14.59.

⁷¹ Again, “Mean” is the mean value of the amount, “SD” its standard deviation, and “SE” the standard error.

statistical sense that one of them makes the observed data more probable than the other). A comparison is done by computing a ratio of the likelihoods under each assumption. The test statistic F is the ratio and it is larger the more likely the multiple distribution assumption seems in the light of the data. Here $F=4.457$, which is several times larger than 1 (a balanced ratio). The numbers 2 and 32 reflect how many data points went into the test statistic, and the p value indicates that it is very unlikely that the single distribution assumption is true for this data.

To get more of a sense of the size of the condition effects, our assistant performed a regression of the proposal amounts on dummy variables representing the three conditions. The second condition proposal amount was treated as a baseline.⁷² The table below shows the estimated model coefficients, their margin of error, their standardized values, and the level of statistical significance they attain in this regression.⁷³

Table 5: Effects of Conditions on Proposal Amounts in Second Experiment

	Estimate	SE	Stand.	Sig.	
Co.	21.4706	1.3942	15.3995	0.000	***
C1	-1.7059	1.9718	-0.8652	0.1956	
C3	-4.5294	1.9718	-2.2971	0.0130	*

The constant term Co. represents a baseline amount, the mean amount proposed in the second condition. C1 is a dummy variable that takes the value 1 for the first condition (anonymous pairs) and 0 otherwise. C3 is a dummy variable that takes the value 1 for the third condition and 0 otherwise. In this model, we interpret C1 as the amount by which the proposal amount increases/decreases from the Co. baseline when subjects are in the first condition, and C3 as the amount it increases/decreases from the baseline amount when subjects are in the third (fiducial) condition. As the table indicates, the mean proposal amount would be expected to decrease \$1.71 when the players are anonymous, as compared to when they know with whom they are paired. The mean proposal amount would be expected to decrease (as compared to the

⁷² Analysis of variance is a special case of regression analysis that does not allow continuous explanatory variables. General regression analysis is conventionally presented in a way that is, for our purposes, more easily interpretable, since it deals explicitly with parameters, i.e., effect sizes, rather than abstract tests of hypotheses.

⁷³ Showing the standardized coefficient - 'Stand.' is 'Estimate' divided by 'SE' - is conventional (so other people can choose a different level of significance and still make use of the results) but it will not aid interpretation and may be ignored when reading these tables. The important quantities in the table for present purposes are the estimate itself and its level of statistical significance, denoted by one or more asterisks.

situation in which they know with whom they are paired and are acting on their own behalf) by \$4.53 when the proposers are acting as agents with a duty to maximize the return to those agents.

The statistical interpretation of the model is as follows: The coefficient C_0 is significantly different from 0 at the .001 level, C_1 is not significantly different from 0, and C_3 is significantly greater than 0 at the 0.05 level. Reliability is quantified by the level of significance, conventionally <0.05 (*), <0.01 (**), or <0.001 (***). The smaller the number, the less likely this coefficient estimate is to have been generated by chance rather than the systematic factors manipulated in the experiment.

This means that we can be confident, statistically speaking, that the true baseline amount offered by proposers is greater than 0, and that the true amount by which the proposed offers in the third condition decline from the baseline amount is also greater than 0. Non-significance indicates that a coefficient is not estimated reliably and that its direction and magnitude may not be sufficiently stable if we estimate it over repeated versions of the same experiment.

The substantive interpretation of the model is that the experimental data allow us to infer that the third, fiducial condition in the experiment generates lower proposal amounts. We can also infer that the expected value of the amount proposed in the third condition is approximately \$4.53 (or 9% of the pot) less than in the second condition. In other words, this experiment indicates that proposers acting on behalf of a principal, instructed to maximize the return to that principal, were much less generous in allocating a portion of the pot to responders.⁷⁴

⁷⁴ And as noted above, many fewer deals were consummated. In the third condition, only 53% of the deals were successful, as compared to 82% when proposers and responders knew with whom they were paired and the proposers were not limited by the fiduciary relation.

2. Effects of Conditions on Reservation Amounts

Having established that the experimental conditions generate different proposal amounts we considered the reservation amounts in the same way. The conditions produced results that were very close (see Table 6) and, predictably, not significantly different. $F(2,32)=2.111$ $p=0.138$.

Table 6: Mean Reservation Amounts in Second Experiment Under Three Conditions

Condition	Mean	SD	SE
First (anonymous/paired)	15.8235	8.9529	2.1714
Second (paired, no agency)	14.5882	9.5594	2.3185
Third (agency/fid duty)	14.0000	8.6241	2.0917

Although the reservation amounts seem to show a trend downward over the three conditions, this effect is quite weak and not statistically significant. Formally, the differences are not large enough for us to be able to reject a null hypothesis that the reservation prices are actually just the same over all conditions.

3. Age Effects

We also investigated the effect of covariates, beginning with the age. The model we used estimates the effect the age of the proposer and the age of the responder has on the proposal amount in each of the three conditions. A separate set of age coefficients was fitted for each condition in case age has a different effect depending on the game being played. The dummy coefficients described earlier representing which game is being played are also included as controls. The coefficients are the proposer's age ("PAge") and the responder's age ("RAge") in each of the three conditions.

Table 7: Effects of Age on Proposal Amounts Under Three Conditions

	Estimate	SE	Standard.	Sig.	
Co.	-61.6775	25.0999	-2.4573	0.0091	**
PAge1	2.6712	1.0724	2.4908	0.0083	**
RAge1	0.2677	0.5217	0.5131	0.3052	
PAge2	1.8637	1.0724	1.7379	0.0447	*
RAge2	1.6632	0.5217	3.1882	0.0013	*
PAge3	0.7436	1.0724	0.6934	0.2459	
RAge3	-0.2639	0.5217	-0.5058	0.3078	
C1	12.6851	35.4967	0.3574	0.3613	
C3	67.5403	35.4967	1.9027	0.0319	*

In this model the age of the proposer is significantly related to the proposal amount in the first and second conditions, but not in the third. Increasing the age of the proposer by 1 year leads to a \$2.67 and \$1.86 increase in the proposal amount over the first two iterations respectively. The older the proposer, the more likely she was to allocate a greater percentage of the pot to the responder. The model also suggests a corresponding effect of the age of the responder in the second condition. That is, the proposer appears to be affected by the age of the responder, at least in the second iteration. (Naturally there is no reliable effect of responder age in first condition since he or she is unknown to the proposer). In the second iteration, increasing the age of the responder by one year appears to add about \$1.66 to the proposal they receive.⁷⁵

The effect of age appears to be decreasing over the games – the absolute value of the coefficients decreases as the pairs perform in each condition. If this effect is reliable, it may be driven either by the condition itself, i.e. the game being played, or by the subjects' experience with each other over the course of the whole experiment. With more theory available a more constrained model could be fit to a subset or combination of these age factors, and more precise estimates would be possible.

Fitting the same model to the reservation amount data we find the following.

⁷⁵ Also worth noting is that there is still a significant effect of the third condition, as in the previous model, even with age factors controlled for.

Table 8: Effects of Age on Reservation Amounts Under Three Conditions

	Estimate	SE	Standard.	Sig.	
Co.	-51.9168	44.9163	-1.1559	0.1271	
PAge1	3.3123	1.9191	1.7260	0.0459	*
RAge1	0.0524	0.9335	0.0561	0.4778	
PAge2	3.1334	1.9191	1.6328	0.0550	?
RAge2	-0.2800	0.9335	-0.2999	0.3829	
PAge3	3.8525	1.9191	2.0075	0.0256	*
RAge3	-0.2985	0.9335	-0.3198	0.3754	
C1	-10.8577	63.5213	-0.1709	0.4325	
C3	-16.9381	63.5213	-0.2667	0.3955	

Consistent with the hints from the results of the first experiment, here there appear to be fairly reliable relationships between the proposer’s age and the reservation amount. In the first and third conditions the increase in reservation amount for a one year increase in the proposer’s age is \$3.31 and \$3.85 respectively. The second condition appears to indicate a similar increase of approximately \$3.13, though it narrowly misses significance at the conventional 0.05 (*) level. These effects are much more similar across conditions than the corresponding age effects on the proposal amount in the previous model.

Notably, there does not appear to be any relation between the age of the *responder* and the reservation amount. Why would the *proposer’s* age have such a dramatic effect on the *responder’s* reservation amount? Some hypotheses might be developed. Perhaps responders expect older proposers to be more aware of fairness norms and are more willing to “punish” such proposers if they do not abide by such norms. Or, perhaps responders themselves feel more altruistic toward younger proposers and thus maintain lower reservation amounts. Nevertheless, this effect is worth further attention, in order to hypothesize why a proposer’s age would have such an impact on the responder’s reservation amount.

We are skeptical of these results, however. The results indicate a correlation between the proposer’s age and the reservation amount even in the first iteration of the experiment, when the players did not know with whom they were paired. There is no reason for responders to be affected by the age of proposers they did not know with whom they were dealing. The dubiousness of the apparent effect under the first condition erodes our confidence in the apparent effects from the second and third iterations. Nevertheless, since the results in the second and third conditions are as strong as they are, and because these results parallel the suggestive results

from the April 26 experiment (see Table 3), we remain intrigued. We are curious to see whether these results reappear in future experiments.

4. Gender Effects

We also looked at whether there was any effect of gender on the proposal amounts, and no statistically significant difference was found. There were several suggestive patterns, however, that deserve further inquiry. Same sex pairs seem to have higher proposal amounts, and male and female proposers appear to differ in their response to the third experimental condition.

We were curious as to whether proposers would be more generous if they were matched with someone of the same gender. Using a model that considers same-gender and non-same gender pairs as the two gender variables, the table below describes the mean proposal amounts for each value of this variable.

Table 9: Effects of Same-Sex Pairing on Proposal Amounts

	Mean	SD	SE
Diff-gen	17.7083	6.7275	1.3732
Same-gen	20.8889	4.7824	0.9204

In this representation of the data, proposers offer a larger amount when paired with someone of their own gender. These differences are not significant, however. $F(1,15)=2.354$ $p=.145$. The effect nevertheless appears worthy of additional study, as it appears to indicate that same-sex pairings result in a proposal amount of more than \$3 (6%) greater than when the players are of different sexes.⁷⁶

We also looked at a possible proposer-gender-specific effect in the third condition. This model is the same as the previous one except that the same-gender / different-gender variable is replaced with one that notes only the proposer's gender in each pair. The following table describes the mean proposal amounts for all combination of conditions.

⁷⁶ Also, because these data conflate the results over the three conditions, the effect might be muted.

Table 10: Effects of Proposer's Gender on Proposal Amount

P-gender	Condition	Mean	SD	SE
M	First	20.2000	6.3403	2.8355
M	Second	21.0000	3.9370	1.7607
M	Third	21.2000	5.4498	2.4372
F	First	19.5833	5.4181	1.5641
F	Second	21.6667	7.1774	2.0719
F	Third	15.1667	4.5092	1.3017

The effect of proposer gender is not significant $F(1,15)=0.698$ $p=.417$, but the effect of gender on the third condition is again very suggestive. From the descriptive statistics there appears to be more than a \$6 (12%) difference in proposal amount in the third condition (\$21.20 to \$15.17) depending on the gender of the proposer. Female proposers' allocations dip by this \$6 in the third condition. This effect, if genuine, might be explained by any number of theories. The effect might suggest that male proposers' dedication to proposing a fair allocation is more robust than that of female proposers. Or, the effect might be explained by female proposers being more attentive to the rules of the game or by male proposers being more willing to replace the rules of the game with their own judgment.

Quite interesting is that even though the variation in reservation amounts across conditions was small (see above), and the sex of the responder does not appear to be significant, the sex of the *proposer* had a large effect on the amount the *responder* was willing to accept in each of the iterations. The table below represents the gender information in terms of the gender of the proposer only. The table shows mean reservation amounts for pairs with female proposers and pairs with male proposers. Responders paired with male proposers appear to generate much smaller reservation amounts (\$8.67 compared with \$17.36).

Table 11: Mean Reservation Amounts by Proposer Gender

Prop-G	Mean	SD	SE
Female	17.3611	7.2787	1.2131
Male	8.6667	9.6708	2.4970

This is partly confirmed by putting the new gender representation into an analysis of variance like the one above. Now the effect just misses significance $F(1,15)=4.124$ $p=.06$. Although the effect of the gender of the proposer on the reserve amount narrowly misses significance, the model suggests that male proposers induce reservation amounts in their

responders that are on average about \$8.70 smaller (almost 17% of the pot) than those induced by female proposers. This effect seems stable across conditions.⁷⁷

This effect deserves further attention as well. If substantiated, one would be challenged to present a theory as to why the gender of the proposer would have such an effect on responders' reservation amounts. One might theorize that responders – of both genders – are more willing to “punish” female proposers for failing to offer a fair allocation, and that a high reservation price effects this punishment. Responders might also believe that male proposers – counter-factually, as it turns out, if the data above are substantiated – will be less generous than their female counterparts. If responders believe male proposers will be more stingy, their expectation might show up as a willingness to accept a lower amount in an exchange with a male proposer.

5. Age and Gender Together

Finally, we put the gender and age analyses together in an overarching model. Using the game condition, the proposer's age, the responder's age, and the proposer's gender, we sought to analyze variation in the proposal and reservation amounts.⁷⁸ First we treat the proposal amount. Table 12 describes the coefficient estimates for a regression model.

Table 12: Effects of Age and Gender on Proposal Amount

	Estimate	SE	Stand.	Sig.	
Co.	-61.6217	24.3014	-2.5357	0.0077	*
PG1	0.4479	2.5070	0.1787	0.4296	
PA1	2.6657	1.0387	2.5664	0.0071	*
RA1	0.2689	0.5051	0.5324	0.2987	
PG2	-0.7361	2.5070	-0.2936	0.3853	
PA2	1.8727	1.0387	1.8029	0.0396	*
RA2	1.6612	0.5051	3.2888	0.0011	**
PG3	5.9803	2.5070	2.3854	0.0110	*
PA3	0.6710	1.0387	0.6460	0.2610	
RA3	-0.2476	0.5051	-0.4901	0.3134	
C1	12.5955	34.3673	0.3665	0.3580	
C3	67.0316	34.3673	1.9504	0.0292	*

⁷⁷ Again, because these results conflate the data over the three conditions, including the first condition in which the pairs did not know with whom they were paired, the significance of the results may be muted.

⁷⁸ We did not look at responder gender for this model, as it appeared to not have a significant effect.

Here PG is the variable for the gender of the proposer (0 for female, 1 for male). PA is the variable representing a one-year increase in the proposer's age, and RA is the analogous variable for responder's age. The number following each letter combination indicates the condition they are estimated in. (E.g., "PG1" is the effect of the proposer's male gender on the offered allocation in the first iteration. "RA3" is the effect of a one-year increase in the responder's age in the third iteration.)

When all the variables are put together, the clearest effect is that of the gender of the proposer in the third condition ("PG3"). Male proposers have larger proposal amounts because female proposers drop their offer by almost \$6.00 (12% of the pot) in this condition. This effect easily reaches statistical significance at the 0.05 (*) level, and barely misses the 0.01 (**) significance threshold. As mentioned above, this effect is might be explained by a number of theories. It deserves further study.

As in Table 7, the proposer's age also appears to create significant results in the first two iterations of the game. Older proposers tend to allocate more of the pot to the responder, at least when the proposers are acting on their own behalf. One explanatory theory, among others, is that older proposers are more attune to fairness norms. The agency and maximization requirements of the third iteration, however, appear to be strong enough to quash this effect.

Also, similar to the data described in Table 7, the responder's age in the second condition ("RA2") appears to create significant effects. There would naturally be no effect of responder's age in the first iteration, as the players did not know with whom they were paired. But in the second iteration, when both players knew with whom they were paired and before the proposers were constrained by the requirements of the third condition, the proposal amount increased \$1.66 (over 3%) for every one-year increase in a responder's age. This effect is the most robust of the lot, nearly reaching the 0.001 (***) threshold. Theories should be developed to explain this effect as well. One might be that proposers believe that older responders will be more attuned to fairness norms. (This would be similar to the way that older proposers are, at least under the theory put forward above, more attuned to fairness norms.) If so, proposers would be more willing to offer a higher allocation to older responders in order to ensure that their deal is consummated.

The same variables applied to the reservation amount yields the following set of regression coefficients.

Table 13: Effects of Age and Gender on Reservation Amount

	Estimate	SE	Stand.	Sig.	
Co.	-51.2357	39.9138	-1.2837	0.1034	
PG1	-9.6110	4.1177	-2.3341	0.0124	*
PA1	3.4288	1.7060	2.0098	0.0257	*
RA1	0.0262	0.8296	0.0316	0.4875	
PG2	-8.9930	4.1177	-2.1840	0.0175	*
PA2	3.2425	1.7060	1.9006	0.0324	*
RA2	-0.3044	0.8296	-0.3670	0.3578	
PG3	-8.2075	4.1177	-1.9932	0.0266	*
PA3	3.9520	1.7060	2.3165	0.0129	*
RA3	-0.3209	0.8296	-0.3868	0.3505	
C1	-10.8109	56.4467	-0.1915	0.3825	
C3	-16.9976	56.4467	-0.3011	0.4246	

The model suggests that male proposers cause responders to generate a reservation amount that is \$9.61 (almost 20%) less than with female proposers in the first condition. This effect repeats in the second and third conditions, with the magnitude of effect being \$8.99 (18%) and \$8.21 (16%), respectively. These estimates should be interpreted lightly, since the number of observations that are generating them is very small. Also, these results are questionable because there is no reason why the proposer’s gender should affect the reservation amount in the first condition, since the pairings were anonymous and thus the responder did not know the gender of the proposer.

The proposer’s age also appears to affect the reservation amount, roughly equally across conditions. An extra year on the proposer leads to approximately \$3.50 more on the reservation price. But again, these results are questionable since they appear not only in the second and third conditions but in the first as well, when the players did not know with whom they were paired.

VI. Conclusion

Much work remains to be done in analyzing the results of these experiments, developing theories for the results, and attempting to test and replicate the results in additional experiments. That having been said, we believe our experiments are quite suggestive in several ways.

Potentially the most important finding is the effect of the third condition in the second experiment. By creating an agency relation linked to a duty to maximize return to the principal, this third condition created a situation that could be analogized to the situation of corporate directors, who owe a duty to maximize return to shareholders. Because the experiment shows that the proposers offer an allocation that is less generous to responders than in the first and second iterations, it supports the notion that the fiduciary duty of corporate directors lessens the generosity of directors when negotiating with non-shareholder stakeholders of the firm, such as workers. This finding in turn supports the adoption of “stakeholder statutes” in order to empower corporate directors to act on the basis of fairness norms in making decisions on behalf of the firm.

Compared to the marked effects of the third condition in the second experiment, the absence of significant effects in the first experiment bears attention. In the first experiment, the agency relationship was not augmented with a stated duty to maximize the return to the principal, and there was no significant difference between the results from turn one, when the proposers were acting on their own behalf, and turn two, when they were acting on behalf of another. If these effects are genuine, one could interpret them aggressively to suggest that legal rules affect fairness norms more than agency relationships do. This insight would have doctrinal implications for corporate law by suggesting that the legal duty to maximize shareholder wealth may affect director behavior more than their putative agency relationship toward shareholders.

Also striking is the apparent effect of proposers’ gender in the third condition of the second experiment. Our experiment indicates that the behavior of female proposers was affected more by the requirements of the third condition than were males. While male proposers seemed to largely ignore the instructions of the third condition, offering a statistically equal amount in the third turn, female proposers offered more than \$6 less to the responders. This effect, if genuine, might be explained by any number of theories. The effect might suggest that male proposers’ dedication to proposing a fair allocation is more robust than that of female proposers. Or, the effect might be explained by female proposers being more attentive to the rules of the game or by male proposers being more willing to replace the rules of the game with their own judgment. In any event, this effect is worth considerable attention in future work.

Finally, our experiments suggest that the ages of both the proposer and responder affect the proposal amounts. In general, older proposers offer a higher allocation to the responders

(except in the third condition), and proposers offer a higher allocation to older responders in the second condition. In other words, older proposers appear to be affected by fairness norms more than younger proposers, and proposers appear to be more willing to share a greater percentage of the pot with older responders than with younger ones. The requirements of the maximization norm in the third condition appear to quash both effects, however.

Overall, then, our experiments show a number of effects that deserve further serious study.