Corporate Governance and Risk-taking: A Statistical Approach

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Because prudent corporate governance often requires managers to take risks based on statistically expected outcomes, corporate failures that have a small but finite chance of occurring cannot always be prevented. This Article makes three related claims about risk-taking in corporate governance.

This Article's first claim is that managers should not automatically be presumed to be at fault for corporate failures that result from risk-taking decisions based on statistical methodologies that reasonably justify the decisions ex ante. Conceptually, the business judgment rule should protect corporate managers for engaging in a reasonable decision-making process, including one that is statistically based. Jurisdictionally, however, the scope of the business judgment rule is narrowly limited (primarily, to state-law shareholder derivative lawsuits), leaving a large protection gap.

To fill this gap, this Article's second claim is that corporate managers should also be protected by a "statistics-based governance" rule that exempts them from liability, under both federal and state law, for making risk-taking decisions based on statistical methodologies that reasonably justify their decision-making (assuming good faith, and no managerial conflicts of interest or fraud). Part of the rationale for this claim is that a statistics-based governance rule would be more objective, and thus less subject to criticism, than the business judgment rule.

The Article's third claim concerns expected-value analysis, which is the statistical methodology most generally accepted and widely used for making risk-taking decisions. When determining an expected value, corporate managers should ask, "Expected value to whom?" For most risk-taking decisions, this determination should only take into account the firm and its investors. However, for decisions that could cause significant economic, environmental, or other social harm, this determination should also endeavor to take into account the public.

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I. INTRODUCTION

The recent failures of Silicon Valley Bank, Signature Bank, and First Republic Bank have spurred widespread demands to impose greater penalties on corporate managers that engage in excessive risk-taking.[1] These types of demands are not unusual; politicians and the media tend to attribute virtually every dramatic business failure to excessive risk-taking or fraud.[2] This Article focuses on risk-taking.

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[1] *See, e.g.*, Zachary Warmbrodt, *Elizabeth Warren, J.D. Vance Team Up on Bank CEO Crackdown*, POLITICO (June 1, 2023), https://perma.cc/3JS8-J4HJ. POLITICO reports that this congressional bill is "backed by 12 other senators that would require the government to claw back executive compensation at large failed banks in a bid to deter excessive risk-taking." Furthermore, this bill "indicates that a thirst for banking industry accountability—one shared by President Joe Biden—persists on Capitol Hill nearly three months after the failure of SVB and other regional lenders," and that "Warren's coalition is evidence that there may be sufficient political will to change policy."

[2] *See, e.g.*, Joe Nocera, *Risk Management*, N.Y. TIMES (Jan. 4, 2009), https://perma.cc/TY8W-2LC3 (reporting that "the risks taken by the largest banks and investment firms in the United States—and, indeed, in much of the Western world—were so excessive and foolhardy that they threatened to bring down the financial system itself"); Gretchen Morgenson & Louise Story, *Naming Culprits in the Financial Crisis*, N.Y. TIMES (Apr. 14, 2011), https://perma.cc/7SQ6-7L6D (quoting Senator Carl Levin as

In part, the political and media responses reflect at least two cognitive biases. The first is hindsight bias, or the tendency to believe that a past event was predictable or inevitable. The second is ultimate attribution error, which in this context is the tendency to assign responsibility for a failure to individuals as bad actors rather than to external factors.[3] The result of these biases is that legislatures, including Congress, often react to failures by enacting laws that focus on preventing excessive risk-taking (and fraud) by imposing harsh managerial performance standards, without addressing the actual causes or consequences of the failures.[4]

This Article makes three related claims about corporate risk-taking. Under principles of modern risk management, much of today's corporate risk-taking is data-driven and statistically based.[5] Although excessive risk-taking and fraud cause some corporate failures, even good faith statistically based risk-taking can result in failure. For example, a successful manufacturer of diesel engines could fail if, shortly after it expands its operations, the government unexpectedly bans the production of fossil-fuel-powered vehicles. This Article's first claim, therefore, is that managers should not automatically be presumed to be at fault for corporate failures that result from risk-taking decisions based on statistical methodologies that reasonably justify the decisions ex ante.

Conceptually, the business judgment rule (BJR), which generally exempts non-conflicted managers from liability for making good faith decisions that have a reasonable basis,[6] already should protect managers from liability for these corporate failures. The BJR has two primary justifications: to balance the

saying that the 2008 financial crisis resulted from "shoddy, risky, deceptive practices on the part of a lot of major financial institutions").

3 *See infra* notes 95–97 and accompanying text (discussing these cognitive biases).

4 *See infra* Part V.

5 *See infra* notes 30–33 and accompanying text.

6 The BJR provides a corporate director immunity from liability when a plaintiff sues on grounds that the director violated the duty of care to the corporation so long as the director's decisions fall within the parameters of the rule. Under those parameters, a court will uphold the decisions of a director as long as they are made (1) in good faith, (2) with the care that a reasonably prudent person would use, and (3) with the reasonable belief that the director is acting in the best interests of the corporation. *See, e.g.*, CORNELL L. SCH.: LEGAL INFO. INST., *Business Judgment Rule*, https://perma.cc/6844-WPP9. *Cf.* Christine Hurt, *The Duty to Manage Risk*, 39 J. CORP. L. 253, 258 (2014) (articulating the BJR as protecting managers from personal liability for negligent managerial decisions—including risk-taking decisions—made in good faith and without conflicts of interest—and in some articulations of the business judgment rule, also without gross negligence).

goals of protecting investors against losses while encouraging the best managers to serve; and to shield reasonable business decisions from being second-guessed by judges, who lack business experience and expertise.[7]

Because statistical methodologies should provide a reasonable basis for at least some risk-taking decisions, it might appear that the BJR already should protect those decisions. Jurisdictionally, however, the BJR has a very limited scope, applying primarily to state-law shareholder derivative lawsuits.[8] Thus, it does not protect managers who are subject to federal liability[9] or, in a non-derivative-lawsuit context, to state liability.[10] Furthermore, even where the BJR otherwise applies, it is uncertain whether, in addition to corporate directors, it also protects corporate officers.[11] The BJR thus leaves a large protection gap.

To fill that gap, this Article's second claim is that corporate managers should also be protected by a "statistics-based govern-

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[7] *See* Hurt, *supra* note 6, at 259–60. *Cf.* Ryan Scarborough & Richard Olderman, *Why Does the FDIC Sue Bank Officers? Exploring the Boundaries of the Business Judgment Rule in the Wake of the Great Recession*, 20 FORDHAM J. CORP. & FIN. L. 367, 377 (2015) (explaining that a typical justification for BJR protection is fear that qualified individuals will refrain from serving as managers due to the significant liability exposure); William T. Allen, Jack B. Jacobs & Leo E. Strine Jr., *Realigning the Standard of Review of Director Due Care with Delaware Public Policy: A Critique of Van Gorkom and Its Progeny as a Standard of Review Problem*, 96 NW. U. L. REV. 449, 455 (2002) (observing that liability for an imprudent decision could be in the millions, whereas outside directors rarely receive fees commensurate with that level of risk).

[8] A shareholder derivative lawsuit is one that shareholders bring on behalf of the corporation in which they are invested. These suits are intended to protect the corporation from mismanagement on behalf of corporate directors, officers, or some other third party. *See* CORNELL L. SCH.: LEGAL INFO. INST., *Shareholder Derivative Suit*, https://perma.cc/GN2J-43DE.

[9] Because states have jurisdiction over corporations incorporated therein, the BJR is largely determined by state law even if the lawsuit is brought in federal court. *See, e.g.*, La. Mun. Police Employees' Ret. Sys. v. Wynn, 829 F.3d 1048 (9th Cir. 2016) (allowing the business judgment rule as a defense in a federal case governed by Nevada state law).

[10] *Cf.* Amy Onder & Adam J. Siegelheim, *Corporate Liability Exposure and the Potential Risk of Individual Director Liability Resulting From Employment-Related Decisions: An Analysis of Recent Case Law and Recommendations on Corporate Governance*, 59 EMPLOYEE RELATIONS L.J. 297, 299 (2008) ("[I]t is unclear whether the [Business Judgment] Rule truly has any applicability in cases that are not derivative in nature . . . .").

[11] *See, e.g.*, Gantler v. Stephens, 965 A.2d 695 (Del. 2009) (observing Delaware law's uncertainty as to whether the BJR protects corporate officers). Whether the BJR protects corporate officers varies on a state-by-state basis. *See, e.g.*, F.D.I.C. ex rel. Cnty. Bank v. Hawker, No. CV F 12-0127 LJO DLB, 2012 WL 2068773 (E.D. Cal. June 7, 2012) (holding that "the business judgment rule did not preclude the FDIC's claims against a bank's officers for making risky construction loans" because BJR protection is limited to corporate directors).

ance" rule (hereinafter, an SG Rule)[12] that exempts officers and directors from both federal and state liability for making risk-taking decisions based on statistical methodologies that reasonably justify their decision-making.[13] Part of the rationale supporting this claim is that an SG Rule would set a relatively objective standard compared to the BJR, which is subject to criticism that its standard can be subjective, and hence vague.[14]

The above-referenced second claim is, of course, normative. Congress and state legislatures can impose whatever liability rules they wish. This Article argues, however, that lawmakers should qualify those liability rules with an SG Rule.

Expected-value analysis (EV Analysis) is the most generally accepted and widely used statistical methodology for assessing risk-taking outcomes.[15] This Article uses it to exemplify statistics-based governance.[16] For most decisions, the expected-value calculation should only take into account the firm and its investors.[17] This Article's third claim, however, is that managers making expected-value decisions should ask, "Expected value to whom?"

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12 An SG Rule would thus supplement other liability rules, including the BJR.

13 Consistent with the BJR (*see supra* note 6 and accompanying text), this assumes good faith, and no managerial conflicts of interest or fraud.

14 *See infra* notes 49–51 and accompanying text. For a discussion of whether this Article should argue for extending the BJR instead of introducing a new SG Rule, see *infra* notes 44–51 and accompanying text.

15 *See, e.g.*, Richard J. Zeckhauser & W. Kip Viscusi, *Risk Within Reason*, 248 SCIENCE 559, 559 (1990) (describing what is now known as expected value ("EV"), or sometimes expected monetary value ("EMV"), analysis: "The success of risk management policies should be judged in terms of their effect on expected utility, *the only well-developed prescriptive framework for choice under uncertainty*. This method assigns each potential outcome a value (utility) on a [numerical] scale, weights these values by their probability of occurrence, and then adds them together to produce an expected utility, a summary measure of the attractiveness of an action . . . .") (emphasis added).

16 Other statistical decision-making methodologies, although less used for making business decisions, include hypothesis testing (formulating and testing both a null and alternative hypothesis), single variable linear regression (identifying the line of best fit between an independent and dependent variable), and multiple variable regression (like single variable regression, but with one dependent variable and multiple independent variables). *See* Kelsey Miller, *3 Statistical Analysis Methods You Can Use to Make Business Decisions*, HARVARD BUS. SCH. ONLINE (Dec. 15, 2021), https://perma.cc/GJ9E-ZCNR. Monte Carlo simulations, which run several simultaneous simulations with random variable sampling, are also used for scenarios that have high levels of uncertainty. *See* Will Kenton, *Monte Carlo Simulation: History, How it Works, and 4 Key Steps*, INVESTOPEDIA (Mar. 26, 2023) https://perma.cc/4LPY-Q8AS.

17 Although myriad externalities can result from corporate risk-taking, it would not be feasible to account for all of those externalities. *Cf.* Steven L. Schwarcz, *Misalignment: Corporate Risk-Taking and Public Duty*, 92 NOTRE DAME L. REV. 1, 4 (2016) [hereinafter *Misalignment*] (explaining why the law does not, and should not, require all externalities to be internalized).

Some corporate governance decisions, for example, could result in externalities that significantly impact the public. Thus, a decision by managers of a systemically important financial institution (SIFI) that causes that institution's failure could trigger a systemically harmful financial collapse, seriously harming the real economy.[18] Likewise, certain decisions by managers of firms, regardless of whether the firms are SIFIs, might significantly risk harming the environment by contributing to climate change or creating other social harm.[19] For these decisions, this Article argues that the answer to "Expected value to whom?" should strive to additionally include the public.[20]

This Article proceeds as follows. Part II shows why prudent risk-taking often requires corporate managers to govern based on statistically expected outcomes. Corporate failures that have a small but statistically finite chance of occurring cannot always be prevented. Accordingly, an SG Rule should protect those managers from liability for making risk-taking decisions based on statistical methodologies that reasonably justify their decision-making.

Part III compares an SG Rule to other liability rules. Part III.A compares an SG Rule to the BJR, examining how an SG Rule relates to, and why it is not rendered irrelevant by, the BJR. Part III.B compares an SG Rule to federal liability rules and, in a non-derivative-lawsuit context, to state-law liability rules. Parts III.A and III.B also analyze whether legislatures should qualify those liability rules with an SG Rule. Finally, Part III.C attempts to reconcile statistics-based governance and cognitive biases, analyzing how an SG Rule could offset the distortions caused by hindsight bias and ultimate attribution error.

Part IV of this Article and Annex 1 thereto examine how to determine expected value. Part IV.A and Annex 1, respectively, introduce expected value and illustrate a typical calculation. Part IV.B discusses which parties should be included in an expected-value determination.

Part V tests an SG Rule by applying it to risk-taking examples retrospectively. Part V.A applies it to Enron's risk-taking that resulted in a corporate failure, the firm's bankruptcy. Part V.B applies it to Ford's risk-taking that resulted in a serious product failure, the exploding gas tank on its "Pinto" car. These applications demonstrate how managers could make statistical-

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18 *See infra* Part IV.B.1.

19 *See infra* Part IV.B.2.

20 *See infra* Part IV.B.2.

ly-based governance decisions. They also help to explain the limits of statistics-based governance.

As a note to readers, this Article variously refers to the SG Rule as a governance rule[21] and as a liability rule.[22] In practice, the SG Rule is both: it is a governance rule insofar as it influences risk-taking decision-making, and it is a liability rule insofar as it establishes a managerial liability standard for making such decisions. Jurisprudential purists might also refer to the SG Rule as a standard of judicial review.[23] These semantics are irrelevant to the substance of this Article's analysis.

II. FORMULATING A STATISTICS-BASED GOVERNANCE RULE

Prudent corporate governance requires managers to take business risks.[24] Managers govern firms primarily in the interest of the shareholders, who benefit from a firm's profitability.[25] Because "potential profit often corresponds to the potential risk"[26] and shareholders can diversify their investment risk, they tend to be risk-prone. It therefore is "very much in the interest of shareholders that the law not create incentives for overly cautious corporate decisions."[27]

Compared to shareholders, managers are generally overly cautious or at least more risk-averse. Not only are managers highly tied to the firm's continuing viability through income, stock options, and personal reputation, they also are wary of being held liable for taking business risks that fail.[28] Their concern

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21 *See, e.g.*, *supra* note 12 and accompanying text.

22 *See infra* Part III.

23 *Cf.* Stephen M. Bainbridge, *The Business Judgment Rule As Abstention Doctrine*, 57 VAND. L. REV. 83, 90 (2004) ("[T]he [business judgment] rule's presumption of good faith does not state a standard of liability but rather establishes a presumption against judicial review of duty of care claims.").

24 *Cf.* Allen, Jacobs & Strine, *supra* note 7, at 455 (observing that risk-averse corporate managers could avoid investing in risky but socially desirable economic projects).

25 *See, e.g.*, E. Merrick Dodd Jr., *For Whom are Corporate Managers Trustees?*, 45 HARV. L. REV. 1145 (1932).

26 Joy v. North, 692 F.2d 880, 886 (2nd Cir. 1982) (also observing that "[s]ome [risk-taking] opportunities offer great profits at the risk of very substantial losses, while the alternatives offer less risk of loss but also less potential profit").

27 *Id.*

28 *See, e.g.*, JEFFREY FRIEDMAN & WLADIMIR KRAUS, ENGINEERING THE FINANCIAL CRISIS: SYSTEMIC RISK AND THE FAILURE OF REGULATION 43 (2011) ("[W]hen Continental Illinois failed, its managers were fired and its shareholders were wiped out, and when [Long Term Capital Management] was bailed out, its principals were essentially wiped out, too. It would not be logical for any self-interested bank executive to run a bank into the ground because of his or her belief that it would then be bailed out if she would then be fired (and, if compensated with equities, wiped out.)"); Susan Rose-Ackerman, *Risk Taking and Ruin: Bankruptcy and Investment Choice*, 20 J. LEGAL STUD. 277, 278 (1991)

is real because the line between reasonable and excessive risk-taking can be imprecise.[29] Shareholders should want managers to be sufficiently protected from liability to be willing to engage in profitable corporate risk-taking.[30] An SG Rule would help to provide that protection.[31]

Corporate risk-taking often is data-driven and statistically based. Corporate managers frequently must decide between risky courses of action, hoping to choose actions that are likely to lead to success while minimizing the likelihood of failure. To do this, they typically utilize expected-value statistical analysis.[32] As business decisions become more complex, managers increasingly will have to rely on these types of statistical calculations.[33]

For example, the Congressional Budget Office reports that pharmaceutical companies use EV Analysis when determining whether to invest in research and development for a new drug.[34] Drug development is a "costly and uncertain process" which is "subject to high rates of failure," and R&D investment for a po-

("In practice, when a publicly held corporation files for bankruptcy, many top managers lose their jobs at the same time."). Even if not fired, the ensuing reputational damage could permanently end a manager's financial career. FRIEDMAN & KRAUS, *supra*. *Cf.* Todd A. Gormley & David A. Matsa, *Playing it Safe? Managerial Preferences, Risk, and Agency Conflicts*, 122 J. FIN. ECON. 431 (2016) (indicating "corporate leaders [have] incentives to tread carefully").

29 *Cf.* FINANCIAL REPORTING COUNCIL, THE UK CORPORATE GOVERNANCE CODE Provision C.2.3 (Apr. 2016) (directing a firm's board to monitor the "risk management and internal control systems and, at least annually, carry out a review of their effectiveness, and report on that review in the annual report," in accordance with the G20 Financial Stability Board's 2014 call for governments to regulate firms' "risk cultures" and "risk appetite frameworks").

30 Although creditors may well oppose such greater risk-taking, they (or at least contracting creditors) would be expected to try to negotiate covenants to protect themselves.

31 *Cf.* Franklin A. Gevurtz, *The Business Judgment Rule: Meaningless Verbiage or Misguided Notion?*, 67 S. CAL. L. REV. 287, 306 (1994) (reiterating the well-known argument that "without protection from liability for ordinary negligence, directors have an incentive to avoid potentially more desirable higher-risk activities in favor of less profitable but more guaranteed undertakings").

32 *Cf. supra* note 15 and accompanying text (discussing the importance of EV Analysis).

33 Many factors are likely to cause business decisions to become more complex. These include increased competition from globalization and the democratizing effects of technology; increasingly complicated, and possibly convoluted, cross-border regulatory environments; increased financing costs to the extent interest rates continue to rise, increasing the cost of capital and decreasing risk tolerance; and increased geopolitical constraints and disruptions in international trade, such as the impact on supply chains of Russia's invasion of the Ukraine.

34 U.S. Cong. Budget Off., Research and Development in the Pharmaceutical Industry (2021), https://perma.cc/5RMV-7P3K.

tential new drug may exceed $2 billion.[35] When evaluating the expected revenues and costs associated with a potential new drug, pharmaceutical companies estimate the probability that a potential new drug survives preclinical and clinical research and, if clinically successful, the probability of the drug's commercial success or failure. They also attempt to evaluate the probability that governments enact policies or programs that could hinder or support the success of the drug. As the drug progresses through the R&D process, they reiterate and refine the EV Analysis based on newly arising information.[36]

EV Analysis is also crucial to airlines, which have thin profit margins and fiercely compete for market share.[37] They use EV Analysis to assess such risk-taking decisions as whether to achieve economies of scale through alliances, whether to increase freight volume, and whether to hedge against volatile fuel prices.[38]

Corporate governance that statistically assesses risk-taking cannot eliminate the chance of failure. Instead, expected-value determinations provide statistical likelihoods of the possible outcomes.[39] As discussed, a failure that has a small, but finite, statistical chance of occurring can sometimes occur.[40] Furthermore, expected-value determinations require managers to estimate the likelihood of each possible outcome.[41] Estimates, by definition, are not guarantees. They may require additional information, and many outcomes are not precisely predictable, creating a degree of uncertainty.[42] A corporate failure, therefore, should not be a *res ipsa loquitur* marker of excessive risk-taking or fraud. Rather, what constitutes prudent risk-taking should turn on the decision-making process itself.

For these reasons, this Article proposes an SG Rule that exempts officers and directors of firms from liability, under both federal and state law, for making risk-taking decisions based on statistical methodologies, such as EV Analysis, that reasonably

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35 *Id.*

36 *Id.*

37 MarketLine, *Top 10 Global Airlines: Industry Issues and Strategic Responses* (2015), https://perma.cc/FU9S-GF3Y.

38 *Id.*

39 *See* Annex 1, *infra*.

40 *See supra* notes 5, 6 and accompanying text.

41 *See* Annex 1, *infra*.

42 In some cases, the degree of uncertainty could undermine any attempt to make a statistically meaningful estimate. *Cf. infra* note 50 (discussing statistical risk versus Knightian uncertainty).

justify their decision-making.[43] This rule assumes, consistent with the BJR, good faith and no managerial conflicts of interest or fraud.[44]

Any use of statistics can be imperfect. Even non-conflicted managers acting in good faith may have to make assumptions in order to fill in information gaps, such as determining the applicable probability distributions. Moreover, the underlying data may be imperfect.[45] Credibility therefore requires full transparency not only of the statistical methodology but also of the underlying data and assumptions.[46] The validity of an SG Rule should be dependent on disclosure providing that transparency.[47] Furthermore, parties should be able to challenge a statistics-based governance decision that depends on methodologies, data, or assumptions that are shown to be manifestly unreasonable.[48]

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[43] *See supra* note 12 and accompanying text.

[44] *See supra* note 13 and accompanying text. An SG Rule also assumes, of course, compliance with all applicable legal requirements and any accepted usages of business. *See, e.g.*, Briggs v. Spaulding, 141 U.S. 132, 152 (1891) (finding that bank directors are bound to a duty of care that takes into account any restrictions imposed by law or by the usages of business).

[45] Indeed, if the underlying data were perfect, there would be no risk.

[46] *Cf.* Administrative Procedure Act, 5 U.S.C. § 552(e)(6)(b) (requiring data transparency for federal agencies that utilize data in their rule-making processes).

[47] Another reason that the use of statistics can be imperfect is that information that is not "statistically significant" might not be disclosed. Professors Bainbridge and Gulati observe, for example, that "courts have rejected claims by plaintiffs suing drug companies for their failures to disclose problems with their drugs on the ground that internal reports of problems were not 'statistically significant,' but they ask, "how do the courts know of this magical relationship between statistical significance and investor interest (we also do not know what measure of statistical significance the courts are talking about)." Stephen M. Bainbridge & G. Mitu Gulati, *How Do Judges Maximize? (The Same Way Everybody Else Does—Boundedly): Rules of Thumb in Securities Fraud Opinions*, 51 EMORY L.J. 83, 125 n.115 (2002). Typically, an outcome is said to be statistically significant if the probability that the outcome was the product of random chance—rather than the product of a true statistical difference produced by some variable of interest—is lower than a preset threshold (usually, 5%). *See* VINCENT FAHERTY, *Probability and Statistical Significance*, *in* COMPASSIONATE STATISTICS: APPLIED QUANTITATIVE ANALYSIS FOR SOCIAL SERVICES 127–38 (2008).

[48] In that context, a "manifestly unreasonable" standard would mean that the methodologies, data, or assumptions are clearly unreasonable on their face. The Restatement of Torts proposes that standard in a product-liability context, for example. *See* RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. e (1998). Professor Kysar observes that "plaintiffs relying on section 2's comment e . . . may attempt to demonstrate that . . . the product as actually manufactured and sold has such 'low social utility and high degree of danger' that it constitutes a 'manifestly unreasonable design. Douglas A. Kysar, *The Expectations of Consumers*, 103 COLUM. L. REV. 1700, 1721 (2003). He further observes that although "only three courts appear ever to have held a manufacturer responsible under a theory similar to that of comment e, several have endorsed the concept in dicta and, thus, [the manifestly unreasonable standard of] section 2's comment e

In proposing an SG Rule, the author considered whether this Article, instead, should simply argue for extending the BJR to all statistically based risk-taking decisions. Extending the BJR's scope to a particular subset of business decisions might be confusing, however. In contrast, an SG Rule—expressly applying, by definition, to statistics-based governance—should minimize confusion.

Furthermore, because statistically based risk-taking decisions are relatively objective, an SG Rule would set clearer liability standards. That helps to avoid the primary criticism of the BJR, that its standard can be subjective, and hence vague.[49] Statistically based risk-taking decisions are relatively objective for several reasons.[50] The nature of statistical methodologies in corporate decision-making nearly guarantees the production of an evidentiary record of inputs and calculations, which inform the final business decision. As discussed, credibility requires full transparency of that record, including the statistical methodology and the underlying data and assumptions.[51]

This Article next considers how an SG Rule relates to, and why it is not rendered irrelevant by, the BJR.[52] Thereafter, it compares an SG Rule and non-BJR liability rules[53] and then ex-

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exists as an area for possible further development by the courts." *Id*. at 1721–22 (citations omitted).

[49] *Cf*. Gevurtz, *supra* note 31, at 296–98 (arguing that the business judgment rule provides a "largely subjective approach" and discussing the vagaries of its application).

[50] In certain scenarios, however, risk-taking may be statistically indeterminable and thus unable to be even roughly quantified. This builds on the "Knightian" distinction between risk and uncertainty. *See* FRANK H. KNIGHT, RISK, UNCERTAINTY AND PROFIT (1921). Risk refers to scenarios where one can assign (approximate) statistical probabilities to possible outcomes. Uncertainty refers to scenarios where one cannot assign such probabilities, possibly because predictions would require "extrapolation from dissimilar (heterogeneous) events." Claire A. Hill, *How Investors React to Political Risk*, 8 DUKE J. COMP. & INT'L L. 283, 287 (1998). *See also* Peter Dizikes, *Explained: Knightian Uncertainty*, MIT NEWS (Jun. 2, 2010) https://perma.cc/9RC3-N6T3 (observing that "true uncertainty," as Knight called it, is "not susceptible to measurement"). The distinction between those scenarios can be unclear. *Cf*. Elke U. Weber, Carolyn J. Anderson, & Michael H. Birnbaum, *A Theory of Perceived Risk and Attractiveness*, 52 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 492, 495 (1992) (examining how parties can perceive those scenarios differently). In these cases, all that managers can reasonably do is to disclose the uncertainty.

[51] *See supra* notes 46–48 and accompanying text (observing the importance of transparency and stating that parties should be able to challenge a statistics-based governance decision that depends on methodologies, data, or assumptions that are shown to be manifestly unreasonable). The objectivity of statistics-based governance can help to offset certain cognitive biases. *See infra* notes 95–111 and accompanying text.

[52] *See infra* Part III.A.

[53] *See infra* Part III.B.

amines how, if at all, an SG Rule could offset the distortions caused by cognitive biases.[54]

III. COMPARING A STATISTICS-BASED GOVERNANCE RULE TO OTHER LIABILITY RULES

A. Comparing a Statistics-based Governance Rule to the Business Judgment Rule

An SG Rule would have the same justifications as the BJR. Like the BJR, an SG Rule would attempt to balance the goals of protecting investors against losses while encouraging the best managers to serve.[55] Similarly, an SG Rule would help to shield reasonable business decisions from being second-guessed by judges, who lack business experience and expertise.[56]

This Article argues that an SG Rule should apply to statistics-based governance in all scenarios, including those in which the BJR does not otherwise apply. In those additional scenarios, however, an SG Rule would only apply to statistics-based governance decisions. For example, the BJR does not apply in federal-law-based or non-derivative lawsuits,[57] nor does it always apply as a defense for corporate officers.[58] An SG Rule should apply to any statistics-based governance decisions at issue in those cases.[59] That broader application of the SG Rule should be justified because an SG Rule would avoid the primary criticism of the BJR, that it is too subjective.[60]

B. Comparing a Statistics-based Governance Rule to non-BJR Liability Rules

Federal liability rules and, in a non-derivative-lawsuit context, state-law liability rules can apply very different criteria

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54 *See infra* Part III.C.

55 *Cf. supra* note 7 and accompanying text (identifying that justification for the BJR).

56 *See supra* note 7 and accompanying text.

57 *See supra* notes 9–10 and accompanying text.

58 *See supra* note 11 and accompanying text.

59 *Cf. supra* note 12 (observing that an SG Rule would thus supplement the BJR and other liability rules).

60 *See supra* notes 49, 50 and accompanying text. For other criticisms of the BJR, see Lyman Johnson, *The Modest Business Judgment Rule*, 55 BUS. LAW. 625 (2000) (arguing that the business judgment rule "should be de-emphasized as an analytical construct in the law of director fiduciary duties and should be sharply differentiated from the broader-gauged duty of care" and that the business judgment rule "is better understood as a narrow gauged policy of non-review than as an overarching framework for affirmatively shaping judicial review of fiduciary performance").

than the BJR. This Part III.B compares those non-BJR liability rules to an SG Rule. Subpart B.1 examines federal liability rules. Subpart B.2 examines state-law liability rules in a non-derivative-lawsuit context. Based on those comparisons, and cautioning that legislatures can impose whatever liability rules they wish, subpart B.3 then analyzes whether, as a normative matter, Congress and state legislatures should qualify liability rules with an SG Rule.

1. *Federal liability rules*. The standard of liability under the federal Sarbanes-Oxley Act of 2002 (SOX),[61] enacted by Congress in reaction to the Enron debacle,[62] is very different from the BJR standard. Superficially, these standards might appear similar, both requiring intentional fraud. Indeed, SOX § 303 directs the SEC to adopt rules making it illegal for officers and directors of issuers of securities to "fraudulently influence, coerce, manipulate, or mislead" any independent public or certified accountant auditing the issuer's financial statements "for the purpose of rendering such financial statements materially misleading."[63] In reality, though, this SOX liability standard is closer to negligence than scienter, merely requiring that an officer or director "was unreasonable in not knowing" that their action would result in a materially misleading financial statement.[64]

SOX also contains a standard that resembles strict liability. Section 304 authorizes the SEC to require the chief executive officer and chief financial officer to reimburse their firm for incentive-based compensation received in the twelve-month period following the issuance of noncomplying financial statements that are required to be restated, if the restatement is due to material noncompliance as a result of the firm's misconduct.[65] This reimbursement obligation can be imposed regardless of whether the CEO or CFO engaged in, or even knew of, the wrongdoing. Rather, it is based on such officers being "captain[s] of the ship"

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61 Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, 116 Stat. 745 (codified in scattered sections of 11, 15, 18, 28, and 29 U.S.C.).

62 *See infra* Part V.A.1.

63 15 U.S.C. § 7242(a) (2005). A violation of § 303 would expose parties to securities-law penalties, including civil and criminal liability. *See, e.g.*, 17 C.F.R. § 240.13b2-2 (2003) (implementing SOX § 303); *In re* John K. Bradley, Exchange Act Release No. 46035, 2002 SEC LEXIS 3736 (June 5, 2002).

64 SOX § 303(a). *Cf.* Willkie Farr & Gallagher Client Memorandum, *SEC Proposes Rules on Improper Influence on Conduct of Auditors* 3–4 (Nov. 19, 2002), https://perma.cc/UL2P-BERK ("In its proposed rules [pursuant to SOX § 303], the SEC has noted that a state of mind short of fraud would be sufficient to impose culpability under the proposed rules, a much lower standard of culpability.").

65 15 U.S.C. § 7243.

and thus ultimately responsible for ensuring accounting compliance.[66]

The federal Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act),[67] enacted by Congress in reaction to the global financial crisis of 2008 (global financial crisis), subsequently expanded the application of SOX's strict liability standard to all executive officers of a firm.[68] Furthermore, the Dodd-Frank Act lowered the standard of culpability for secondary offenders of federal securities laws. Although the aiding-and-abetting provision in § 20(e) of the Securities Exchange Act of 1934 originally made secondary offenders liable only if they had actual knowledge of the principal's violation, § 929O of the Dodd-Frank Act amended § 20(e) to also make secondary offenders liable if they "recklessly" (albeit unknowingly) aid or abet the principal's violation.[69] Sections 929M and 929N of the Dodd-Frank Act also incorporated aiding-and-abetting liability premised on recklessness into the Securities Act of 1933, the Investment Company Act of 1940,[70] and the Investment Advisers Act of 1940.[71]

In short, federal laws enacted in reaction to Enron's failure and to failures relating to the global financial crisis impose management-liability standards based on negligence, recklessness, and even strict liability.[72]

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66 *See* Press Release, Securities and Exchange Commission, SEC Seeks Return of $4 Million in Bonuses and Stock Sale Profits From Former CEO of CSK Auto Corp (July 22, 2009).

67 Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010).

68 Section 954 of the Dodd-Frank Act broadens the group of executives subject to liability under § 304 and increases the penalties of violations. *See* 17 C.F.R. § 240.10D-1 (2022).

69 *See* Dodd-Frank Act § 929O (amending the aiding and abetting provision of the Securities Exchange Act to include "recklessly" in addition to "knowingly").

70 § 929M.

71 § 929N.

72 Congress is not unique in imposing these types of onerous management-liability standards in reaction to corporate failures. Following the global financial crisis, for example, the U.K. Parliament enacted the Senior Managers and Certification Regime which imposed on senior managers of financial institutions a "duty of responsibility." Financial Services and Markets Act 2000 c. 8, § 66A. As part of this duty, senior managers must submit a Statement of Responsibilities to regulators which describes the departments of the firm under their supervision. *Id*. § 60(2A). Senior managers can then be held liable for violations that occur within those departments, even though they have no knowledge of the violations. *Id*. § 66A. Senior managers can raise a defense, however, that they took such reasonable steps to ensure compliance as would a person in their position. *Id*.

2. *State-law liability rules in a non-derivative-lawsuit context*. The common law Responsible Corporate Officer Doctrine (RCOD) appears to be the principal example of a state-law doctrine that applies very different criteria than the BJR.[73] First established by the U.S. Supreme Court,[74] this doctrine enables courts to make senior executives liable for corporate violations of state, and even federal, statutes without a showing of personal wrongdoing on the part of the executive.[75] The executives are subject to RCOD liability when (1) they are in a position of responsibility allowing them to influence corporate policies, (2) there is a connection between the executive's position and the alleged violation, and (3) the executive's actions enabled the violation through action or inaction.[76] Courts have used the RCOD to make executives liable for corporate violations of environmental,[77] securities,[78] and consumer protection statutes.[79] There is no requirement that the corporation itself be held liable for the relevant violation.[80]

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[73] This subpart III.B.2 does not discuss state-law claims based on *Caremark* (*In re Caremark Int'l Inc. Deriv. Litig.*, 698 A.2d 959, 970 (Del. Ch. 1996)) because, to date, such claims appear to be limited to derivative-lawsuit contexts. Accordingly, the BJR would be available as a defense to a *Caremark* claim. *Cf.* Gregory A. Markel, Daphne Morduchowitz & Matthew C. Catalano, *A Director's Duty of Oversight after* Marchand *in "Caremark" Case*, HARV. L. SCH. FORUM ON CORP. GOV., Jan. 23, 2022 (stating that if "a reasonable system for causing information to be transmitted to the board concerning material issues for the business of the company and significant risks to that business . . . is created in good faith, and monitored in good faith, under Delaware law [its business judgment rule], the board will be protected from claims of lack of oversight").

[74] The Supreme Court established this doctrine in response to a corporation's misbranding and adulteration of drugs shipped in interstate commerce in violation of the Federal Food, Drug, and Cosmetic Act. United States v. Dotterweich, 320 U.S. 277, 279 (1943).

[75] People v. Roscoe, 169 Cal. App. 4th 829 (2008).

[76] *In re* Dougherty, 482 N.W.2d 485, 490 (Minn. Ct. App. 1992).

[77] *See, e.g.*, BEC Corp. v. Dep't of Env't Prot., 256 Conn. 602 (2001) (noting that Connecticut's Water Pollution Control Act incorporated the RCOD by statute); U.S. v. Ming Hong, 242 F.3d 528 (4th Cir. 2001) (affirming a corporate officer's criminal conviction for violations of the Clean Water Act).

[78] *See, e.g.*, Wittenberg v. Gallagher, No. 1 CA-CV 01-0168, 2001 WL 34048121, at *2 (Ariz. Ct. App. Nov. 20, 2001) (affirming an arbitration award against a corporate officer that employed a broker who violated federal and state securities laws).

[79] *See, e.g.*, U.S. v. Park, 421 U.S. 658 (1975) (affirming a corporate officer's conviction of the Federal Food, Drug, and Cosmetic Act when the corporation shipped contaminated food interstate); People v. Byrne, 494 N.Y.S.2d 257 (App. Term 1985) (holding that corporate officers can be criminally liable for violating alcohol control laws despite their lack of knowledge or participation in the violation).

[80] United States v. Dotterweich, 320 U.S. 277, 279 (1943) ("Equally baseless is the claim of Dotterweich that, having failed to find the corporation guilty, the jury could not find him guilty.").

The RCOD thus creates a quasi-strict liability standard that is broader than what vicarious liability statutes typically mandate. For example, federal law allows controlling persons of violators of securities-law statutes to assert a defense that they lacked "reasonable ground" to know of the alleged violation.[81] Under the RCOD, however, courts have imposed liability on controlling persons notwithstanding their lacking a "reasonable ground" to know of the alleged violation.[82] Similarly, the RCOD allows courts to impose liability on senior executives who are unaware of the underlying corporate violation,[83] provided the other liability criteria are met.[84]

3. *Should Congress and state legislatures qualify liability rules with an SG Rule?* Whether Congress and state legislatures should qualify liability rules with an SG Rule is, of course, a normative question. As observed, legislatures can impose whatever liability rules they wish. The analysis below merely suggests how Congress and state legislatures should think about answering this question.

The foregoing discussion in this subpart B has shown that federal liability rules and, in a non-derivative-lawsuit context, state-law liability rules sometimes apply very different criteria than does the BJR (and thus, very different criteria than those this Article proposes for liability under an SG Rule). Those different criteria are based on negligence, recklessness, and possibly even quasi-strict liability standards. Should corporate managers who use statistical methodology to make risk-taking decisions be judged under those different criteria?

There are several ways to answer this question. One way is to recognize that the laws establishing those different criteria do not adequately address the actual causes or consequences of the corporate failures that prompted their enactment. This Article later examines that disconnect and argues that those different criteria are unnecessarily harsh.[85]

Another answer turns on the consequences of using those different criteria to judge managerial risk-taking decisions. Those different criteria—negligence, recklessness, and possibly quasi-strict liability—would "partially undermine[] the liability

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81 15 U.S.C. § 77o.

82 *Wittenberg*, 2001 WL 34048121.

83 *See id.*

84 *Cf. Dougherty*, 482 N.W.2d at 490 (describing those criteria).

85 *See infra* Part V (arguing that those laws focus on preventing excessive corporate risk-taking (and fraud) by imposing harsh managerial performance standards, without addressing the actual causes or consequences of the failures).

protections that corporate laws, with good reason, provide to directors and officers. The result, from the perspective of the potential defendants, [would be] an unfortunate state of relative legal uncertainty and heightened liability risks."[86] Competent corporate managers may not wish to serve in the face of uncertain exposure to liability.[87] Qualifying managerial liability rules with an SG Rule would greatly reduce that uncertainty.

A related reason for qualifying managerial liability rules with an SG Rule is to protect managers from cognitive biases, discussed below.[88] Even absent these biases, parties face inherent litigation risk—the risk that a party with a good case will not prevail—in the order of magnitude of perhaps ten percent.[89] Cognitive biases almost certainly will exacerbate this litigation risk in lawsuits involving a failed company; these biases can influence judges and juries to attribute blame to, and impose liability on, managers whose decisions led to a company's failure.[90] Furthermore, these biases are reinforced by what the author elsewhere has called a flawed syllogism[91]: The public is harmed; the firm's managers decided on the action that caused the harm; therefore, those managers should be liable for the harm.[92] An SG Rule could enable managers who comply with the Rule to dismiss cases on summary judgment, thereby avoiding the litigation risk.

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86 Martin Petrin, *Circumscribing the "Prosecutor's Ticket to Tag the Elite"—A Critique of the Responsible Corporate Officer Doctrine*, 84 TEMP. L. REV. 283, 306 (2012) (internal citation omitted). Indeed, applying a quasi-strict liability standard to managerial statistical risk-taking decision-making would appear to invite what the author later describes as a flawed syllogism. *Cf. infra* note 91 and accompanying text (discussing that flawed syllogism).

87 *See supra* note 28 and accompanying text.

88 *See* Part III.C, *infra* (discussing these cognitive biases). *Cf. supra* notes 3–4 and accompanying text (introducing these biases).

89 When the author was a young litigation associate at Shearman & Sterling, the partners would sometimes remark that parties to lawsuits, virtually irrespective of the merits of their case, have an inherent litigation risk in the order of magnitude of ten percent. Research appears to confirm this approximation. *Cf.* Heather D. Heavin & Michaela Keet, *Litigation Risk Analysis: Using Rigorous Projections to Encourage and Inform Settlement*, J. ARB. & MEDIATION (forthcoming) (manuscript at 15), https://perma.cc/JEJ2-WK5L (observing that even "a high probability of success . . . is still less than 100% (for example, 90%)").

90 *See infra* note 98 and accompanying text.

91 Steven L. Schwarcz, *The Limits of Lawyering: Legal Opinions in Structured Finance*, 84 TEX. L. REV. 1, 37 (2005).

92 *Cf. supra* note 2 and accompanying text (arguing that corporate failures create a presumption of liability, given that politicians and the media tend to attribute virtually every dramatic corporate failure to excessive risk-taking or fraud).

More formalistically, one might argue that corporate managers who use statistical methodology to make risk-taking decisions would not be judged under those different criteria because such criteria do not apply to corporate risk-taking decisions. Currently, those different criteria apply only to managerial failures to monitor or prevent accounting, securities law, and other legal non-compliance or violations. That answer is dissatisfying, however, because the application of those criteria might be expanded beyond legal compliance violations. Professor Bainbridge, for example, observes strong similarities between risk management and "law compliance and accounting controls."[93] The Delaware Chancery Court also has suggested in dictum that managerial failure to properly oversee a business risk could, in some situations, result in personal liability.[94]

C. Reconciling Statistics-based Governance and Cognitive Biases

The theory of "bounded rationality" posits that we cannot access and process all the information needed to maximize our benefit.[95] The human mind therefore "necessarily restricts itself" by relying on cognitive shortcuts, or biases.[96]

At least two cognitive biases—hindsight bias and ultimate attribution error—create an ex post presumption that any failed corporate risk-taking must have been excessive, potentially leading to the imposition of liability on corporate managers

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93 Stephen M. Bainbridge, *Caremark and Enterprise Risk Management*, 34 J. CORP. L. 967, 980 (2009). *Cf. id.* at 981 (observing that "risk management does not differ in kind from legal compliance or accounting controls"). *But cf. id.* at 984 ("Chancellor Chandler correctly recognized . . . *Caremark* claims premised on risk management failures . . . uniquely implicate the core concerns animating the business judgment rule in a way typical *Caremark* claims do not.").

94 *In re* Citigroup Inc. Shareholder Derivative Litigation, 964 A.2d 106, 124 (Del. Ch. 2009). Shareholders sued claiming that Citigroup's managers failed to install or follow a proper reporting system that would have alerted them to the risks of the global financial crisis. The plaintiffs asserted that the directors and officers were personally liable under the doctrine articulated in *Caremark*. The court noted that unlike a typical *Caremark* claim which would assert liability against directors for failing to properly oversee employees who subsequently violate the law, this claim asserted that directors should be liable for failure to properly oversee a business risk. The court noted, though, that "it may be possible for a plaintiff to meet [that] burden under some set of facts." *Id.* at 126.

95 *See* Herbert A. Simon, Professor, Carnegie-Mellon University, Nobel Memorial Lecture: Rational Decision-Making in Business Organizations (Dec. 8, 1978) (discussing bounded rationality).

96 *Herbert Simon*, ECONOMIST (Mar. 20, 2009), https://perma.cc/Q3DG-WMAG.

whose decisions led to the failure.[97] These biases can influence judges and juries.[98] They also can exacerbate media and other public reactions to a corporate failure, influencing politicians to enact laws directed at mitigating alleged excessive risk-taking or fraud without actually addressing the cause, or the consequences, of the underlying failure.[99]

Studies have shown that,[100] and scholars are now beginning to explore how,[101] bounded rationality can be addressed and sometimes improved.[102] Professors Christine Jolls and Cass R. Sunstein have argued, for example, that regulation can reduce cognitive biases through an approach they call "debiasing through law."[103] The goal is to give people more control over the process of information by making an event more tangibly available to them.[104] For instance, smokers are more likely to believe that smoking will harm their health if they are exposed to specific, poignant, and concrete narratives rather than general information of health risks.[105] Thus, foreign cigarette package

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97 *Cf.* MELVIN ARON EISENBERG & JAMES D. COX, BUSINESS ORGANIZATIONS: CASES AND MATERIALS, 625–26 (unabr. 11th ed., 2014) (explaining that due to these cognitive biases, people often erroneously treat decisions that have bad results as bad decisions).

98 *Cf.* HERBERT A. SIMON, MODELS OF MAN: SOCIAL AND RATIONAL (1957) (discussing behavioral psychology, questioning the assumption of rationality in decision-making, and calling decision-making that is suboptimal but adequate as "satisficing"); D. Kahneman & A. Tversky, *Prospect Theory: An Analysis of Decision under Risk*, 47 ECONOMETRICA 263 (1979) (examining how cognitive biases affect human thinking).

99 *Cf. infra* notes 178–81 and accompanying text (finding that Congress's enactment of the Sarbanes-Oxley Act, in response to Enron's failure, set management-liability standards that were unrelated to the actual causes and consequences of that failure); Steven L. Schwarcz, *Too Big to Fool: Moral Hazard, Bailouts, and Corporate Responsibility*, 102 MINN. L. REV. 761 (2017) (arguing that although politicians and the media often claim that the excessive corporate risk-taking that led to the global financial crisis resulted from morally hazardous behavior by so-called too-big-to-fail companies, that risk-taking more likely resulted from the shareholder-primacy model of corporate governance which requires directors to consider risk-taking decisions only from the standpoint of the firm and its investors).

100 David Z. Hambrick & Alexander P. Burgoyne, *The Difference Between Rationality and Intelligence*, N.Y. TIMES (Sept. 16, 2016), https://perma.cc/UU98-P7RU (describing a pair of studies published by psychologist Carey Morewedge and colleagues that found that computer training led to decreases in decision-making bias).

101 Barry Schwartz, *Why Not Nudge? A Review of Cass Sunstein's Why Nudge*, BEHAV. SCIENTIST (Apr. 17, 2014), https://perma.cc/KRN3-MP9V.

102 *Cf.* Oskari Juurikkala, *The Behavioral Paradox: Why Investor Irrationality Calls for Lighter and Simpler Financial Regulation*, 18 FORDHAM J. CORP. & FIN. L. 33 (2012) (examining how bounded rationality can be addressed in consumer finance).

103 Christine Jolls & Cass R. Sunstein, *Debiasing Through Law*, 35 J. LEGAL STUD. 199, 200 (2006).

104 ROY F. BAUMEISTER & BRAD J. BUSHMAN, SOCIAL PSYCHOLOGY AND HUMAN NATURE 155 (2d ed. 2011).

105 Jolls & Sunstein, *supra* note 103, at 210.

warnings that are more pictorially graphic than U.S. text-only warnings have been found to be more effective to discourage smoking.[106]

The use of statistical methodology, such as EV Analysis, arguably can improve rationality both for third-party observers, such as politicians, media, and the public, and for corporate managers. From the standpoint of third parties, statistical methodology more concretely illustrates (assuming there is full disclosure, as this Article advocates[107]) how corporate managers make risk-taking decisions, thereby giving third parties at least the perception of control.[108] From the standpoint of corporate managers, statistical methodology introduces an independent perspective into risk-taking decisions, which has also been shown to mitigate cognitive biases by reducing overconfidence and facilitating more analytical thinking.[109]

In these ways, statistical methodology should help to mitigate cognitive biases. It cannot, however, eliminate all such biases. Even if statistical methodology significantly reduces hindsight bias and ultimate attribution error, parties could be subject to other cognitive biases. For example, loss-aversion bias can motivate managers to take risks to try to avert expected losses because decision-makers are twice as likely to try to avoid losses than to achieve gains.[110] Furthermore, the "egos of business executives" can create a "natural tendency to overestimate [their] abilities and perceived chances of success."[111]

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[106] *See, e.g.*, Yong et al., *Mediational Pathways of the Impact of Cigarette Warning Labels on Quit Attempts*, 33 HEALTH PSYCH. 1410 (2014) (comparing Canadian, Australian, United Kingdom, and U.S. cigarette-package warnings).

[107] *See supra* notes 46, 47 and accompanying text.

[108] *Cf. supra* notes 103, 104 and accompanying text (observing that giving people more control over the process of information can reduce cognitive biases).

[109] *Cf.* Human Dimension Capabilities Dev. Task Force Capabilities Dev. Integration Directorate Mission Command Ctr. of Excellence, Cognitive Biases and Decision Making: A Literature Review and Discussion of Implications for the US Army 21 (2015), https://perma.cc/8MPU-NZAC (arguing for an outsider's perspective to reduce overconfidence and facilitate more analytical thinking).

[110] *Cf.* S. Trevis Certo, Brian L. Connelly, & Laszlo Tihanyi, *Managers and their Not-So Rational Decisions*, 51 BUS. HORIZONS 113, 115 (2008) (observing that the "perception that losses appear larger than equal-size gains forms the basis of the endowment effect in economics"); *id.* at 117 (observing that "individuals will take irrational risks when the alternative is a certain loss").

[111] *Id.* (referencing N. J. Hiller & D. C. Hambrick, *Conceptualizing Executive Hubris: The Role of (Hyper-) Core Self-Evaluations in Strategic Decision-making*, 26 STRATEGIC MANAGEMENT J. 297 (2005)).

IV. DETERMINING EXPECTED VALUE

A. Introduction

To determine expected value, one must attempt to identify each possible outcome that may result from a given decision, estimate the probability that each such outcome will occur, and then assess such outcome's likely benefit or harm. This determination "gives decision makers a way to make rational, quantifiable decisions when facing uncertain outcomes,"[112] and has "become essential to business decision making."[113]

The calculation of expected value has been described as "the average expected financial outcome of a decision. You can get it by multiplying all of the possible payoffs by the probability each of them will happen and summing your answers."[114] Annex 1 to this Article provides a detailed illustration of this calculation.

EV Analysis sometimes can be imperfect, even beyond recognizing that the use of statistics can be imperfect.[115] Notably, balancing the outcomes that may result from a decision does not necessarily account for the possibility that alternative decisions might yield more favorable outcomes. For example, in what can be viewed as an early and intuitive application of EV Analysis, the renowned judge Learned Hand held that liability for negligently causing an accident should depend on whether the burden of taking adequate precautions to prevent the accident is less than the probability of the accident multiplied by the amount of injury that would be caused by the accident.[116] Profes-

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[112] Robert M. Lloyd, *Discounting Lost Profits in Business Litigation: What Every Lawyer and Judge Needs to Know*, 9 TRANSACTIONS: TENN. BUS. L.J. 9, 17 (2007).

[113] Nicole Liguouri Micklich, Michael W. Lynch & Ingrid C. Festin, *The Continuing Evolution of Franchise Valuation: Expanding Traditional Methods*, 32 FRANCHISE L.J. 223, 227 (2013). *Cf.* FOSTER PROVOST & TOM FAWCETT, *Decision Analytical Thinking 1: What is a Good Model?*, *in* DATA SCIENCE FOR BUSINESS: WHAT YOU NEED TO KNOW ABOUT DATA MINING AND DATA-ANALYTIC THINKING 187, 194–95 (2013) (describing expected value as a "very broadly useful conceptual tool to aid data analytic thinking," and finding that the "expected value computation provides a framework that is extremely useful in organizing thinking about data-analytic problems"); Lloyd, *supra* note 112, at 19 ("Expected value analysis . . . has become a foundation of business decision making.").

[114] Eugene Vyborov, *How to Calculate the Expected Value of Your Venture*, FORBES TECH. COUNCIL (Feb. 20, 2020, 7:25 AM) https://perma.cc/5CBM-7W9R.

[115] *See supra* note 45 and accompanying text (observing that the use of statistics can be imperfect because the underlying data may be imperfect).

[116] United States v. Carroll Towing Co., 159 F.2d 169, 173 (2d Cir. 1947). This case involved the sinking of the barge, "Anna C." The lower court found the owner of the barge and the charterer and owner of a tugboat assisting the barge to be liable in negligence to the United States for the loss of the barge's cargo of flour, to the Pennsylvania

sor Franklin A. Gevurtz observes, however, that Judge Hand's "approach is perhaps simplistic because it treats any decision yielding a positive net expected return as reasonable without regard to how the expected return would compare with other investments of similar risk."[117]

Although Professor Gevurtz might technically be correct, decision-makers—especially, business managers—cannot realistically be expected to take all alternatives into account. They often must decide based on the choices before them. Furthermore, there are no formal methodologies for actually identifying alternative approaches, and therefore for making alternative decisions.[118] The possibility of missing preferable alternatives is thus a widely known and accepted imperfection of any decision-making, including when making cost-benefit-analysis decisions.[119]

Another possible imperfection of EV Analysis could occur where a decision could lead to an action that violates law. Clearly, managers should not consider actions that violate criminal

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Railroad Company for expenses in salving the cargo and barge, and to others. Judge Hand ruled that,

> Since there are occasions when every vessel will break from her moorings, and since, if she does, she becomes a menace to those about her; the owner's duty, as in other similar situations, to provide against resulting injuries is a function of three variables: (1) The probability that she will break away; (2) the gravity of the resulting injury, if she does; (3) the burden of adequate precautions.

Id. He then brought "this notion into relief [by stating] it in algebraic terms: if the probability be called P; the injury, L; and the burden, B; liability depends upon whether B is less than L multiplied by P: i. e., whether B > PL." *Id.* He admitted that the burden of providing adequate precautions would be fact dependent:

> Applied to the situation at bar, the likelihood that a barge will break from her fasts and the damage she will do, vary with the place and time; for example, if a storm threatens, the danger is greater; so it is, if she is in a crowded harbor where moored barges are constantly being shifted about. On the other hand, the barge must not be the bargee's prison, even though he lives aboard; he must go ashore at times. We need not say whether, even in such crowded waters as New York Harbor a bargee must be aboard at night at all; it may be that the custom is otherwise . . . ; and that, if so, the situation is one where custom should control.

Id.

117 Gevurtz, *supra* note 31, at 305 n.81.

118 Steven L. Schwarcz, *Changing Law to Address Changing Markets: A Consequence-Based Inquiry*, 80 L. & CONTEMP. PROBS. 163, 170 n.47 (2017).

119 *See, e.g.*, Robert W. Hahn et al., *Assessing Regulatory Impact Analyses: The Failure of Agencies to Comply with Executive Order 12,866*, 23 HARV. J.L. & PUB. POL'Y 859, 862 (2000) (reviewing the cost-benefit analysis for forty-six major regulations and finding that regulators did not evaluate any alternatives for 27% of the regulations and only fully examined the costs and benefits of possible alternatives for 31% of the regulations).

law.[120] But should they consider actions that merely require paying civil monetary penalties as a cost of doing business?[121] Although there does not appear to be an absolute answer,[122] some argue that managers should avoid outcomes that are not legally compliant.[123] Even if the direct cost of compliance might exceed the monetary penalties of non-compliance, non-compliance can generate indirect costs including reputational costs, lower worker morale, potentially weaker investor demand, and the costs of defending against an investigation and prosecution.[124]

Next, recall that the first step in determining expected value is identifying each possible outcome that may result from a given decision. That requires determining which parties are affected, or at least should be included in the calculation. Part IV.B analyzes that.

B. Expected Value to Whom?

Determining expected value entails a fundamental interpretive issue: which parties should be identified as being materially affected by the outcome? Ordinarily, the expected-value calculation should only take into account the firm and its investors; they are the parties primarily impacted by managerial decisions.[125] For some decisions, however, the uncompensated exter-

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[120] *See, e.g.*, Pennsylvania Dep't of Env't Res. v. Tri-State Clinical Lab'ys, Inc., 178 F.3d 685, 692–93 (3d Cir. 1999) ("We refuse to adopt an analysis of administrative expenses that is based upon the assumption that legitimate businesses engage in a 'cost-benefit' analysis to determine if they will comply with criminal laws that protect the very public that the owners and operators of those legitimate businesses are part of. It is neither reasonable nor necessary for a commercial enterprise to violate criminal laws and endanger the public to preserve the estate or to conduct legitimate business operations . . . .").

[121] *Cf.* Richard McGregor & Aaron Stanley, *Banks Pay Out $100bn in U.S. Fines*, FIN. TIMES (Mar. 25, 2014, 6:42 PM), https://perma.cc/82X6-S4Q8 (quoting Professor Anat Admati of Stanford University to the effect that firms that engaged in the origination, packaging, and sale of mortgage-backed securities in connection with the global financial crisis may have viewed possible fines as the "cost of doing business," a cost they could afford given their multiple-year earnings).

[122] *But cf.* Briggs v. Spaulding, 141 U.S. 132, 152 (1891) (finding that bank directors are bound to a duty of care that takes into account *any restrictions imposed by law*).

[123] *See, e.g.*, Craig S. Lerner & Moin A. Yahya, *"Left Behind" After Sarbanes-Oxley*, 44 AM. CRIM. L. REV. 1383, 1411 (2007) (making a hypothetical comparison between an "ideal entrepreneur" who always complies with law and a "swashbuckler" who may flaunt legal compliance if the cost is lower, and concluding that the ideal entrepreneur is generally preferred).

[124] *See id.*

[125] *See, e.g.*, Dodge v. Ford Motor Co., 204 Mich. 459, 507 (1919) ("A business corporation is organized and carried on primarily for the profit of the stockholders. The powers of the directors are to be employed for that end."); eBay Domestic Holdings, Inc. v. Newmark, 16 A.3d 1, 34 (Del. Ch. 2010) ("Having chosen a for-profit corporate form, the

nalities could significantly harm the public. For example, a managerial decision that causes a SIFI's failure could seriously harm the real economy by triggering a systemically harmful financial collapse. Likewise, certain decisions by managers of firms (whether or not SIFIs) might significantly risk harming the environment by contributing to climate change or creating other social harm. For those "ESG"-type decisions,[126] managers should additionally have a "public" governance duty not to cause significant economic, environmental, or other social harm. Accordingly, then, the expected-value calculation should try to take into account the public.[127]

The analysis next differentiates managerial decisions that could cause a SIFI's failure, thereby triggering a systemically harmful financial collapse (discussed in subpart 1, below), and those that could significantly risk harming the environment or creating other social harm (discussed in subpart 2, below). The rationale for splitting the analysis is that the criteria discussed in subpart 1 are somewhat more objective than those discussed in subpart 2.

The discussion in this subpart B is normative, intended as a first step. An incremental approach to developing norms has strong precedent in legal ordering.[128] That is especially valuable where, as discussed herein, "the subject is either controversial or technical."[129]

1. *Managerial decisions that could cause a SIFI's failure, thereby triggering a systemically harmful financial collapse*. In a

craigslist directors are bound by the fiduciary duties and standards that accompany that form. Those standards include acting to promote the value of the corporation for the benefit of its stockholders.").

[126] ESG stands for environmental, social, and governance considerations. *See, e.g.*, *ESG Investing and Analysis*, CFA INST., https://perma.cc/UQU6-BFT3.

[127] *See supra* notes 18–20 and accompanying text.

[128] *Cf.* Oona A. Hathaway, *Between Power and Principle: An Integrated Theory of International Law*, 72 U. CHI. L. REV. 469, 531 (2005) ("[S]tates can be gradually led toward stronger legal rules . . . by starting with relatively weak international rules backed by little or no sanctions that all states feel comfortable joining, but then gradually pushing states to accept successively stronger and more challenging requirements.").

[129] Susan Block-Lieb & Terence Halliday, *Incrementalisms in Global Lawmaking*, 32 BROOK. J. INT'L L. 851, 852 (2007). An incremental approach to developing norms has also been valuable for addressing environmental problems, such as climate change. *See, e.g.*, DANIEL J. FIORINO, THE NEW ENVIRONMENTAL REGULATION 221 (2006) (arguing that "an incremental . . . strategy for change offers the best alternative for speeding up the transition to a new environmental regulation"); Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 CAP. U. L. REV. 21, 133–34 (2001) (observing that "any solution to current concerns with the U.S. environmental regulatory system is likely to be and is best served by an incremental approach").

separate article,[130] the author of this Article has analyzed how managers of SIFIs should, and how they could, fulfill a public governance duty not to cause significant economic harm. That article observes that the shareholder-primacy model of corporate governance encourages SIFI risk-taking that has a positive expected value to the firm and its shareholders, even if it harms the public who would suffer the externalized systemic harm if the firm fails.[131] Therefore, the most direct way of correcting those failures (and controlling excessive risk-taking) would be to modify that model by imposing some type of a public governance duty that requires SIFI managers to also consider the public consequences of their firm's actions.[132] That public governance duty would parallel this Article's argument that the expected-value calculation should sometimes take the public into account.

That separate article recognizes that proposing a public governance duty engages the longstanding debate whether corporate governance law should require a duty to the public. This Article recognizes that taking into account the public when mak-

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[130] *Misalignment*, *supra* note 17.

[131] *Cf.* Daniel K. Tarullo, Member, Bd. of Governors of the Fed. Rsrv. Sys., Remarks at the Association of American Law Schools Midyear Meeting: Corporate Governance and Prudential Regulation 7–8 (June 9, 2014) (arguing that "prudential regulation [should] need to involve itself with corporate governance" because "risk-taking" by systemically important financial intermediaries "carries substantial potential societal consequences").

[132] *Misalignment*, *supra* note 17, at 21–29. That article argues that shareholder primacy is much more important than moral hazard to explain the externalities of SIFI risk-taking. The moral hazard claim is that persons protected from the negative consequences of their risky actions will be tempted to take more risks, and that SIFIs are protected from those negative consequences because they are too big to fail (TBTF). Governments have no choice but to bail them out to prevent a failure. However, there is no evidence, much less proof, that TBTF causes firms to engage in morally hazardous behavior. Most studies discussing that alleged behavior merely assume it without actually offering evidence, whereas other studies conflate correlation and causation, assuming that if many systemically important firms engage in risky behavior, their behavior was predicated on bailout expectations. The economic studies purporting to "prove" that TBTF causes firms to engage in morally hazardous behavior merely show that systemically important firms can borrow at lower-than-average cost. Economists presume this funding advantage derives from investor belief that these firms will be bailed out before they default. But that ignores the many other reasons why systemically important firms, which usually are large, can borrow at lower-than-average cost; these include that large firms generally have economies of scale, better access to debt markets, and credit that is less vulnerable to market disruption. Furthermore, these studies do not even attempt to examine whether systemically important firms can borrow at lower cost than non-systemically important large firms. The idea that TBTF causes systemically important firms to engage in morally hazardous behavior is also antithetical to managerial incentives. Managers take serious personal risks when they cause their firms to engage in excessive risk-taking with the expectation that the firm will be bailed out by the government.

ing an expected-value calculation likewise engages that debate. Although questioned by the ESG movement,[133] the long-accepted wisdom is that corporate governance should not require a public duty because corporate profit maximization provides jobs and other public benefits that exceed any harm.[134] The assumption underlying that wisdom is that any significant public harm would be prohibited by law or internalized through tort law.[135] That assumption fails, however, for systemic economic harm, which is neither prohibited by law nor internalized through tort law.[136]

That article then examines how SIFI managers could fulfill a public governance duty not to cause systemic economic harm. To minimize the burden on managers, it proposes that this duty should apply only when managers are deciding on a risky project whose failure might, either itself or in combination with other factors, cause a SIFI to fail.[137] From a corporate governance standpoint, only a SIFI's failure could trigger a systemically harmful financial collapse.[138] For that same reason, this Article proposes that SIFI managers should take into account the public when making an expected-value calculation for a risk-taking decision whose failure might, either itself or in combination with other factors, cause a SIFI to fail.[139]

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133 *Cf.* Stavros Gadinis & Amelia Miazad, *Corporate Law and Social Risk*, 73 VAND. L. REV. 1401 (2020) (discussing the ESG movement and corporate sustainability initiatives).

134 *Misalignment*, *supra* note 17, at 2–3.

135 *Id.* at 20.

136 *Id.* Regulation such as the Dodd-Frank Act nonetheless indirectly attempts to reduce systemic economic harm by imposing certain capital and liquidity requirements on SIFIs, to minimize their likelihood of failure.

137 A simple illustrative example would be a double-or-nothing gamble of the firm's assets. Even if such a gamble had a positive expected value for shareholders, the firm's failure might externalize systemic harm—a public cost that strict shareholder primacy would not take into account. The global financial crisis also offers real examples, such as AIG's decision to sell protection under numerous credit-default swaps (CDS) all correlated with the value of mortgage-backed securities, thereby exposing itself to failure if that value plummeted (as it did, requiring AIG's bailout); and the decision of several major banks to assume the massive indebtedness of their affiliated structured investment vehicles (SIVs), solely for reputational benefits.

138 *Misalignment*, supra note 17, at 44.

139 For example, Dutch law makes managers of public firms responsible for weighing competing public and private interests, while still holding the fundamental goal of ensuring the firm's continuity and creating long-term shareholder value. DUTCH CORPORATE GOVERNANCE CODE Principle 1.1.1 (Dec. 8, 2016). Dutch law also requires bank employees to carefully balance the interests of the bank's customers, its shareholders, its members, its bond holders and other creditors, its employees, and society as a whole. *Id.* at Principle 1.1.1(vi). Section 172 of the UK Companies Act 2006 similarly imposes on a director the duty to "act in a way he considers, in good faith, would be most

SIFI managers making that expected-value calculation first would have to assess the likelihood that their risk-taking decision could fail and, if so, whether that failure might, itself or in combination with other factors, cause the SIFI to fail. Assume they decide, for example, to have the SIFI invest in a risky project with a 5% chance of failure,[140] and that such failure has a 5% chance of causing the SIFI to fail. The expected-value calculation of the decision to invest in that project would then include a 0.25% chance (that is, 5% of 5%) of causing the SIFI's failure.

SIFI managers making that expected-value calculation next would have to assess the likelihood that the SIFI's failure triggers a systemically harmful financial collapse. It certainly is possible that a SIFI's failure could cause the failure of its counterparties, which could include other SIFIs.[141] However, research now questions the so-called domino effect, the belief that a single SIFI's failure could trigger a systemically harmful financial collapse by causing numerous other SIFIs to fail.[142] Rather, "a better metaphor for financial contagion would be a single domino falling, prompting investors to question the solidity of similar dominos."[143] Arguably, therefore, it should be reasonable for a SIFI's managers to estimate that their firm's failure has a small (e.g., 1%) chance of triggering a systemically harmful financial collapse. Those managers would then include in their expected-value calculation a 0.0025% chance (that is, 1% of 0.25%) of that

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likely to promote the success of the company for the benefit of its members as a whole," taking into account such factors as promoting social, environmental, and governance objectives. Companies Act 2006, c. 46, § 172 (UK). Section 172 appears to prioritize shareholder interests over other interests. *Id.*

140 The expected-value calculation would thus include a 5% chance of failure and a 95% chance of success. *See* step 2 of Annex 1, *infra* (estimating the probability of each possible outcome).

141 *Cf.* Daniel K. Tarullo, Member, Bd. of Governors of the Fed. Rsrv. Sys., Regulating Systemically Important Financial Firms, Speech at the Peter G. Peterson Institute for International Economics, Washington, D.C. (June 3, 2011) ("In a period of financial stress, the disorderly failure of one or more SIFIs carries the potential for a devastating impact on the financial system.") (transcript available at https://perma.cc/8SP6-RFRT).

142 *See, e.g.*, Mathieu Bédard, *Are Dominos a Good Metaphor for Systemic Risk in Banking?*, 17 INT'L J. BUS. 352 (2012) (comparing financial contagion theories of systemic risk in banking and observing that empirical and theoretical literature gives little credence to counterparty contagion theory—that is, the domino effect metaphor). *Cf.* Allison Morrow & Matt Egan, *Silicon Valley Bank Collapses After Failure to Raise Capital*, CNN (Mar. 10, 2023) https://perma.cc/4JCR-TRPU ("Despite initial panic on Wall Street over the run on SVB, which caused its shares to crater, analysts said the bank's collapse is unlikely to set off the kind of domino effect that gripped the banking industry during the financial crisis [because the financial] system is as well-capitalized and liquid as it has ever been . . . .").

143 Bédard, *supra* note 142.

risky investment triggering a systemically harmful financial collapse.

To complete the expected-value calculation, the SIFI's managers would have to estimate the harm caused by triggering a systemically harmful financial collapse. An upper-range estimate might use the cost of the global financial crisis, estimated as approximately $15.5 trillion.[144] Given that estimate, their expected-value calculation would include $387.5 million of public harm.

Ultimately, however, valuing the harm caused by triggering a systemically harmful financial collapse should be a public policy choice. It should be much lower than $15.5 trillion, for example, if it were based on the estimated cost of a government bailout of the SIFI to avoid a systemic failure. Such an estimate could be made by the government as part of the process of designating a firm as systemically important, and thereafter periodically updated by the government.[145]

This Article's illustrative numbers may or may not be realistic. A SIFI's managers should use their reasonable judgment in estimating these numbers. Whatever their estimates, it is critical that the managers clearly document their rationales therefor so the process is fully transparent.[146]

2. *Managerial decisions that could significantly risk harming the environment or creating other social harm*. This subpart 2 next analyzes managerial decisions that could cause significant uncompensated environmental or other social harm. As mentioned, ascertaining when such harm would be significant enough to justify taking the public into account is more subjective than the subpart 1 systemic-economic-harm discussion. Subpart 1 only impacts SIFI managerial decisions—and only when such decisions could cause a SIFI's failure—whereas this subpart 2 potentially impacts the managerial decisions of all firms, whether or not such decisions could cause a firm's failure.

For the reasons discussed in the preceding subpart 1, SIFI managers theoretically should take into account the public when

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144 *See, e.g.*, Tyler Atkinson et al., *How Bad Was It? The Costs and Consequences of the 2007–09 Financial Crisis*, FED. RES. BANK OF DALLAS, STAFF PAPERS, July 20, 2013, at 10 (estimating the likely cost of the financial crisis to the United States as possibly greater than $15.5 trillion).

145 *Cf. Misalignment*, *supra* note 17, at 34 (suggesting that methodology).

146 *Cf. supra* notes 46–47 and accompanying text (arguing that the validity of an SG Rule should be dependent on disclosure providing full transparency, and that parties should be able to challenge a statistics-based governance decision that depends on methodologies, data, or assumptions that are shown to be manifestly unreasonable).

making an expected-value calculation for a risk-taking decision that could cause significant uncompensated environmental or other social harm. As mentioned, the ESG movement questions the long-accepted wisdom that corporate governance should not require a public duty.[147] There are, however, certain important differences—in addition to whether all firms or merely SIFIs could cause the harm[148]—between environmental or other social harm on the one hand and systemic economic harm on the other.

For example, subpart 1 observes that systemic economic harm is neither prohibited by law nor internalized through tort law.[149] It is more common, however, for law to regulate environmental and other social harm. To that extent, such harm would already be constrained, or parties causing such harm would at least be required to pay compensation. Another difference is that the primary trigger of systemic economic harm is well defined: the failure of a SIFI.[150] In contrast, the triggers of significant environmental or other social harm are not well defined.

For these reasons, there do not appear to be incontrovertible normative guidelines for deciding when, or how, managers should include significant environmental or other social harm in their expected-value calculations. In the face of uncertainty, managers are likely to avoid including such harm in their expected-value calculations.[151] The next step, therefore, is for policymakers and politicians to evaluate when, and how, regulators should require managers to take that harm into account. In that context, policymakers and politicians may also wish to evaluate this Article's normative recommendations for when and how regulators should require managers to take into account systemic economic harm.

V. TESTING A STATISTICS-BASED GOVERNANCE RULE

This Part tests an SG Rule by applying it retrospectively to risk-taking examples. Subpart A applies it to Enron's risk-taking that resulted in a corporate failure—the firm's bankruptcy. Subpart B applies it to Ford's risk-taking that resulted in a

147 *See supra* notes 133–34 and accompanying text.

148 *See supra* notes 126–27 and accompanying text.

149 *See supra* notes 135–36 and accompanying text.

150 *See supra* note 139 and accompanying text.

151 To the extent managers do choose to include such harm, it is critical (as with systemic economic harm; *see supra* text accompanying note 146) that they clearly document their rationales so the process is fully transparent.

serious product failure—the exploding gas tank on its "Pinto" car.

A. Corporate Failure—Enron

The 2002 failure of Enron Corporation (Enron)[152] is thought to epitomize management fraud and excessive risk-taking.[153] Enron's managers were severely criticized, and some were held criminally liable.[154] As shown in this subpart 1 and Annex 2, however, at least insofar as those managers were engaging in hedging transactions, they were acting reasonably from a statistics-based governance standpoint. Indeed, the United States Supreme Court eventually overturned the convictions of at least certain of Enron's managers.[155] Arguably, therefore, those managers should have had the protection of an SG Rule.

Enron had engaged in a range of complex structured hedging transactions designed to achieve accounting rather than operating results. Its principal motivation was to minimize volatility and avoid the risk of incurring financial-statement losses[156] that could impair its investment-grade credit rating and thereby destroy its primary business of derivatives-based energy trading (which depended on Enron maintaining an investment-grade rating).[157]

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[152] This discussion of Enron's failure is based in part on the author's article, Steven L. Schwarcz, *Reexamining Enron's Regulatory Consequences*, NYU ANN. SURV. AM. L. (forthcoming 2023), https://perma.cc/HYY2-NZTG.

[153] *See, e.g.*, Mark Chediak et al., *Enron's Cast of Characters: Where They Are 20 Years After the Fall*, BLOOMBERG (Dec. 2, 2021, 9:00 AM), https://perma.cc/65QT-VNXK (describing Enron as the "posterchild of corporate fraud").

[154] *See, e.g.*, *See What Happened to Key Players in Enron Scandal*, HOUS. CHRON. (Aug. 31, 2018), https://perma.cc/49NR-A5V2.

[155] *See, e.g.*, *Enron's Skilling Wins His Appeal*, ECONOMIST (June 24, 2010), https://perma.cc/SYF2-EN7G ("The scandalous collapse of Enron may have started out as a case study in abusive management but it is ending up looking more like a worrying example of overzealous prosecution by government.").

[156] William C. Powers, Jr. et al., Report of Investigation by the Special Investigative Committee of the Board of Directors of Enron Corp. 4, 68, 78, 97 (Feb. 1, 2002), [hereinafter Powers Report]. Enron may have been additionally motivated to accelerate profits. *Id.* at 56.

[157] *Id.* at 36. Enron's former president indicated in an interview with Senate Committee staff that Enron's "business model [did not] exist below investment grade." STAFF OF S. COMM. ON GOVERNMENTAL AFFAIRS, 107TH CONG., ENRON'S CREDIT RATING: ENRON'S BANKERS' CONTACTS WITH MOODY'S AND GOVERNMENT OFFICIALS 2 (Comm. Print 2003), https://perma.cc/UGQ3-29H9. Because a derivatives contract creates credit risk, an investment-grade derivatives counterparty can be viewed as sufficiently creditworthy; but a derivatives counterparty lacking such a rating may be required to collateralize or otherwise secure its potential payment obligation, which can be very costly. *See, e.g.*, *Over-the-counter Derivatives*, Fed. Rsrv. (July 9, 2008), https://perma.cc/Q65V-MVNX. Impairment of Enron's credit rating also could trigger a cross-default under cer-

A common factor in many of these transactions was the use of non-consolidated (that is, off-balance-sheet) special purpose entities, or SPEs, to hedge the value of certain Enron "merchant asset" investments.[158] Under generally accepted accounting principles (GAAP), these assets must be fair valued periodically.[159] Enron must account for any change in that fair value as a gain or loss, as the case may be, to its reported income.[160] If the merchant assets' fair value drops significantly, the resulting accounting-driven paper "loss" would likely cause the credit-rating agencies to downgrade Enron's credit rating below investment grade.[161] Hedging the value of those assets would protect that business by allowing Enron to avoid having to account for a drop in their fair value as a loss.[162]

In a typical hedge, Enron would transfer its own stock to one of the non-consolidated SPEs in exchange for a note or cash,[163] and also directly or indirectly guarantee the SPE's value.[164] The SPE, in turn, would hedge the value of Enron's merchant assets, using the transferred Enron stock as the principal source of payment.[165] Relying on its "historically rising stock price, Enron judged the risk that it would have to pay on its guarantees as remote."[166]

Unexpectedly, however, the value of Enron's merchant assets and the price of Enron's stock simultaneously fell, causing

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tain of Enron's derivatives agreements. STAFF OF S. COMM. ON GOVERNMENTAL AFFAIRS, *supra*.

158 Powers Report, *supra* note 156, at 77.

159 E-mail from Jennifer Francis, Associate Professor of Accounting, The Fuqua School of Business, to the author (Apr. 8, 2002) (on file with author).

160 *Cf. id.* ("The fair valuing process causes the value of the merchant investment (an asset on Enron's books) to go up when the value of the equity in the [investment] goes up, and to go down when the value of the equity in the [investment] goes down. The key is that the change in the fair value of the merchant investment is an unrealized gain/loss that goes to income in the period. Hence, if fair values of these merchant investments swing about, so will Enron's income.").

161 Because its credit rating was then barely investment grade, a downgrade could cause Enron to lose its investment-grade rating. *See Moody's Downgrades Enron Corp Long Term Debt Ratings and Keeps Them Under Review for Downgrade; Senior Unsecured to Baa3. Lowers Rating for Commercial Paper to Not Prime*, MOODY'S (Nov. 9, 2001), https://perma.cc/R5JZ-PN9U.

162 *See* Powers Report, *supra* note 156, at 13.

163 *See id.*

164 *Id.* at 36–37.

165 *See, e.g., id.* at 13.

166 Steven L. Schwarcz, *Enron and the Use and Abuse of Special Purpose Entities in Corporate Structures*, 70 U. CIN. L. REV. 1309, 1310, 1315 (2002).

the SPEs' value to fall and triggering the Enron guarantees.[167] Notwithstanding those guarantees, the SPEs lacked sufficient assets to validly hedge the value of the merchant assets.[168] The failure of the hedges required Enron to account for the fall in value of its merchant assets as a loss to reported income, causing the rating agencies to downgrade Enron's credit rating and ending Enron's derivatives business—thereby forcing Enron into bankruptcy.[169]

Although Enron's managers were criticized and held liable for engaging in these SPE hedging transactions,[170] they were acting reasonably from a statistical perspective.[171] Lacking other options, they found a creative alternative to hedge the value of the merchant assets: to create SPEs to perform that hedge by engaging in the structured transactions previously described. The key to these transactions is that Enron's publicly traded stock had real value in the hands of a third party. As such, the non-consolidated SPEs providing the hedging were structured for accounting purposes as third parties.[172] Furthermore, Enron's managers complied with reasonable corporate processes in cre-

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167 These guarantee payments in turn apparently further reduced Enron stock value, triggering additional guarantees. *Cf.* Powers Report, *supra* note 156, at 125 (noting that Enron unwound the Raptor transactions because, under its guaranties, it would have to "deliver so many shares of its stock to the Raptors that its reported earnings per share would be diluted significantly").

168 Moreover, these drops in the SPE's value caused the SPEs to breach the 3% independent equity requirement for non-consolidation, thereby bringing the SPEs's debt onto Enron's balance sheet. E-mail from Jennifer Francis to the author, *supra* note 159 (observing that "[t]he insufficient assets to meet the hedge was also biting into the SPE's equity, causing the SPE to fall below the 3%" requirement"). In at least one case, the ab initio lack of sufficient SPE third-party equity caused the SPEs to breach the 3% independent equity requirement for non-consolidation. *See* Powers Report, *supra* note 156, at 41–42, 49–50, 52 (observing that the financing structure Enron created for the Chewco SPE was at least 50% short of the required third-party equity need for non-consolidation because certain employees of Enron improperly, if not fraudulently—and apparently without senior management's knowledge—arranged reserve accounts funded by Enron to protect a portion of that equity).

169 *See Rating Action: Moody's Downgrades Enron Corp's Long-Term Debt Ratings (Senior Unsecured to B2); Commercial Paper Confirmed at Not-Prime; Ratings Remain Under Review for Downgrade*, MOODY'S (Nov. 28, 2001), https://perma.cc/CHX4-FJFA (noting that "disclosures in [Enron's] recent 10-Q and required restatement of prior period earnings are of concern").

170 *See supra* note 154 and accompanying text.

171 The only clearly wrongful act connected with Enron's failure concerned a single hedging transaction, involving the Chewco SPE, which was at least 50% short of the required third-party equity needed for non-consolidation. *See supra* note 168. *See also* Powers Report, *supra* note 156, at 41–42, 49–50, 52.

172 *See, e.g.*, Powers Report, *supra* note 156, at 79; *see also* Schwarcz, *supra* note 166, at 1312–13.

ating these transactions.[173] They engaged in these transactions with the help of Enron's outside counsel, they obtained independent fairness opinions,[174] and they received at least cautious approval[175] of the accounting treatment from the company's external auditor—the big-five accounting firm Arthur Andersen.[176] They also judged the probability of a simultaneous drop in both Enron's stock price (which had been steadily rising for a decade) and the value of the merchant assets to be extremely unlikely.[177]

In reaction to Enron's failure, Congress enacted SOX,[178] which imposes management-liability standards based on negligence and strict liability.[179] Those liability standards, however, are unrelated to the actual causes and consequences of Enron's failure. As shown, Enron's managers were acting reasonably from a statistical perspective. Other observers agree that SOX "was in large part misguided . . . ."[180] Many of its provisions, for example, were said to be

> easy fixes that look good in thirty-second television commercials [and] simply follow[] headlines from Enron and other corporate scandals, with little appreciation for whether those headlines highlight systemic problems that need legislative attention. Many other provisions, particularly the vaunted criminal provisions, represent little more than political grandstanding and are unlikely to have any real deterrent effect . . . . [T]here was little appreciation that markets still work and can right themselves.[181]

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[173] Management's compliance was not perfect, however; managers did not always obtain approval of potential conflicts in compliance with Enron's Code of Conduct. Powers Report, *supra* note 156, at 41–47.

[174] *Id.* at 79, 81 (referring to PriceWaterhouseCoopers fairness opinion (regarding exchange of the Enron shares for the SPE-put and note) on the Rhythms transaction).

[175] The external auditor cautioned that the proposed accounting treatment "presented a high degree of risk of non-compliance with [GAAP]." *See* S. PERMANENT SUBCOMM. ON INVESTIGATIONS OF THE COMM. ON GOVERNMENTAL AFFS., 107TH CONG., THE ROLE OF THE BOARD OF DIRECTORS IN ENRON'S COLLAPSE 15 (Comm. Print 2002), https://perma.cc/2RDX-VCRT.

[176] Powers Report, *supra* note 156, at 83.

[177] *Cf. supra* notes 166–67 and accompanying text (observing the unlikelihood of these events occurring simultaneously).

[178] *See supra* notes 61–62 and accompanying text.

[179] *See supra* notes 63–66 and accompanying text.

[180] Frank Partnoy, *A Revisionist View of Enron and the Sudden Death of "May"*, 48 VILL. L. REV. 1245, 1246 (2003).

[181] Michael A. Perino, *Enron's Legislative Aftermath: Some Reflections on the Deterrence Aspects of the Sarbanes-Oxley Act of 2002*, 76 ST. JOHN'S L. REV. 671, 671 (2002).

B. Product Failure—Ford Pinto's Exploding Gas Tank

In 1970, the Ford Motor Company introduced its Pinto model, a small and inexpensive car that took less than 24 months to be conceptualized, designed, and put into production—much shorter than the more typical 43 months required for other models. To reduce cost, the Pinto lacked the standard bumper used to cushion collisions and its gas tank lacked standard reinforcement. As a result, a rear-end collision would be more likely to puncture the gas tank and cause it to explode.[182]

Rear-end Pinto collisions are estimated to have caused "an estimated 500 deaths and hundreds of injuries."[183] Allegedly, subsequent litigation discovered that Ford managers decided that the cost of producing the Pinto with its safety deficiencies and paying for any lawsuits would be less than making the requisite safety modifications.[184]

If Ford managers actually made that decision, however, it turned out to be grossly incorrect. In just one publicly touted case, for example, a California appellate court upheld an order for $6 million in damages, of which $3.5 million was for punitive damages.[185] Ford customers are estimated to have filed 117 lawsuits,[186] and Ford Motor Company itself was indicted and prosecuted on criminal homicide charges.[187] In retrospect, Lee Iacocca,

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[182] *See* Reiff Law Firm, *Ford's Fiery Pintos Lead to Injuries, Deaths, and Lawsuits* (2023), https://perma.cc/38DN-RV34. Ford's cost-reduction strategy was not unique. In 1993, General Motors Corporation (GMC) engaged in similar risk-taking when deciding to place the fuel tank in its Chevrolet Malibu only eleven inches from the rear bumper, compared to more than twenty inches in previous models. GMC calculated that the expected cost of settling resultant lawsuits would be less than the additional cost of $8.59 per vehicle to implement a safer design. In 1999, a Los Angeles jury awarded $4.9 billion (of which $4.8 billion was punitive damages) to six people burned in a rear end collision when the gas tank in their 1979 Malibu exploded in flames. *See* Andrew Pollack, *$4.9 Billion Jury Verdict In G.M. Fuel Tank Case*, N.Y. TIMES (July 10, 1999), https://perma.cc/T5FR-ZM3S.

[183] Robert Sherefkin, *Lee Iacocca's Pinto: A Fiery Failure*, AUTOMOTIVE NEWS (June 16, 2003), https://perma.cc/B587-4PW8. *But cf.* NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. OFFICE OF DEFECTS INVESTIGATION, INVESTIGATION REPORT: PHASE I C7-38 3 (1978) (estimating that Pinto rear-end collisions resulted only in twenty-seven deaths and twenty-four nonfatal burn injuries).

[184] Sherefkin, *supra* note 183. *But cf. infra* note 204 (questioning whether Ford actually made that cost comparison).

[185] Reiff Law Firm, *supra* note 182 (referencing Grimshaw v. Ford Motor Co., 119 Cal. App. 3d 757, 813 (Cal. Ct. App. 1981)).

[186] Sherefkin, *supra* note 183 (attributing that estimate to PETER WYDEN, THE UNKNOWN IACOCCA (1987)). Sherefkin observes that "[t]here is no way of knowing how much Ford paid in Pinto suits because some were settled quietly out of court." *Id.*

[187] *Id.* (referencing Indiana v. Ford Motor Co., Cause No. 11-431 (1980), in which Ford ultimately was not held guilty).

the Ford executive in charge of Pinto design and production and later Ford's president, admitted that the lawsuits "might have bankrupted the company."[188]

Although Ford's decision not to make the requisite safety modifications superficially appears to have been based on an EV analysis,[189] the circumstances show that any such analysis would have been flawed. One flaw stemmed from Lee Iacocca's hubris. The Pinto "quickly became known as 'Lee's car,'"[190] and he imposed constraints based on time and price. Regarding time, Iacocca "wanted the car in showrooms for the 1971 model year [in order to win over the competition]. That meant one of the shortest production planning periods in modern automotive history: just 25 months, when the normal time span was 43 months."[191] When Ford engineers found a serious defect in the Pinto's gas tank, "it was too late [to change the design in time]. The tooling process was well under way."[192] The reality, in other words, was that time constraints would override the results of any EV analysis.

Regarding price, Iacocca "demanded that [the Pinto] weigh no more than 2,000 pounds and sell for $2,000."[193] This meant that he would tolerate no price increase, and thus would not pay to fix the gas tank.[194] Hubris also may explain why Ford did not

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188 LEE IACOCCA, TALKING STRAIGHT 141 (1989).

189 *See supra* note 184 and accompanying text.

190 Sherefkin, *supra* note 183.

191 *Id*.

192 *Id*. The California Court of Appeals explained this defect:

> It was then the preferred practice in Europe and Japan to locate the gas tank over the rear axle in subcompacts because a small vehicle has less 'crush space' between the rear axle and the bumper than larger cars. The Pinto's styling, however, required the tank to be placed behind the rear axle leaving only 9 or 10 inches of 'crush space'—far less than in any other American automobile or Ford overseas subcompact. In addition, the Pinto was designed so that its bumper was little more than a chrome strip, less substantial than the bumper of any other American car produced then or later. The Pinto's rear structure also lacked reinforcing members known as 'hat sections' (two longitudinal side members) and horizontal cross-members running between them such as were found in cars of larger unitized construction and in all automobiles produced by Ford's overseas operations. The absence of the reinforcing members rendered the Pinto less crush resistant than other vehicles. Finally, the differential housing selected for the Pinto had an exposed flange and a line of exposed bolt heads. These protrusions were sufficient to puncture a gas tank driven forward against the differential upon rear impact.

Grimshaw v. Ford Motor Co., 119 Cal. App. 3d 757, 774 (Cal. Ct. App. 1981).

193 Sherefkin, *supra* note 183.

194 *Cf. id*. (reporting that "Iacocca's $2,000 limit on the car's costs left no money to protect the fuel system," and estimating that "it would have cost $137 million to fix the

adequately rely on the data from the crash tests it performed. Iacocca had a "don't-bother-me-with-trifles haughtiness toward technicians."[195] The reality, in other words, was that price constraints also would override the results of any EV analysis.

Ford's experience provides important lessons for an EV analysis. Any such analysis should be done seriously, and its results should be respected. If Ford's managers actually performed an EV analysis, they likely did it to justify not making the requisite safety modifications; if so, their methodology may well have been contorted to reach that result. This is not to say, however, that managers should comply with the results of an EV analysis as a computer would comply with a mathematical algorithm. "Estimating the risk associated with an activity or product is quite different than judging whether the risk is acceptable or not," which "is a normative" judgment.[196] Managers should always use good judgment[197] to interpret and decide how to utilize the results in a way that observers will perceive as reasonable.[198]

Another flaw in Ford's analysis was its apparent willingness to blatantly equate human life with dollars.[199] As Professor Gary Schwartz observed, the *Grimshaw v. Ford Motor Co.* case[200] "shows how disturbed the public can be by corporate decisions that balance life and safety against monetary cost."[201] Ford was

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Pinto immediately"). The California Court of Appeals estimated the cost of substantially improving the safety of the gas tank as $15.30 per vehicle. *Grimshaw*, 119 Cal. App. 3d at 776.

195 Sherefkin, *supra* note 183.

196 John R. Danley, *Polishing Up the Pinto: Legal Liability, Moral Blame, and Risk*, 15 BUS. ETHICS Q. 205, 212 (2005).

197 *Cf.* Gary T. Schwartz, *The Myth of the Ford Pinto Case*, 43 RUTGERS L. REV. 1013, 1023–24 (1991) (in the context of discussing automotive safety cost-benefit analysis, observing that "the NHTSA [National Highway Traffic Safety Administration] agency has always resisted the notion that it must employ anything resembling a formal cost-benefit analysis; and it has definitely rejected the claim that, in issuing standards, it should place an explicit value on life and serious injury. In interpreting its obligations under the [Motor Vehicle Safety] Act, NHTSA has taken the position that while it should gather and consider all information relevant to the safety benefits and the likely costs of a proposed standard, the decision whether to adopt a standard is then a judgment call on the part of the NHTSA Administrator.").

198 *Cf.* Danley, *supra* note 196, at 212 (arguing that debates whether risk is acceptable "are usually debates over what principles or standards should be adopted in generating specific rules. By far, the most widely invoked standard is that of reasonableness.").

199 *See supra* note 184 and accompanying text.

200 *See* Grimshaw v. Ford Motor Co., 119 Cal. App. 3d 757, 813 (Cal. Ct. App. 1981).

201 Schwartz, *supra* note 197, at 1014.

condemned for using a $200,000 value-of-life figure,[202] even though that figure was the value-of-life that the National Highway Traffic Safety Administration (NHTSA) used[203] when calculating the social cost of motor-vehicle accidents and setting vehicle safety standards.[204]

The possible lesson here is that formally assigning a value to human life to use in a cost-benefit safety equation, even if the value is otherwise justifiable, appears cold-blooded and callous.[205] This reflects "a basic belief held by many (indeed most) of the public that it is wrong for a corporation to make decisions that sacrifice the lives of its customers in order to reduce the corporation's costs, to increase its profits."[206] This belief "extends beyond laypersons who serve on juries and watch television shows. It is also the belief relied on by . . . judges . . . and many academics."[207] Professor Schwartz suggests that the "reluctance to present risk-benefit arguments to juries"—at least arguments that assign numerical values to human life—"should be regarded as an important part of the significance and legacy of the Pinto case."[208]

Besides appearing cold-blooded and callous, there is another possible explanation for the belief that it is wrong for a corpora-

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[202] *See, e.g.*, *id*. at 1022 (citing Mark Dowie, *Pinto Madness,* MOTHER JONES (Sept./Oct. 1977), https://perma.cc/3YLA-EKHF ("Ever wonder what your life is worth in dollars? Perhaps $10 million? Ford has a better idea: $200,000.")).

[203] Professor Schwartz suggests, however, that the NHTSA—unlike Ford—merely used that value-of-life figure informally as a rule of thumb to inform its judgment. Schwartz, *supra* note 197, at 1022–24.

[204] *Id*. at 1024. Professor Schwartz also questions whether Ford actually compared whether the cost of producing the Pinto with its safety deficiencies and paying for any lawsuits would be less than making the requisite safety modifications. *See id*. at 1033 ("[A] famous Ford report cannot be interpreted as showing Ford balancing lives against dollars in designing the Pinto."). As this Article indicates, the refusal to fix the gas-tank problem appears to reflect Iacocca's refusal to delay production or accept a price increase. *See supra* notes 192–94 and accompanying text.

[205] *Cf. Grimshaw*, 119 Cal. App. 3d at 813 ("by engaging in a cost-benefit analysis balancing human lives and limbs against corporate profits[,] Ford's institutional mentality was shown to be one of callous indifference to public safety"); GUIDO CALABRESI & PHILLIP BOBBITT, TRAGIC CHOICES 144 (1978) (describing a "tragic choice" as one that requires that "we put a price on things we desperately would like to treat as priceless").

[206] Schwartz, *supra* note 197, at 1035.

[207] *Id*. at 1036.

[208] *Id*. at 1039. Professor Schwartz clarifies his view, though: "I regard it as clear that products should be designed in accordance with risk-benefit criteria. It does not automatically follow, however, that the risk-benefit test is the best test for manufacturers' design liability." *Id*. at 1041 n.113. In that context, he questions how the public reluctance to balance cost and human life could distort product design, observing that this reluctance "suggests an apparent mismatch between public opinion and the assumptions underlying the risk-benefit test for design liability." *Id.* at 1014.

tion to make "decisions that sacrifice the lives of its customers in order to" increase its profits.[209] Those types of decisions appear implicitly illegal, even if they do not technically violate law.[210] This explanation stems from the insight that even though governments sometimes weigh the value of lives when balancing costs and benefits, private firms should not take lives, even indirectly; thus, they should have no need to value lives when balancing costs and benefits of their decision-making.

In other contexts, the author of this Article has similarly argued that there should be an ethical distinction between government and private action that harms third parties. For example, in the context of using a Kaldor-Hicks efficiency model[211] to weigh the consequences of decisions, governmental decision-making would be (theoretically) unbiased, whereas a private firm's decision-making would be based on the firm's selfish interests.[212] Private firms therefore can take unfair advantage of Kaldor-Hicks efficiency, which merely requires the aggregate benefits to exceed the aggregate costs, regardless of which parties benefit and which lose.[213] Professor Schwartz apparently would agree with this distinction.[214]

The additional lesson here is that private firms should try to avoid making decisions that, even indirectly, can sacrifice the lives of their customers.[215] As discussed, those types of decisions appear implicitly illegal, even if they do not technically violate law. Private firms that make those types of decisions therefore could become subject to the same consequences as would firms that make decisions to violate law or avoid legal compliance.[216]

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[209] *Cf. supra* text accompanying note 206 (discussing that decision-making).

[210] This insight can help to explain why Ford was prosecuted, but not ultimately convicted, on criminal homicide charges in a Pinto exploding-gas-tank case. *See supra* note 187 and accompanying text.

[211] Kaldor-Hicks efficiency means that the aggregate benefits of an action exceed the aggregate costs, regardless of which parties benefit and which lose. It is the theoretical basis of cost-benefit analysis. *See, e.g.*, ROBIN PAUL MALLOY, LAW IN A MARKET CONTEXT: AN INTRODUCTION TO MARKET CONCEPTS IN LEGAL REASONING 190 (2004).

[212] *Cf. Misalignment*, *supra* note 17 (observing that "Kaldor-Hicks efficiency implicitly assumes that the distribution of benefits and costs is not controlled by the party—in our case, a firm's managers—also controlling the decision whether to engage in the project," and referencing MALLOY, *supra* note 211, at 190–91).

[213] *See supra* note 211.

[214] *Cf.* Schwartz, *supra* note 197, at 1043–44 (observing that there should be a difference between a government valuing life to balance costs and benefits and a private corporation doing so).

[215] *Cf. supra* text accompanying note 206 (discussing that decision-making).

[216] *See supra* notes 120–24 and accompanying text (discussing those consequences).

VI. CONCLUSION

This Article makes three related claims about corporate risk-taking. Prudent corporate governance requires managers to take business risks, many of which are data-driven and statistically based. Although excessive risk-taking and fraud cause some corporate failures, even good faith statistically based risk-taking can result in failure.

This Article's first claim, therefore, is that managers should not automatically be presumed to be at fault for corporate failures resulting from risk-taking decisions that are based on statistical methodologies that reasonably justify the decisions ex ante. The BJR already generally exempts non-conflicted managers from liability for making good faith decisions that have a reasonable basis. But the BJR has a very limited jurisdictional scope, and it is unclear whether it protects corporate officers. The BJR thus leaves a large protection gap.

To fill that gap, this Article's second claim is that corporate managers should also be protected by a statistics-based governance rule. This rule would exempt officers and directors from both federal and state liability for making risk-taking decisions based on statistical methodologies that reasonably justify their decision-making (assuming good faith and no managerial conflicts of interest or fraud). Protection under this rule would require full transparency of the evidentiary record of corporate decision-making, including the statistical methodology and the underlying data and assumptions. A statistics-based governance rule thus would be more objective, and therefore less subject to criticism, than the BJR.

Expected-value analysis is the most generally accepted and widely used statistical methodology for assessing risk-taking outcomes. This Article's third claim is that managers making expected-value decisions should ask, "Expected value to whom?" For most decisions, the expected-value calculation should only take into account the firm and its investors. For decisions that could significantly impact the public, the answer to "Expected value to whom?" should strive to additionally include society at large.

Next, this Article tests a statistics-based governance rule by applying it retrospectively to two risk-taking examples: Enron's risk-taking that resulted in the firm's bankruptcy, and Ford's risk-taking that resulted in the exploding gas tank on its "Pinto" car. These applications demonstrate how managers could make statistically based governance decisions.

In the case of Enron, the applications indicate that the managers acted reasonably when deciding, ex ante, to engage in special-purpose-entity hedging transactions in compliance with reasonable corporate processes and with the help of the firm's outside counsel and accountants. The applications also suggest that the liability standards of congressional legislation enacted in reaction to Enron's failure were unrelated to the actual causes and consequences of that failure.

In the case of Ford, the applications show that the managers may have contorted statistics-based governance to avoid making the requisite safety modifications. Furthermore, Ford's managers improperly equated human life with dollars. Even though governments sometimes weigh the value of lives when balancing costs and benefits, there should be an ethical distinction between government and private action that harms third parties.

The foregoing applications also help to explain other limits of statistics-based governance. For example, although such governance can help to balance the outcomes that may result from a decision, it does not necessarily take into account the possibility that alternative decisions might yield more favorable outcomes. Business managers and other decision-makers cannot, however, realistically be expected to take all alternatives into account. They often must decide based on the choices before them. The possibility of missing preferable alternatives is thus a widely known and accepted imperfection of any decision-making, including cost-benefit-analysis decisions.

Another limitation can occur where a decision could lead to an action that violates law. Clearly, managers should not consider actions that violate criminal law. But should they consider actions that merely require paying civil monetary penalties as a cost of doing business? This Article examines that question, taking into account such indirect costs as reputational cost, lower worker morale, potentially weaker investor demand, and the costs of defending against an investigation and prosecution.

ANNEX 1 — EXPECTED VALUE ILLUSTRATION

These steps illustrate how to determine an expected value:

1. Identify all possible outcomes of the contemplated action.
2. Estimate the probability of each possible outcome. This estimate may require additional information. Also, some probabilities may be imprecise or even indeterminable. Ex-

pected value may not be meaningful in the context of indeterminable probabilities.

3. Confirm that the sum of all of those probabilities add up to 1.0, meaning that it is 100% certain that one of those outcomes will occur.

4. Assess each outcome's likely benefit or harm (and assign a positive or, if applicable, negative value thereto).

5. Multiply the value of each outcome by its respective probability. Each possible outcome represents a portion of the total expected value for the calculation.

6. Calculate the sum of those products, and interpret the result.

To exemplify how the determination of expected value can inform decision-making, assume you are seeking a law job and *have only one interview slot available.* You must decide between interviewing at a large money-center law firm and a smaller money-center law firm. Further assume that your primary consideration is income. A job at the large money-center law firm would pay $215,000 per annum, and you estimate the probability of receiving such an offer is 20%. A job at the smaller money-center law firm would pay $150,000 per annum, and you estimate the probability of receiving such an offer is 50%. Absent being offered either job, your fallback is an assured job at a hometown local law firm, which would pay $80,000 per annum.

To decide which firm to interview at, the expected-value calculations would be as follows:

If you interview at the large money-center law firm:

Expected Value (EV) = ($215,000 x 0.2) + ($80,000 x 0.8) = $107,000

[Note that that sum of these probabilities (0.2 + 0.8) add to 1.0, or 100%.]

If you interview at the smaller money-center law firm:

Expected Value (EV) = ($150,000 x 0.5) + ($80,000 x 0.5) = $115,000

[Note again that that sum of these probabilities (0.5 + 0.5) add to 1.0, or 100%.]

Therefore, your higher expected value would be to interview at the smaller money-center law firm.

ANNEX 2 — EXPECTED VALUE REAL-WORLD APPLICATION

This Annex provides a real-world application of expected-value analysis, showing how Enron's managers could have used that analysis to determine whether to arrange the SPE hedging transactions discussed in Part V.A.1 of this Article.

Assume for this analysis that Enron's value as a firm with an investment-grade rating would be $X.[217] Further assume that Enron's value as a firm after losing an investment-grade rating would be 20% (that is, 0.20) of $X, because its primary business (derivatives-based energy trading) would be lost.[218]

The following identifies the relevant outcomes, and their likely benefit or harm, that turn on the value of Enron's merchant assets:

- If that value falls sufficiently to cause Enron to lose its investment-grade rating, Enron's value as a firm would fall to 0.20 $X.[219]
- If that value does not fall sufficiently to cause Enron to lose its investment-grade rating, Enron's value as a firm would remain at $X.

The following estimates the probability of each possible outcome:

- Probability, absent the hedge, that the value of Enron's merchant assets falls sufficiently to cause ratings downgrade = 25%.
- Probability, absent the hedge, that the value of Enron's merchant assets does not fall sufficiently to cause ratings downgrade = 75%.
- Probability, *with the hedge*, that the value of Enron's merchant assets falls sufficiently to cause ratings downgrade = 5%.
- Probability, *with the hedge*, that the value of Enron's merchant assets does not fall sufficiently to cause ratings downgrade = 95%.

If Enron's managers arrange the SPE hedging transactions:

Expected Value (EV) = ($X x 0.95) + (0.20 $X x 0.05) = 0.96 $X

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[217] The actual value of $X would be irrelevant, as the above calculation shows.

[218] *See supra* note 157 and accompanying text.

[219] *See* text accompanying note 218, *supra*.

If Enron's managers do not arrange the SPE hedging transactions:

Expected Value (EV) = ($X x 0.75) + (0.20 $X x 0.25) = 0.80 $X

Given the above assumptions, these calculations show that Enron's managers would have acted reasonably, from a statistical standpoint, in arranging the SPE hedging transactions.

Although one might challenge the above assumptions, the same result would obtain even by stress testing the assumptions. Set forth below are the calculations with the following highly stressed assumptions: Enron's value as a firm would only fall to 0.50 $X if it loses its investment-grade rating (and thus loses its primary business); the probability, absent the hedge, that the value of Enron's merchant assets does not fall sufficiently to cause a ratings downgrade is as great as 85%; and the probability, with the hedge, that the value of Enron's merchant assets does not fall sufficiently to cause a ratings downgrade is as low as 90%.

If Enron's managers arrange the SPE hedging transactions:

Expected Value (EV) = ($X x 0.90) + (0.50 $X x 0.10) = 0.95 $X

If Enron's managers do not arrange the SPE hedging transactions:

Expected Value (EV) = ($X x 0.85) + (0.50 $X x 0.15) = 0.925 $X

Even given these highly stressed assumptions, these calculations show that Enron's managers would have acted reasonably, from a statistical standpoint, in arranging the SPE hedging transactions.