On the Allocation of Burdens of Proof in Corporate Law: An Essay on Fairness and Fuzzy Sets

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ON THE ALLOCATION OF BURDENS OF PROOF IN CORPORATE LAW: AN ESSAY ON FAIRNESS AND FUZZY SETS

Charles M. Yablon

I. A DEFINITION OF THE PROBLEM

The legal rules governing liability of corporate officers and directors for breach of fiduciary duty contain few, if any, categorical prohibitions on the kinds of transactions that may be conducted by corporate management. Rather, the rules operate (and are generally believed to deter a certain amount of managerial misconduct) by describing the effect of undertaking certain types of transactions on the allocation of the burden of proof in a subsequent lawsuit against such officers or directors for breach of fiduciary duty. Burdens of proof are described as “shifting” back and forth between plaintiffs and defendants, bouncing between them like a tennis ball.

Thus we are told that:

[A] plaintiff attacking a corporate payment has the heavy burden of demonstrating that no reasonable businessman could find that adequate consideration had been supplied for the payment. However, where the directors have a personal interest in the application of the corporate payments, such as where they are fixing their own compensation, the business judgment rule no longer applies and the burden shifts to the directors to demonstrate affirmatively that the transactions were engaged in with good faith and were fair, i.e., that adequate consideration had been supplied.¹

However, if there has been a ratification of the transaction by a majority of the disinterested directors or shareholders, the burden shifts yet again and, “the objecting stockholder has the burden of showing that no person of ordinary sound business judgment would say that the consideration received for the options was a fair exchange for the options granted.”²

Given all this discussion of shifting burdens of proof, some students get the mistaken impression that proof standards change during

¹ Cohen v. Ayers, 596 F.2d 733, 739-40 (7th Cir. 1979); see also, Marciano v. Nakash, 535 A.2d 400 (Del. 1987).
the course of a trial for breach of fiduciary duty. The language in which these rules are stated makes it sound as if the courts must first make a preliminary determination as to whether the transaction involves self-dealing or has been ratified by disinterested directors, and then, on the basis of that determination, allocate to one side or the other the burden of proving the fairness or unfairness of the transaction.

In fact, these burden-shifting rules have nothing to do with trial procedure or the presentation of evidence. In fiduciary duty trials, as in most other trials, attorneys for plaintiffs present their case first and put forth all evidence they have on self-dealing, fairness, and any other relevant issues. Defendants follow and do the same. The parties may not even know who has been allocated the burden of persuasion on the fairness issue until they read in the judge's opinion whether or not the appropriate evidentiary standard has been met.3

In short, the rules governing allocations of burdens of proof in corporate law are not designed to affect the presentation of evidence at trial; rather they are a way of structuring the decision-making process of the finder of fact, who, in these kinds of cases, is usually the same judge who will be deciding such legal issues as the appropriate allocation of the burden of proof. Once we recognize this, however, another problem arises, and that is the one which this paper seeks to address.

Simply put, the question is, Why is it so important which side has the burden of proof to establish fairness and similar issues in fiduciary duty litigation? That it does matter seems to be a very basic assumption of this area of corporate law. Courts spend much time and effort in their opinions discussing and clarifying exactly who has the burden of persuasion on each aspect of the claim. Statutes and even American Law Institute ("ALI") restatements are explicit in allocating such burdens.4 Certainly, the common assumption among corporate law practitioners is that if your client has the burden of proof in these matters, you are very, very likely to lose the case.5

3 Where factual issues are being tried to a jury, some allocation of burdens would have to be made at the time of the judge's charge. But jury trials are rare in breach of fiduciary duty cases in state courts. Before the Delaware Court of Chancery, the most important venue for such claims, they are nonexistent.

4 See e.g., CAL. CORP. CODE § 310(a)(3)(West 1990); N.Y. BUS. CORP. LAW § 713(b) (McKinney 1991); PRINCIPLES OF CORPORATE GOVERNANCE §§ 5.02(b), 5.04(b) (Tent. Draft No. 5, 1986).

5 "[B]ecause the effect of the proper invocation of the business judgment rule is so powerful and the standard of entire fairness so exacting, the determination of the appropriate standard of judicial review frequently is determinative of the outcome of derivative litigation."
As a former corporate lawyer, I share those assumptions, yet I find them at odds with the theoretical literature involving burdens of proof in civil actions. That work implies that the allocation of the burden of proof should be relatively unimportant in all but a small number of civil cases, and rarely significant on the issue of fairness. After all, the basic standard of proof in almost all corporate actions, including breach of fiduciary duty cases, is the preponderance of the evidence. Most of the theoretical work involving the civil burden of proof assumes that a preponderance standard requires no more than a showing that the disputed fact is “more likely than not” to be the case, or that the probability of its occurrence is greater than fifty percent. The standard is justified, moreover, since any greater demonstration of the probability of the disputed fact would increase the likelihood of erroneous determinations either against plaintiffs or defendants. The preponderance-of-the-evidence standard has the virtue of keeping the risk of erroneous determinations as equal as possible between plaintiffs and defendants, thus maintaining the neutrality between parties that is appropriate in civil actions.

Under a preponderance-of-the-evidence standard of proof, allocation of the burden of persuasion should rarely be important. If some evidence on the issue is available, enough that the court can form some rational (albeit subjective) assessment of the likelihood of the disputed fact, allocation of the burden of persuasion should only matter where that assessment is exactly fifty percent. If the judge believes it is even slightly more probable than not that the terms of the transaction are fair, if she finds, for example, that the testimony of plaintiff’s expert is just a bit more credible than that of the defendant concerning the appropriate valuation of the stock at issue, allocation of the burden of proof should become unimportant. A determination that there is a fifty-one percent probability in favor of one side or the other should be dispositive, irrespective of the allocation of the burden of proof.


Allocation issues will admittedly still be important in those cases in which the issue is one on which neither side is able to adduce any evidence (e.g., whether defendant manufactured the defective product purchased by plaintiff many years ago). It seems unlikely, however, that the dispositive issue in a breach of fiduciary duty case, particularly the issue of fairness, is likely to be one on which little or no evidence is available. Quite the contrary, the fairness of a given transaction is an issue on which experts can almost always be found to testify for both sides, creating the kind of "battle of the experts" also found in medical malpractice cases, condemnation proceedings and certain other kinds of litigation. It seems unlikely that an experienced finder of fact, hearing all the expert testimony subjected to competent cross examination, would not find herself at least somewhat persuaded that one or the other side had the stronger position. Even if both experts' testimony were exactly equal in persuasive power, the judge could still look to other circumstances surrounding the transaction, such as the negotiation process, the nature and extent of the bargaining, and the terms of the deal itself—all of this evidence relating to the fairness of the transaction. It is hard to believe that a judge, after considering all this evidence, will generally be unable to conclude that a preponderance favors one or the other side.

Indeed, cases considering the fairness or unfairness of a recent corporate transaction are very different from the sparsely evidenced issues which concern most theoretical work on civil burdens of proof. The theoretical work usually deals with cases where evidence on some crucial issue, such as causation or identity, is either entirely lacking or available only in a weak or attenuated form. In fairness cases, however, the court will generally have available to it all relevant facts


10 See, e.g., Weinberger v. UOP, Inc., 457 A.2d 701, 711 (Del. 1983) (fairness determinations include "questions of when the transaction was timed, how it was initiated, structured, negotiated, disclosed to the directors, and how the approvals of the directors and stockholders were obtained" as well as the "economic and financial considerations of the proposed merger, including all relevant factors: assets, market value, earnings, future prospects ... "); see also Simpson, The Emerging Role of the Special Committee, 43 BUS. LAW. 665, 685-87 (1988).

11 The "blue bus" hypothetical, for example, involves a plaintiff who, having been negligently run over by a blue bus, can only adduce evidence of identity which establishes that defendant operates 60% of the blue buses in town. Most commentators assume that such a showing of identity would not be sufficient to withstand a motion for a directed verdict, let alone sustain the burden of persuasion at trial. Yet these commentators have not been able to produce an entirely satisfactory account of why this should be so. David Kaye suggests that the failure of plaintiff to submit any stronger evidence of identity is itself a relevant fact for the fact finder to consider and may well justify the fact finder in forming a subjective probability that the likelihood that defendant owned the bus is less than 50%. See Kaye, The Paradox of the Gatecrasher and Other Stories, 1979 ARIZ. ST. L.J. 101.
concerning the transaction itself, accounts by all the major participants as to how the deal was negotiated, as well as expert opinions as to its fairness. Considering all the evidence as to whether the deal was fair, and a burden of proof that makes even a slightly stronger showing for one side or the other dispositive, why is corporate litigation so obsessed with allocating the burden of proof?

To answer this question, one must recognize the rather peculiar way in which the fairness of the transaction constitutes a factual issue for the court. Fairness, as I hope to show in the following section, is treated by the courts not as a distinct property which either does or does not characterize the transaction, but rather as a “fuzzy” property which may characterize a transaction to various degrees. In the third section, I hope to show that recent work that has been done on the logic of propositions involving such fuzzy properties (so-called “fuzzy set theory”) can illuminate the role of allocations of burdens of proof in this area of corporate law.

Before going on to this paper’s next two sections, however, I want to consider two preliminary objections to the problem as I have posed it.

Most careful corporate lawyers would rightly note that the legal standards applicable to transactions subject to the business judgment rule (or applicable to transactions ratified by shareholders or disinterested directors), and those legal standards applicable to self-dealing or interested-director transactions, involve more than just a shift in the burden of proof. Interested-director transactions constitute a breach of fiduciary duty unless they are “intrinsically fair” to the corporation. Transactions subject to the business judgment rule, in contrast, or those ratified by the appropriate disinterested groups, only breach management’s fiduciary duty if they involve “waste” or a “gift” of corporate assets.

The difference between the “intrinsic fairness” and “waste” standards is more than a difference in the allocation of the burden of proof. It seems to involve a substantive difference in the kind of thing that must be proven to establish liability, like the difference between negligence and recklessness in tort law, or the difference between a complaint which merely fails to state a claim under Rule 12(b)(6) of

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12 This is said to be an “exacting standard,” requiring rigorous judicial scrutiny of the transaction with regard to both “fair dealing” and “fair price.” Block, Radin & Rosenzweig, The Role of the Business Judgment Rule in Shareholder Litigation at the Turn of the Decade, 45 Bus. Law. 469, 491 (1990).

the Federal Rules of Civil Procedure and one which is "frivolous" and triggers sanctions under rule 11.

But even after one acknowledges, as I think one must, that there is this substantive difference in relevant standards, the fact remains that corporate law judges are quite insistent that their rules involve not only substantive differences in standards, but also shifts in allocations of the burden of proof. Unlike tort law, where plaintiff has the burden of proving either negligence or recklessness, or under the Federal Rules of Civil Procedure, where defendants must establish either failure to state a claim or frivolousness, the structure of the corporate law rules implies that requiring defendants to prove fairness, rather than simply easing the burden on plaintiffs from a showing of waste to unfairness, constitutes an additional serious hardship to defendants that renders their case significantly more difficult. The question remains, therefore, in light of the preponderance of the evidence standard, why shifting the allocation of the burden of proof is believed to have this significant impact on the outcome of cases.

Furthermore, while waste and intrinsic fairness do seem to be different substantive standards, they do not appear to measure entirely different things. Quite the contrary, waste is usually defined in terms of particularly egregious or extreme forms of unfairness. If so, the analysis of fairness as a fuzzy variable admitting of various degrees may not only shed some light on the allocation of burdens of proof, but may also help define the relationship between the fairness and waste standards.

The other preliminary objection to the problem I have posed would be that, despite all the judicial talk about allocations of burdens of proof, such allocations are not really very significant after all. I have heard this view expressed by some lawyers who frequently litigate corporate law issues. These lawyers maintain that despite all the judicial attention to allocation of burdens of proof, the dispositive issue in all such cases is whether or not the judge is convinced that the transaction at issue is fair. This also appears to be the view of Dean Robert Clark, who in his recent treatise on corporate law describes the "basic self-dealing" standard as "a fairness test," and devotes only

16 The proverbial "smell test" used in Delaware proceeds upon the theory that if the terms of the underlying transaction stink badly enough, the courts will find a way to abrogate any procedural protections supplied by the business judgment rule. See e.g., Mundheim & Block, The Business Judgment Rule, in Twentieth Annual Institute on Securities Regulation 173, 180-81 (C. Nathan, H. Pitt & S. Volk eds. 1989).
one sentence to allocation of the burden of proof. The real question is whether the judge's determination of whether a transaction is fair or not is significantly affected by which party has the burden of proof on that issue, and whether those actions which allegedly shift the burden of proof, such as disinterested director approval, really do affect substantive legal outcomes.

It is possible, of course, to answer this question in the negative. We have already noted that, for the corporate litigator, the allocation of burdens has no effect on his presentation of evidence at trial. The attorneys for both parties will simply present the strongest evidence they can on the fairness issue. It is not surprising, therefore, that some attorneys may believe that the dispositive factor is always the strength of their presentation, not the allocation of the burden of persuasion. Some might even agree that considerations such as disinterested-director approval might have an effect on the outcome, but only because it is a factor in the court's fairness determination, not because it "shifts" the burden of proof.

These are plausible views, and they derive much of their strength from the previously noted fact that it is hard to understand why, given our standard view of the burden of proof, the burden's allocation should be a significant factor in fairness cases. Even if we accept the view that allocation rules are mostly judicial smoke and mirrors, masking what is in every case a straightforward determination of the fairness or unfairness of the transaction, the persistence of and the attention given to allocation-of-burden-of-proof rules in judicial opinions must still be explained. Why do courts insist on describing disinterested-director approval as an action which shifts the burden of proof, rather than simply a factor to be considered in determining the overall fairness of the transaction?

In short, rejection of the view that allocation-of-burden-of-proof rules are important in corporate-law adjudication does not solve the

17 R. CLARK, CORPORATE LAW, §§ 5.2-3 (1986).

18 Alternatively, if a judge finds a transaction to involve substantial unfairness, she will grant relief to the plaintiff. The one situation in which the doctrinal formulations suggest there might be a departure from a straight fairness standard is when the transaction is perhaps "somewhat" or "slightly" unfair, but has been approved by disinterested directors and/or ratified by shareholders and is not so egregious as to constitute waste. This problem is analyzed more fully in the third section of this paper.
problem to which this paper is addressed, but merely reposes the problem in a new form. If the allocation rules simply function as a "tie-breaker" when the evidence from both parties is equally unpersuasive, we are still left wondering why so many corporate lawyers and judges take these rules so seriously, and why lawyers and judges view these rules as potentially dispositive in many cases.

II. FAIRNESS AS A FUZZY PROPERTY

In order to answer the question posed in the preceding section, we should take a closer look at what it means to describe a given transaction as fair or unfair. Fairness, as that term is understood and used in fiduciary-duty litigation, is a property which may characterize transactions in various degrees. Like the properties of being tall or pretty or old or hot, a deal may be fair to various degrees: that is, it is plausible and sensible to speak of deals that are very fair to shareholders, somewhat fair, almost fair, and egregiously unfair, just as it is intelligible to speak of things as very tall, somewhat pretty, or extremely hot.²⁹

While many may find it intuitively obvious that fairness is a "fuzzy" property, to others, the term almost fair in the context of transactions may sound as strange as almost pregnant or almost evenly divisible by 7. Such people may have in mind the economic definition of fair price as the price at which a willing seller and willing buyer would agree to an exchange, or may envision a chart in which the supply and demand curves for a particular commodity meet at a single point which defines both the amount that will be produced and its fair price. At the more mundane level, many items do have a single, nonfuzzy fair price. If the bus fare is $1.15, it is, on a plausible use of the language, unfair to ask any more or less than that.

Yet economists recognize that under many circumstances, there can be no single easily defined and ascertainable fair price, even as a matter of economic theory. Rather, the theory can only define a fair range of prices. One circumstance under which this fair range of prices may occur is bilateral monopoly. Assume that A owns the only piece of land in the area that has oil underneath it, but B owns the only drilling equipment and is the only one who knows how to use it. Together they can produce a well worth $1,000. Separately the land and drilling equipment are worthless. Obviously, it is efficient (that is, it will maximize A and B's aggregate wealth) for the two to agree in some way, whether by B purchasing the land from A, by A leasing the

²⁹ See Zadeh, Fuzzy Logic, COMPUTER, April 1988, at 83.
equipment from B, or by some other joint arrangement. But any agreement they reach concerning division of the $1,000 increase in value created by their drilling venture is equally fair from the point of view of economic theory. While it would be inefficient for A to demand $1,500 for land that could only produce $1,000 in incremental value, economic theory has nothing to say about the fairness of any price A might charge between $1 and $999. Accordingly, one might say that in cases of bilateral monopoly, economists recognize that the efficiency gains obtainable from cooperation define a range of fair allocations of those efficiency gains.

Economists also recognize that a range of fair prices can occur in the absence of complete information about the item being sold. Consider a thing of value, say, a promissory note from Mr. X, promising to pay $1,000 at the end of the year. Obviously, the note will be worth $1,000 on the day Mr. X pays it, but there is the possibility that other events will occur in the interim, such as X might go bankrupt or flee the country, which would make the note worthless. On this simplified model, we can say that the value of the note today is its value at maturity multiplied by the likelihood or probability that it will be paid at maturity. If we believe there is a ten percent chance that X will be bankrupt by the end of the year, the note will be worth only $900 today. If we decide that the probability of bankruptcy is fifty percent, the fair value of the note is $500. Determining the likelihood of some future event is almost always going to be a matter of informed speculation. Accordingly, if we decide that X’s bankruptcy is not very likely, we might put its probability at between one percent and ten percent, thereby creating a range of fair values of between $990 and $900 for the promissory note. We might conclude that such a range of fair prices was the best we could do in valuing the note, either because no further information about X’s financial condition was available or because the cost of gathering the information was greater than the benefit obtainable from that information.

I would suggest that problems of prediction and bilateral monopoly are almost invariably involved in fiduciary duty cases. The very common situation of the corporate “freeze-out,” in which a majority

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20 For the sake of simplicity, we are purposely ignoring the problem of discounting the value at maturity to its present value. For a discussion of such discounting, see W. Klein & J. Coffee, Business Organization and Finance, 280-88 (4th ed. 1990).

21 If the point of any further investigation is to enable us to determine which value between $900 and $990 is the fair price to pay for the note, it would be irrational (in an economic sense) to spend more than $90 to obtain such further information. If it would cost more than $90 to obtain that additional information, then the range of fair values is the best information about price that is rationally obtainable.
shareholder of a corporation purchases all the outstanding shares of the minority, involves a classic bilateral monopoly situation. The majority shareholder, by virtue of its controlling position with the corporation, is the only potential buyer of the minority shares, and there are no adequate substitutes for the minority shares it seeks to purchase. Accordingly, there is no single fair price at which the shares should be purchased, but rather a range of values defined by the difference between the value of the stock if it stays in minority hands and the incremental value the majority holder expects to receive from the purchase.  

Even more common in corporate law is the lack of complete information necessary to arrive at a single fair price. The value of most corporations and other profit-making enterprises, as well as the stock which represents claims on the control and future profits of such enterprises, is generally thought to be most accurately determined by computing the present value of the likely future income or cash flows anticipated from the enterprise. Such an analysis necessarily involves making speculative and imperfectly informed predictions about the future business and financial prospects of the enterprise. It is not surprising that valuations based on such speculative and uncertain data can yield no more than a range of potentially fair prices.

Viewing fairness in corporate law as a property involving a range of values is not only justified by economic theory, but is reflected in practice as well. When investment bankers are asked to elucidate the meaning of the formal “opinions” they issue in connection with tender offers or other corporate combinations, in which they state that the price being offered to shareholders is fair, they are careful to point out that they are not defining that price as the single fair price. Rather, they are simply giving an opinion that the price is within the fair range, again implicitly recognizing a certain fuzziness in the parameters of fairness.

The clearest statement that fairness is a fuzzy property for corporate law purposes is to be found in the Revised Model Business Corporation Act (“RMBCA”) which notes:

22 Weinberger v. UOP, Inc., 457 A.2d 701 (Del. 1983) presents the classic situation. The majority shareholder had studies performed which indicated that purchase of the remaining 49.5% of the company would be a “good investment” at up to $24 per share. The stock was then selling at about $14.50 per share in the market. The majority shareholder offered the minority $21 per share in a transaction ultimately held to be unfair to the minority. See also discussion of the “self-dealing surplus” in R. CLARK, supra note 17, § 5.4.2.

23 In Smith v. Van Gorkom, 488 A.2d. 858 (Del. 1985), the response of the target company's chief financial officer to a takeover bid which was favored by the target's President (but probably not by the chief financial officer) was that it was “in the range of a fair price,” but not at the beginning of the range.” Id. at 869.
If the issue in a transaction is the "fairness" of a price, "fair" is not to be taken to imply that there is a single "fair" price, all others being "unfair." It has long been settled that a "fair" price is any price in that broad range which an unrelated party might have been willing to pay or willing to accept, as the case may be, for the property, following a normal arm's-length business negotiation, in the light of the knowledge that would have been reasonably acquired in the course of such negotiations, any result within that range being "fair"...\(^{24}\)

Even when we have established that fairness in fiduciary-duty litigation is a property defined by a range of values, we still have not established that such fairness is a fuzzy property. Consider the following statements: (1) "X is tall"; and (2) "X is an American citizen." Both statements ascribe certain properties to X. Both properties involve a range of values, in that we can imagine people of very different descriptions and backgrounds for whom these would be true statements. But the property of being tall is one that can be used to rank those who possess it in varying degrees. For any two people appropriately described as tall, we can determine whether one is taller than the other. We can also ascribe degrees of tallness like very tall, kind of tall, extremely tall, not very tall. The property of being an American citizen, by contrast, cannot be used to rank those who possess it. It makes little sense to speak of someone being more of an American citizen than someone else, or to speak of someone being very much an American citizen or just a little bit an American citizen.

What kind of property is fairness? The section of commentary from the Revised Model Business Corporation Act quoted above, as well as the economic theory previously discussed, would seem to imply that fairness involves a range of values that cannot ordinally be ranked. If it is determined, for example, that a willing buyer and a willing seller in (for example) a bilateral monopoly situation, would agree to a price between $5 and $10 per share, then both economic theory and the RMBCA tell us that "any result within that range" is "fair."\(^{25}\)

Here, however, I think there is a crucial difference in perspective between those, like economists and the RMBCA commentators, who are seeking to define an abstract notion of fairness, and the perspective of a judge in an actually litigated fiduciary-duty case. The judge is considering a challenge to the fairness of a certain transaction from the perspective of the plaintiff. The plaintiff's claim, after all, is not...\(^{24}\) Revised Model Business Corp. Act § 8.61, note on Fair Transactions (1989).

\(^{25}\) Id.
that the transaction is unfair in the abstract, but that it is unfair to the plaintiff.

There is a significant difference between the determination that a price is fair in the abstract, and that it is fair to a particular individual. We might determine, for example, that a fair price for a cup of coffee, based on a survey of local coffee shops, is a range from $.50 to $.70. The question, whether a price of $.50 is fair or not, would, from an abstract perspective, be uncertain, depending on how wide we determine the range of fairness to be. From the perspective of the purchaser of the $.50 cup of coffee, however, aware that he often pays more, $.50 seems an eminently fair price. By the same token, if asked to pay $.70, our disgruntled purchaser might comment that such a price was barely fair, or hardly fair or even a little unfair.

From the perspective of a certain individual or class of individuals, therefore, the fairness of various prices can be quite easily compared and ranked. From the perspective of shareholders whose interest in a company has been purchased by a majority shareholder in a cash out merger, for example, there is no doubt that $20 a share is fairer than $15, and $25 is fairer still. Accordingly, from the perspective of the judge in a fiduciary duty case, whose job it is to decide whether the price paid by defendants was fair to the plaintiff, the issue of fairness-to-the-plaintiff presents itself as a fuzzy property. 26

Consider then the issue of fairness as it is likely to be presented to the judge in a fiduciary-duty litigation. There will rarely be any dispute about the amount actually being offered in the transaction. Say, for purposes of the following hypothetical, that it is $25 per share, offered by the majority shareholder to purchase all the remaining minority shares of the company. If the market price for the stock in the preceding year has averaged $20 per share, everyone might agree that a price below $20 would be very unfair, and by the same token, it might generally be agreed that a fifty percent premium over that market price, or $30 per share, was undeniably within the range of fairness to the plaintiff. But the judge must decide whether $25 per share, a price which, on our hypothetical, is neither clearly fair nor clearly unfair, is fair for purposes of the lawsuit.

Note, moreover, that it is probably no accident that the price

26 A fuzzy set is a class with fuzzy boundaries. "Such a class, say F, may be characterized by associating with each object u in a universe of discourse U the grade of membership of u in F." L. Zadeh, Fuzzy Sets, Usuality and Common Sense Reasoning 4 (Oct. 2, 1985) (unpublished manuscript). For our purposes at the moment, the universe of discourse contains the prices at which minority shares may be purchased, with F being the property of being fair to minority shareholders. F is a fuzzy property because any price u may be associated with a grade of membership of u in F—i.e., any price possesses some degree of fairness.
being considered by the judge falls right in the middle of the fuzzy range. The majority shareholder has an obvious economic interest in paying as little for the stock as possible, and has presumably asked its lawyers and financial advisors, in originally structuring this transaction, what was likely to be the lowest amount that it could pay and still have a good chance of winning the subsequent lawsuit. While natural or professional caution and uncertainty might cause such advisors to err on the side of generosity to shareholders, it seems far more likely that the dominant motive will be economic, and will incline lawyers and financial advisors to approve prices that will present hard cases to the judge—prices that might be described in the vocabulary of fuzziness as just barely fair or minimally fair or not quite fair.

If this analysis is correct, determining whether a price in fiduciary duty litigation is fair is a difficult question in much the same way that it is a difficult question whether a man whose height is 5 feet 10 1/2 inches is tall or a temperature of seventy-eight degrees Fahrenheit in June is hot. In all of these cases, the problem is not a lack of information about the thing to be evaluated (we know exactly what the price, height or temperature is). Rather, it is the nature of the criteria we are using to evaluate the thing which leads to uncertainty in the evaluation. Since those criteria are not crisply defined, but fuzzy, we may find it difficult to give a simple yes or no answer to the question presented.

The mere fact that legally dispositive criteria are fuzzy and not crisp, however, is not necessarily grounds for condemning them. We can imagine a legal regime in which all legally dispositive terms had crisp definitions—in which only men 6 feet or over were tall; in which only June days over eighty degrees were hot; and in which only freeze-out merger prices at least twenty-five percent above average-market price for the previous year were fair. Any gains in clarity from such a regime might well be outweighed by the loss in flexibility—e.g., does the same definition of tallness apply to Swedish and Japanese men? Is a hot day in early June as hot as one on June 30? Is a fixed percentage above market a reliable criteria in all cash freeze-out mergers? If one agrees that the answer to some of these questions may be no, one can begin to appreciate that legal standards may utilize fuzzy criteria and yet be preferable to the available crisp alternatives.

How do courts go about making determinations, like the determination concerning fairness, which involve applications of fuzzy criteria to often largely undisputed facts? It is here, I believe, that work from the field of fuzzy set theory can provide lawyers with certain
insights. The following section attempts, in a preliminary way, to consider some applications of fuzzy set theory to understanding the role of allocations of burdens of proof.

III. FUZZY SET THEORY AND ALLOCATIONS OF THE BURDEN OF PROOF

Standard logic, which utilizes the law of the excluded middle, holds that every variable \( x \) either has the property \( P \) or the property not \( P \). Put slightly more colloquially, everything is either red or not red, divisible by two or not divisible by two, President of the United States or not President of the United States. From the perspective of set theory, everything is either a member of the set of red things or it is not. Everything is either a member of the set of things divisible by two, or it is not.

Fuzzy set theory relaxes the law of the excluded middle to the extent of recognizing that some variables may be neither fully members of a set nor fully excluded from it. Consider the set of tall people. Some individuals may be definitely tall and others definitely not tall, while yet others may be kind of tall or somewhat tall or not very tall. Fuzzy set theory assigns to those variables which are fully members of the set (i.e., definitely tall) the value of 1, and to those which are not at all members of the set (i.e., definitely not tall) a value of 0. But fuzzy set theory also permits, as standard logic does not, that a variable may be a member of a set at some value between 1 and 0. So, a variable having a .2 membership in the set might be considered to correspond to someone just barely tall, while .5 membership might be somewhat tall and .8 membership rather tall.\(^{27}\)

Thus, fuzzy set theory captures the cardinal ranking that is possible with fuzzy properties. It makes it possible for systems analysts to create computer systems which model the decision processes of experts in various fields, fields whose experts utilize fuzzy properties like hot, tall, etc., in making their decisions. Properties like very hot, not very hot, somewhat hot and not too hot can be assigned numerical values, and computers can be programmed to, for example, start the manufacturing process when the machinery is somewhat hot and monitor the process to prevent the machinery from becoming very

\(^{27}\) The ways in which these numerical values are assigned to linguistic variables remains unclear, and a number of methods have been suggested. Zadeh, supra note 26, at 5-8. One must recognize, of course, that in shifting from words to numbers, one cannot supply these fuzzy predicates with any more crispness than they originally had.
hot.\textsuperscript{28}

Obviously, fuzzy set theory cannot tell judges how to decide fairness issues in fiduciary duty litigation. What it can do is provide us with a way of thinking about the difficulties in factual determinations involving fuzzy properties. Consider again the hypothetical freeze-out case, where a majority stockholder offers to purchase minority-held stock for $25 per share. We might assign to the certainly fair price of $30 a value of 1, and to the certainly unfair price of $20 a value of 0. The transaction price, which is exactly halfway between these points, might be considered a .5 on a cardinal ranking of possible prices. The question then becomes whether .5 degree of fairness is sufficient to satisfy the standards imposed by the corporate law rules. Fuzzy set theory obviously cannot tell us that, but it does tell us to pay careful attention to the precise verbal formulations decision makers use in describing their decision making processes.\textsuperscript{29}

Fuzzy set theory uses the verbal gradations implicit in such terms as not very hot, kind of hot, and rather hot as ways of indicating the degree to which certain objects are members of the set of hot things. Consider two responses to the question, Is that coffee hot? The first response is, no; the second is, not very hot. Both are negative answers, and in a world in which only yes-no bipolar answers are recognized, both no and not very hot would count as no. But if we are attuned to various degrees of yes and no, we quickly recognize that coffee which is not hot may be quite different from coffee which is not very hot. Whereas coffee that was not hot would have a value of 0 in the set of hot things, coffee which is not very hot might still be a .5 or .6 member of such a set. Put colloquially, tepid coffee or lukewarm coffee would still be not very hot.

What does this have to do with determinations of fairness in fiduciary duty litigation? Consider again the question, Is that coffee hot? It is an ambiguous question in that we do not know whether, in asking about the fuzzy predicate hot, the questioner meant piping hot or just not ice cold. Is any value below 1 (say, piping hot) excluded or are only values below .2 (tepid) excluded? Consider again the answer, Not very hot. It responds to the ambiguity of the question by providing greater specificity, as well as by giving greater definition to the criteria being used in the answer (i.e., I am interpreting the ques-

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tioner's criteria for hot to mean very hot and am answering the question, Is that coffee hot?—no).

The question, Is the transaction price fair? is also, as we have seen, an ambiguous question in that it does not tell the judge the degree of fairness that must characterize the transaction to satisfy the criteria. But the judicial opinions themselves, in seeking to answer that question, may provide their own subtle indication of the criteria they are actually applying. The case law often states that the criteria for approval of these transactions is not just fairness, but full fairness,30 "entire fairness,"31 "intrinsic fairness,"32 or "the most scrupulous inherent fairness."33

Little attention has been paid to these extra adjectives, and indeed, it is difficult to define, in any abstract sense, what the difference between fairness and entire fairness or intrinsic fairness might be. Yet in the context of fairness as a fuzzy property, there seems little doubt that all these adjectives function as intensifiers to the property "fairness" and as such, send a subtle message to the judge concerning the substantive criteria to be used in determining fairness. In our hypothetical, the judge may be quite uncertain whether $25 is a fair price for the stock, but as she peruses the case law, and is instructed to rule against any prices not fully or entirely or inherently fair, she will view these adjectives as setting a higher standard than mere fairness—something akin to a very fair standard.

The result is that these rules, while phrased in terms of shifting the burden of proof, also change the substantive standard to be applied in the case. If we envision a cardinally ranked scale of fairness/unfairness, where the egregiously unfair or wasteful transaction is ranked as 0 and the intrinsically fair transaction is ranked as 1, we can see that any rule that shifts from a standard of waste to a standard of intrinsic fairness involves a major substantive change in the criteria applied to the transactions at issue. Many transactions that would easily pass muster under the former standard will be struck down under the latter.

Thus far, our analysis of burden-shifting rules implies that such rules are not primarily directed at allocating burdens of proof at all, but at choosing between two substantive criteria of fairness. These implications are mistaken, at least insofar as they imply that there is

some secret code or deception going on, with substantive rules being disguised as procedural allocations of proof burdens.

Our aim is to understand the allocation rules from the perspective of the judicial finder of fact. To do that, we must further consider the effects of judicial uncertainty. We have already seen how, for a judge uncertain as to how fair a transaction must be to satisfy the requirements of the corporate-law rules, such terms as intrinsic fairness and entire fairness acquire meanings they might not have when considered in the abstract. Such modifications of the mere fairness standard tell the judge to resolve all questionable or intermediate cases in a particular way (e.g., a transaction price that is only somewhat fair or possibly fair is not intrinsically or entirely fair).

Consider again the corporate freeze-out at $25 per share. This time, however, plaintiff, in an effort to show the price is unfair, puts on an expert who testifies that, based on certain assumptions and projections about the future earnings of the company, the company should generate cash and earnings which imply that a fair price for the stock at the present is $30 per share. You, as judge, are not particularly persuaded by the presentation, and assign it a .4 subjective probability. Defendants, on the other hand, put forward their own view of the future earnings and cash flow potential of the business, which implies that the stock has a present fair value of only $24. You find this the more persuasive view, and assign it a .6 subjective probability.

Two possible decision-making procedures are now available to you as judge. One is to conclude that since a preponderance of the evidence favors defendants, (i.e., you assigned a .6 probability that the transaction price is fair) you should rule for defendant. If the disputed issue involved the occurrence or nonoccurrence of some past event (e.g., did defendant manufacture the faulty tire) this would seem to be the only decision-making procedure available.

However, when dealing with questions of fairness in valuation, the fact that such valuations depend on probability assessments of future events, and the fact that intermediate valuations between plaintiff’s and defendant’s assessments are available, means that you as judge might approach the decision-making process in another way. You might conclude that since there is a .6 likelihood of future events which will lead to a present valuation of $24 per share, and a .4 likelihood of future events which will lead to a present valuation of $30, a weighted average reflecting the relative likelihood of the occurrence of either set of events (\.6 \times 24) + (.4 \times 30)) yields a present value for the stock of $26.40 per share. Since $26.40 is more than the $25 per share
offered by defendant, the judge applying this method might well con­
clude that defendant had not met its burden of persuasion, even if
defendant’s presentation of evidence was more persuasive than the
plaintiff’s presentation.

Notice that under this second-mentioned approach to decision-
making, the degree of certainty or confidence which the finder of fact
has in each side’s presentation of the facts is extremely important.
Returning again to the hypothetical, assume that the finder of fact
was far more convinced by defendant’s case than by plaintiff’s, as­
signing their positions subjective probabilities of .9 and .1, respec­
tively. With these assessments, even under a weighted average
approach, the judge would find the present value of the stock to be no
more than $24.60 ((.9 x 24) + (.1 x 30)) and would rule for
defendant.

While the numbers lend these cases a spurious exactitude that
would not be found in the context of actual litigation, they illustrate
why it is perfectly possible that a judge, knowing that defendants have
the burden of proving fairness, and uncertain as between evidence put
forth by plaintiff and defendant (i.e., she finds both valuations plausi­
ble, even if one is somewhat more plausible than the other), might
hold that defendant had failed to meet their burden of proof on the
issue of fairness, even if she thought defendant’s presentation was
somewhat more persuasive. This scenario implies that the party with
the burden of proof may have to make a far more convincing showing
than the other party, (as in our example of the .9 and .1 subjective
probabilities) in order to prevail on the merits.

This analysis, then, provides a potential answer to the question
posed in the first section. It describes a decision-making mechanism
in which the allocation of the burden of proof, as well as the substan­
tive legal standard, can have a major impact on the outcome of the
case. The analysis implies that the party without the burden may be
able to prevail by making no more than a plausible case that the trans­
action was unfair (or, where the plaintiff has the burden, that the
transaction does not constitute waste).

Two basic questions have to be asked about this analysis: first, Is
there any indication that judges actually decide cases in this manner?
and second, Is it proper for judges to do so? The first question, like
many fundamental issues of judicial process, has no definitive answer.
Judicial decisions explain and justify the results of the decision-mak­
ing process, but do not provide a record of the process itself, and
judges are notoriously reticent to discuss their decision-making
processes outside of the opinions themselves.
Nonetheless, the case law in this area does provide some interesting indications that a weighted-average approach which combines factual claims of value with the judge's subjective probability assessments is sometimes utilized by the courts. The old "Delaware block" method of valuation, whereby courts would determine the value of stock by taking a weighted average of market price, net asset value and discounted earnings is a fairly clear indication of such an approach. The weightings given to these various valuation techniques were not fixed, but were to be determined in the discretion of the individual judge, under the circumstances of the case. Accordingly, even if a judge believed that market value was the best indication of the stock's value, and had a seventy-percent subjective probability of being correct, the judge could not value the stock at the market price. Rather, the judge would assign seventy percent of the final value to market price and the other thirty percent to her assessments of the relative credibility of the other two valuation techniques.

Although the Delaware block method is no longer required by Delaware courts in valuation proceedings, the discounting of price by credibility continues. In the recent case of In Re Appraisal of Shell Oil Co., an appraisal proceeding involving the purchase by Royal Dutch Shell of the minority shares of Shell Oil Co., the Delaware Court of Chancery was faced with widely differing valuations of the stock held by the minority shareholders. The minority shareholders valued the stock at $89. Royal Dutch Shell's expert valued it at $55. The court found that the minority shareholders' evidence was the most credible and was therefore entitled to "greater weight." Nevertheless, the court proceeded to discount that weightier valuation, which still contained some "errors and distortion," by twenty percent, to arrive at a valuation of $71.20—a price nowhere near the contentions of either party.

These results were obtained in appraisal proceedings which, like damage calculations, often permit a court to make intermediate determinations reflecting the court's mistrust or uncertainty concerning both sides' evidence. In such circumstances, it should be noted, the preponderance of the evidence standard plays little or no role. An increase in perceived credibility of valuation evidence from forty-five to fifty-five percent will not be the difference between winning and

36 Id. at *95.
37 Id. at *95-96.
losing, but may simply represent an increment in the assessed valuation of ten percent.

Liability, however, remains an all-or-nothing determination. In deciding whether a plaintiff has shown waste or whether a defendant has satisfied the intrinsic-fairness standard, ultimately only a yes or no answer is possible. Yet consider the following quotation from *Beard v. Elster*, a widely cited case in which the Delaware Supreme Court was asked to determine whether a stock option plan, approved by disinterested directors, constituted a "waste" of corporate assets. The court stated:

> We have before us a plan which, in the judgment of a disinterested Board, is adequately designed to further the corporate purpose of securing the retention of key employees' services. It is theoretically possible, we suppose, that some businessmen could be found who would hold the opinion that options exercisable at once were improvidently granted, but, on the other hand, there are businessmen who would hold a favorable view, as this Board of independent businessmen in fact did. At most, therefore, we find ourselves in the twilight zone where reasonable businessmen, fully informed, might differ. We think, therefore, we are precluded from substituting our uninformed opinion for that of experienced business managers of a corporation who have no personal interest in the outcome, and whose sole interest is the furtherance of the corporate enterprise.

The substantive standard for waste, as set forth in *Beard v. Elster*, was that there be a "reasonable assurance" that the option plan would provide a benefit to the corporation. In the paragraph just quoted, however, the court is unable to make a finding of reasonable assurance, but locates the case in a "twilight zone" where reasonable businessmen might differ on that issue. One might expect, under a preponderance-of-the-evidence standard, that the court would ask which side had made the stronger showing. Instead, the court indicates that the fact that the issue is uncertain and that the plan possibly provides benefits is determinative of the issue.

It is as if the plaintiff had to prove that the plan was "definitely unfair," or totally excluded from the set of fair plans, or had a zero degree of participation in the set of fair plans. By showing that there was at least a possibility that the plan was fair (even if only barely fair), defendants had shown by a subjective probability greater than zero that the plan was fair to a degree greater than zero. If the mere

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39 Id. at 165, 160 A.2d at 738-39 (emphasis added).
40 Id. at 160, 160 A.2d at 736.
possibility that the plan is fair (even if a preponderance of the evidence shows otherwise) can be considered, then any plan about which such a showing can be made will, on a weighted average, have a value greater than zero and will not constitute waste. That, in effect, seems to be what *Beard v. Elster* holds.

In short, there seems to be some indication that, in considering issues of fairness, courts do not really apply a preponderance of the evidence standard, but a sliding scale in which the degree of credibility they ascribe to the evidence is directly related to the degree of fairness that the court finds. In such cases, the prime considerations will be allocation of the burden of proof and the substantive degree of fairness that must be proved. A plaintiff who must prove that the deal is very unfair (i.e., waste) may be defeated by a moderate showing that the deal is barely fair. A defendant who must prove that the deal is very fair (intrinsically fair) may also be defeated by a moderate showing that the deal is barely fair.

Do such results make any sense? A justification of such results in terms of the broader structure of corporate law is beyond the scope of this paper. I would note, however, that such results are perfectly consistent with a Bayesian analysis of evidence. In determining whether $25 is a fair price for stock, it does not violate Bayes' theorem to hold that plaintiff should win if plaintiff establishes a forty-percent probability that the stock is worth $30, while defendant establishes a sixty-percent probability that the stock is worth $24. The key is in recognizing that the issue to which this proof is relevant is whether the fair value of the stock is greater than $25. Given the fuzziness of the property of fairness, a forty-percent likelihood that the stock is worth $30 may establish that the Bayesian probability of fair value being greater than $25 is substantially more than fifty percent. Defendant's showing of a sixty-percent likelihood that the stock is worth $24 in contrast, is not a very strong showing that the stock is worth less than $25.

These results do not violate Bayesian principles, but they are different than those that would be obtained in dealing with crisp rather than fuzzy properties. If there is a sixty percent probability that defendant breached the contract, and a forty percent probability that he did not, one would not conclude that he breached the contract sixty percent. One would conclude that, on a preponderance of the evidence, defendant breached the contract. On the question of fairness, however, a court might well reach a judgment, either on liability or damages, which reflects a 60-40 weighting of the credibility. On an intuitive level, it seems perfectly justifiable to multiply the degree of
credibility of each piece of evidence by the degree of fairness or unfairness presented, so that a moderate showing of substantial unfairness can overcome a stronger showing that the transaction is just barely fair.

I suspect that despite the appearance of crispness implied by syllogistic legal rules and binary results (A is either liable or not liable), fuzzy predicates play a far larger role in the legal process than is generally acknowledged in most legal literature. I have tried in a preliminary way in this paper to suggest some of the ways in which such fuzzy reasoning may play a role in the law of corporations.