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Building On Kahneman's Insights in the Development of Behavioral Finance

*Hersh Shefrin**

INTRODUCTION

First, I want to thank Michael Kaufman for inviting me to be part of this esteemed panel. And second, I would like to thank Danny Kahneman for his wisdom, insights, generosity, kindness, and much more.

On a personal dimension, I first met Danny in 1978 when he and Amos Tversky were visiting Stanford University's Center for Advanced Study in the Behavioral Sciences. At the time I was working with Dick Thaler, who was also visiting Stanford, on developing a System 1/System 2 model of economic choice.¹ It should come as no surprise that what I learned from Danny and Amos in those first interactions, and subsequently over the years, dramatically influenced my own research and indeed the entire field of economics.²

* Mario L. Belotti Professor of Finance, Santa Clara University. This Article stems from remarks that I gave in response to Daniel Kahneman's keynote address at Loyola University Chicago School of Law's Second Annual Investor Protection Conference, "Behavioral Economics and Investor Protection."

1. See generally DANIEL KAHNEMAN, THINKING, FAST AND SLOW 19–109 (2011) (describing System 1 and System 2 decision making processes). Professor Adam Zimmerman briefly summarizes the two Systems as follows:

Cognitive psychologists and neurologists have identified two types of decisionmaking processes: intuitive and deliberative. Intuitive decisionmaking processes, which are sometimes called System I processes, are intuitive, automatic, and quick, encompassing the types of instantaneous judgments that permit a person to size up a situation. Deliberative processes, sometimes described as System II processes, describe reflective, logical, and self-conscious thinking.

Adam S. Zimmerman, *Funding Irrationality*, 59 DUKE L.J. 1105, 1132 (2010) (footnotes omitted).

2. As one article put it,

Kahneman's career tells the story of how an idea can germinate, find far-flung disciples, and eventually reshape entire disciplines. Among scholars who do citation analysis, he is an anomaly. "When you look at how many areas of social science he's put his fingers in, it's just ridiculous," says Jevin West, a postdoctoral researcher at the University of Washington, who has helped develop an algorithm for tracing the spread of ideas among disciplines. "Very rarely do you see someone with that amount of influence."

This Article first discusses Kahneman concepts that underlie four dimensions of my own research: (1) the disposition effect; (2) market risk aversion and return biases over time; (3) fairness and finance; and (4) the planning fallacy. The Article concludes by discussing examples of legal areas ripe for the application of behavioral ideas.

I. THE DISPOSITION EFFECT

In 1985, my Santa Clara colleague and good friend, Meir Statman, and I introduced a concept called “the disposition effect” into the finance literature. We coined the term as shorthand for the “disposition to sell winners too early and ride losers too long,” a behavior pattern that often leads to the foregoing of tax benefits.³ Truth be told, Danny writes that the “disposition effect” is not one of his favorite terms, because it is opaque.⁴ And of course, he is correct, if one doesn’t link the shorthand to the longer phrase. Now, Meir and I were first drawn to study this behavior because in prospect theory, people are willing to take actuarially unfair risks in order to avoid sure losses.⁵ In reviewing the finance literature, including the seminal paper by Schlarbaum, Lewellen, and Lease,⁶ we found that there already was evidence that individual investors take longer to realize losses than they do to realize gains. But the authors of these studies had concluded that such behavior is not psychological.⁷

Meir and I set out to address this issue and to identify what seemed to us the key psychological elements. Notably, we argued that prospect theory, by itself, cannot explain the disposition effect—one reason being that investors appear quite willing to sell losers in December than in other months.⁸ However, we argued that this was not the only

Evan R. Goldstein, *The Anatomy of Influence: Is Daniel Kahneman the Most Important Social Scientist of His Generation?*, THE CHRON. (Nov. 8, 2011), <http://chronicle.com/article/The-Anatomy-of-Influence/129688/>.

3. See Hersh Shefrin & Meir Statman, *The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence*, 40 J. FIN. 777 (1985) [hereinafter Shefrin & Statman, *Sell Winners*].

4. KAHNEMAN, *supra* note 1, at 344 (“[F]inance research has documented a massive preference for selling winners rather than losers—a bias that has been given an opaque label: the *disposition effect*.”).

5. See HERSH SHEFRIN, BEYOND GREED AND FEAR: UNDERSTANDING BEHAVIORAL FINANCE AND THE PSYCHOLOGY OF INVESTING 107–19 (2000) (discussing the concept of riding losers too long—what Shefrin terms, “Get-Evenitis”); KAHNEMAN, *supra* note 1, at 278–88 (discussing modern prospect theory).

6. Gary G. Schlarbaum, Wilbur G. Lewellen & Ronald C. Lease, *Recognized Returns on Common Stock Investments: The Experience of Individual Investors*, 51 J. BUS. 299 (1978).

7. See, e.g., *id.* at 322–24.

8. See Shefrin & Statman, *Sell Winners*, *supra* note 3, at 783–85. For some, selling losses in

reason, and therefore broadened the disposition effect framework beyond just prospect theory to incorporate explicit System 1/System 2 elements, including emotions such as regret and pride, along with the presence or absence of habits associated with the exercise of self-control. In applying our broad framework, we made a series of predictions that were later tested and confirmed by Terry Odean,⁹ among others.

The disposition effect arises in criminal cases involving rogue traders. Rogue trading results when a professional trader incurs, but does not accept, a loss, and instead makes unauthorized risky trades in an effort to break even. Traders who are unsuccessful in breaking even sometimes cause their firms to lose very large amounts, an outcome that usually leads to their criminal prosecution for fraud and associated imprisonment and fines. The most prominent cases in recent years involved Toshihide Iguchi, a Daiwa Bank trader, who in 1995 lost \$1.1 billion in the U.S. bond market;¹⁰ Nick Leeson, a derivatives trader in Singapore for Barings Bank, who in 1995 lost \$1.3 billion;¹¹ John Rusnak, a foreign-exchange dealer in Allied Irish Bank's U.S. unit, Allfirst Financial Inc., who in 2002 lost \$691 million;¹² Jérôme Kerviel, a trader for Société Générale SA, who in 2008 lost \$7.3 billion;¹³ and Kweku Adoboli, a trader for UBS, who lost \$2.3 billion between 2008 and 2011.¹⁴ All were convicted for their actions and served (or are serving) several years of jail time.

To reiterate, elements of prospect theory formed part of the explanation we advanced, and constituted our starting point. But as we suggested, it was not the whole story. More importantly, we analyzed

December is rational because of the additional interest payment that would be required for a sale in the new year. *Id.* at 784. I believe, however, that a concentration of loss realizations in December is more consistent with a behavioral framework—one in which the investor is affected by mental accounting, regret aversion, and self-control (behaviors that do not affect the “rational” investor). *Id.* at 784–85.

9. See Terrance Odean, *Are Investors Reluctant to Realize Their Losses*, 53 J. FIN. 1175 (1998).

10. Andrew Pollock, *U.S. Holds Trader in Bank's Big Losses*, N.Y. TIMES, Sept. 27, 1995, <http://www.nytimes.com/1995/09/27/business/us-holds-trader-in-bank-s-big-loss.html?pagewanted=all&src=pm>.

11. John Thor-Dahlberg, *Barings May Be Gone, but the Story Isn't Over*, L.A. TIMES, Oct. 30, 1995, http://articles.latimes.com/1995-10-30/business/fi-62857_1_barings-bank.

12. Uri Friedman, *Where are the Rogue Traders Now?*, THE ATLANTIC (Sept. 16, 2011), <http://www.theatlanticwire.com/business/2011/09/where-are-rogue-traders-now/42529/>.

13. Nicola Clark, *Court in France Upholds Trader's Sentence and Fine*, N.Y. TIMES, Oct. 25, 2012, at B4.

14. Julia Werdigier & Mark Scott, *Ex-Trader Sentenced in Loss at UBS*, N.Y. TIMES, Nov. 21, 2012, at B1.

how, from a System 1/System 2 self-control perspective, investors, particularly professional investors, have learned to mitigate the disposition effect. Investors want to avoid the emotional pain from losses and seek pleasure in realizing market gains. Indeed, the disposition effect is one of many systematic departures from what rational theory predicts. The law's expectation that investors are optimizing economic agents who make informed decisions may need to be rethought in light of the disposition effect and other systematic biases.

II. MARKET RISK AVERSION AND RETURN BIASES OVER TIME

In January 2000, Danny gave a talk at Northwestern in which he cautioned economists not to think about the market as if it were a person with emotions or ethnic heritage. For example, he humorously told us that the market doesn't worry and the market isn't Jewish.

To be sure, markets do aggregate human beliefs and emotions into what economists call a "representative investor," who some in the legal arena view as having the traits of a "reasonable investor."¹⁵ For example, investors who are bullish on a stock tend to purchase that stock from investors who are bearish on that stock, causing the market clearing price to lie between what the price would have been were there only bullish investors in the market and what the price would have been were there only bearish investors in the market. Economic theory, however, tells us that the representative investor resulting from the market mix might not look anything like a real person.¹⁶

15. See, e.g., *Basic Inc. v. Levinson*, 485 U.S. 224, 234 (1988) ("The role of the materiality requirement is not to attribute to investors a child-like simplicity, an inability to grasp the probabilistic significance of negotiations, but to filter out essentially useless information that a reasonable investor would not consider significant, even as part of a larger mix of factors to consider in making his investment decision." (internal citations and quotations omitted)).

16. As Professor Black notes,

Behavioral economists, by contrast, do not observe real people investing in today's markets behaving as the reasonable investors that federal securities law expects them to be. . . . To date, courts have not acknowledged this gap between judicial expectations about the behavior of reasonable investors and behavioral economists' views of investors' cognitive shortcomings.

Barbara Black, *Behavioral Economics and Investor Protection: Reasonable Investors, Efficient Markets*, 44 *LOY. U. CHI. L.J.* 1493, 1496–97 (2013). As a result, Professor Rapp suggests,

Instead of trying to imagine whether a "reasonable" investor cares about a particular piece of information when buying or selling shares (which the reasonable investor rarely does), or looking narrowly at how a stock's price has responded to some piece of information (something that surely has little to do with the actions of "reasonable" investors), courts should recognize that reasonable investors care about very little information. All that *should* matter to an average, ordinary investor is the relationship between a particular stock and the investor's broader investment portfolio. In other

Consider a pictorial analogy. Imagine a group of people each of whom is seated in a red armchair. If we aggregate them the way the market aggregates investors, would we get something that looks like any of them? Or would we get Picasso's cubist portrait of a woman seated in a red armchair?¹⁷ The answer is that we get something that appears more cubist than real. In market aggregation, we can discern human traits, but those traits are often distorted and can change rapidly.

This issue is especially important for the question of whether security market prices provide the best estimate of fundamental values, with the representative investor effectively having the appearance of a sage. Theory suggests not, meaning that the market lacks the wisdom to correctly balance bullishness and bearishness at all times. Nevertheless, at the end of the day, the issue is more empirical than theoretical.

Let me describe some recent work on the empirical question as it relates to the aggregation of risk aversion and judgmental biases. Figure 1, below, is from my current work with Giovanni Barone-Adesi and Lorian Mancini.¹⁸ We use behavioral asset pricing theory to estimate the time series of market risk aversion and judgmental return biases between 2002 and 2009, a period that includes the outbreak of the global financial crisis. Keep in mind that prospect theory indicates that people are risk averse in the domain of gains, but move to become risk seeking in the domain of losses.¹⁹ Now, let me draw your attention to the time series of our estimates of market aversion. At the left of Figure 1, in 2002, the economy was just coming out of recession and risk aversion was low. During the middle of the sample period, when the housing price bubble was at its peak, risk aversion rose significantly. At the right of the figure, when the economy experienced the great recession, risk aversion dropped significantly. This pattern has a distinct prospect theory flavor; it might also be counterintuitive, as most people think that risk aversion soared during the financial crisis, not declined.²⁰ And that leads me to the next issue.

words, only misstatements that go to *that relationship* should meet the current definition of "materiality."

Geoffrey Rapp, *Rewiring the DNA of Securities Fraud Litigation: Amgen's Missed Opportunity*, 44 LOY. U. CHI. L.J. 1475, 1482 (2013).

17. The portrait can be accessed at *About This Artwork*, ART INST. CHI., http://www.artic.edu/aic/collections/citi/images/standard/WebLarge/WebImg_000139/182408_1451715.jpg (last visited Apr. 23, 2013).

18. Giovanni Barone-Adesi, Lorian Mancini & Hersh Shefrin, *A Tale of Two Investors: Estimating Risk Aversion, Optimism, and Overconfidence* (Working Paper, Santa Clara Univ., 2012), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2060983.

19. See generally KAHNEMAN, *supra* note 1, at 278–88 (summarizing prospect theory).

20. See, e.g., LUIGI GUIISO ET AL., TIME VARYING RISK AVERSION (July 2011), available at

FIGURE 1

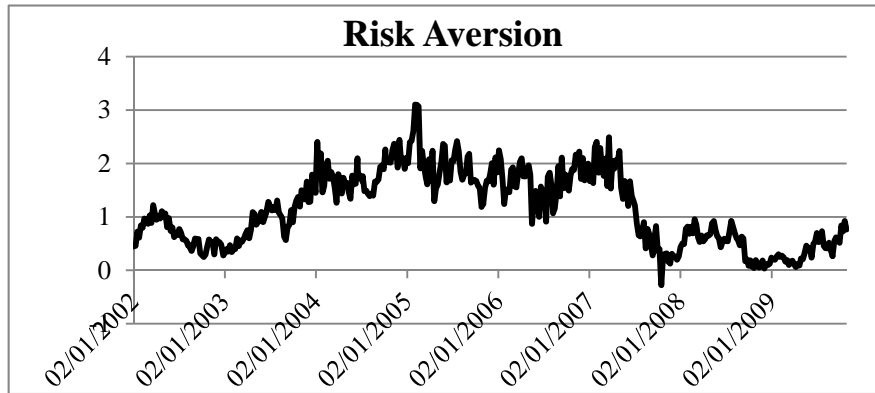
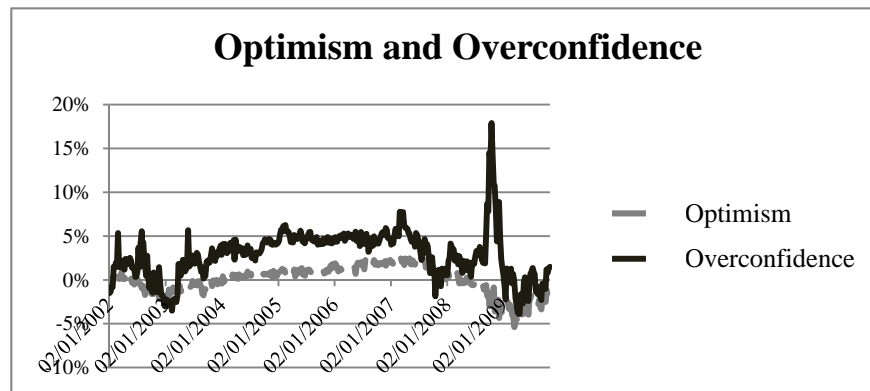


Figure 2 shows the time series for our estimates of excessive optimism and overconfidence during our sample period. The gray curve represents excessive optimism and the black curve represents overconfidence. The figure tells us that optimism and overconfidence soared during the economic expansion and declined dramatically during the financial crisis, becoming transformed into excessive pessimism and underconfidence. So it is true that investors became reluctant to take risks, but because of pessimism and underconfidence, not because of risk aversion.

FIGURE 2



From a legal perspective, the distinction is important when rendering judgments about investor losses. Risk aversion pertains to tastes. From

a neoclassical perspective, acting in a way that is consistent with tastes does not imply a lack of rationality. Investor losses simply reflect bad luck, as compensation for risk bearing is *ex ante* in nature and imbedded in risk premiums, not *ex post* outcomes.

From a behavioral perspective, acting on the basis of biased beliefs typically implies a lack of rationality, in the sense that risk premiums are inappropriate compensation for risk borne. In the absence of biased beliefs, markets are efficient and so risk premiums reflect rational compensation for risk. However, biased beliefs that do not wash out in the aggregate typically lead to risk premiums that do not reflect rational compensation for risk.

III. FAIRNESS AND FINANCE

In 1992, Meir Statman and I wrote a monograph about the role that different concepts of fairness play in the political process that produces financial market regulation.²¹ Examples of how the term “fair” is used are “fair and orderly market” associated with the development of the Securities Exchange Act of 1934²² and the Fair Credit Reporting Act of 2004.²³ The wording in these laws lack precision about how to construe the meaning of “fair,” instead using the term in conjunction with other terms, as in “fair, orderly and efficient market,” “fair and accurate,” “fair and impartial,” “fair and reasonable,” and “unfair and deceptive.”²⁴

We suggested that different concepts of fairness are central to debates and tugs-of-war about the shape of financial market regulation, with the relative strength of different concepts varying over time with the degree to which markets are efficient. Our work on fairness was inspired by the work of Kahneman, who, in collaboration with Jack Knetsch and Richard Thaler, developed a framework for understanding how the concept of fairness acts as a constraint on competitive markets.²⁵ As they pointed out, there are laws against price gouging—even when prices are competitively set to clear markets—because in some

21. HERSH SHEFRIN & MEIR STATMAN, RESEARCH FOUND. OF THE INST. OF FIN. ANALYSTS, ETHICS, FAIRNESS, EFFICIENCY, AND FINANCIAL MARKETS (1992) [hereinafter SHEFRIN & STATMAN, ETHICS].

22. Securities Exchange Act of 1934, Pub. L. No. 73-291, 48 Stat. 881 (codified as amended at 15 U.S.C. §§ 78a–78pp (2006 & Supp. V. 2011)).

23. Fair Credit Reporting Act of 2004, 15 U.S.C. §§ 1681–1681x (2006).

24. See, e.g., 15 U.S.C. § 78(b) (“insure the maintenance of fair and honest markets.”); *id.* § 78k (“fair and orderly markets.”); *id.* § 1681g(f)(8) (“fair and reasonable”); *id.* § 1681(a)(1) (“fair and accurate credit reporting”); *id.* § 1681s(a)(1) (“unfair or deceptive”).

25. See generally Daniel Kahneman, Jack L. Knetsch & Richard Thaler, *Fairness and the Assumptions of Economics*, 59 J. BUS. S285 (1986).

circumstances people perceive equilibrium prices to be unfair and prefer non-price rationing to market clearing.²⁶ This work motivated Meir Statman and me to study how notions of fairness impact financial market regulation, such as requirements pertaining to suitability, margin, trading interruptions, and insider trading. Some of these requirements are clearly paternalistic, and seek to address System 1/System 2 fragilities.

Just as Kahneman, Knetsch, and Thaler sought to identify how people understand fairness in the market and the legal environment for goods and services, Statman and I strove to understand how people understand fairness in the market and legal environment for financial services. We pointed out that political and philosophical differences play a central role in the debates associated with the passage of financial market regulations.²⁷

Some view the concept of maximal liberty/minimal paternalism as defining the notion of a fair market.²⁸ In this view, fair markets prohibit coercion, but little more. A second somewhat stronger view of fairness is one in which it is illegal both to coerce market participants into contracts and for participants to disclose false or fraudulent information. A third definition might require that market participants disclose particular types of information, such as financial statements. Notably, regulations that are intended to make the market fairer by imposing requirements for suitability, margin requirements, and trading interruptions are more paternalistic in character and less libertarian. Adherents to paternalistic notions of fairness view markets as fair when they protect participants from their own ignorance and impulsive inclinations.²⁹ Paternalists will view lightly regulated markets as unfair,

26. *Id.* at S295–S297.

27. SHEFRIN & STATMAN, *ETHICS*, *supra* note 21, at 22–25.

28. See Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism Is Not an Oxymoron*, 70 U. CHI. L. REV. 1159 (2003) (showing how limited influence on choice behavior can improve citizen welfare). *But see* Gregory Mitchell, *Libertarian Paternalism Is an Oxymoron*, 99 NW. U. L. REV. 1245 (opposing Sunstein and Thaler’s viewpoints on paternalism).

29. Margin regulations provide a good example of paternalistically motivated fairness.

Section 7 [of the 1934 Securities Act] specifies the maximum amount of credit that can be advanced to finance the purchase of an individual stock (called initial margin) and allows for the imposition of a maintenance margin. . . .

. . .

In the deliberations leading up to the passage of the 1934 act, three distinct motivations can be seen underlying the regulation of margin—the perceived need to protect investors from their own poor judgment, a desire to limit price volatility induced by low margin requirements, and a desire to allocate credit to productive investment instead of to financial speculation.

Hersh Shefrin & Meir Statman, *Ethics, Fairness and Efficiency in Financial Markets*, 49 FIN.

while libertarians will view heavily regulated markets as unfair.

Statman and I argued that the appeal of different types of fairness for structuring financial market regulation is psychological and depends on recent circumstances.³⁰ During favorable economic conditions, libertarian notions of fairness will attract more adherents (and strength); in the wake of financial crises, paternalistic notions of fairness will gain adherents (and strength).

Legislation is a tug-of-war, in constant motion. During periods of favorable economic conditions and positive market sentiment, the regulatory framework will move to lighter regulations. For example, the Gramm-Leach-Bliley Act of 1999,³¹ which repealed many regulations that were instituted during the 1930s, especially key portions of the Glass-Steagall Act of 1933, was passed during the robust economic expansion of the 1990s. A similar statement applies to the Commodity Futures Modernization Act of 2000,³² which effectively left the derivatives market without regulatory oversight. In the tug-of-war dynamic, deregulation before a crisis leads to heavier regulation after a crisis.³³ A recent example is the Dodd-Frank Act of 2010,³⁴ which was passed in response to the global financial crisis and associated great recession. Both libertarians and paternalists will continue to tug at their ends, but the strength will shift from one side to the other depending on recent events.

Moreover, the tug-of-war will continue even after passage of legislation such as Dodd-Frank, when adherents to different positions fight over interpretation and implementation. A good example features the staffing and funding of the Bureau of Consumer Financial

ANALYSTS J. 21, 25 (1993).

30. See SHEFRIN & STATMAN, ETHICS, *supra* note 21, at 1–14 (discussing how the regulation of markets is an attempt to increase fairness and efficiency).

31. Gram-Leach-Bliley Act, Pub. L. No. 106-102, 113 Stat. 1338 (1999) (codified in scattered sections of 12 U.S.C. and 15 U.S.C. (2006))

32. Commodity Futures Modernization Act of 2000, Pub. L. No. 106-554, 114 Stat. 2763 (codified in scattered sections of 7 U.S.C. (2006)).

33. See, e.g., MATTHEW SHERMAN, CTR. FOR ECON. POLICY & RESEARCH, A SHORT HISTORY OF FINANCIAL DEREGULATION IN THE UNITED STATES (2009), available at <http://www.openthegovernment.org/sites/default/files/otg/dereg-timeline-2009-07.pdf> (discussing transformations in the system of financial regulation that ultimately caused, in part, the 2008 economic downturn). Cf. Hari M. Osofsky, *Multidimensional Governance and the BP Deepwater Horizon Oil Spill*, 63 FLA. L. REV. 1077, 1121–35 (proposing various government responses to regulate offshore drilling after the 2010 BP oil spill disaster).

34. Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010). See generally Umang Desai, *Crying Foul: Whistleblower Provisions of the Dodd-Frank Act of 2010*, 43 LOY. U. CHI. L.J. 427, 447 & nn.136–40 (2012) (providing background on Dodd-Frank in the wake of the 2008 financial crisis).

Protection, which was created by Dodd-Frank.³⁵ The original idea for the Bureau came from then Harvard Law School Professor Elizabeth Warren.³⁶ Because of her strong opinions and skills, President Obama planned to nominate Warren to be the first permanent head of the Bureau.³⁷ However, her nomination was fiercely opposed by Republicans, who resisted the Bureau being headed by a strong leader, and as a result she was never formally nominated.³⁸

IV. THE PLANNING FALLACY

Finally, Danny's work on curriculum development in Israel led him to develop the concept of "the planning fallacy."³⁹ This concept lies at the heart of the behavioral approach to capital budgeting that I cover in *Behavioral Corporate Finance*.⁴⁰ Danny and Amos developed this concept when working on a new curriculum with their Dean.⁴¹ The Dean knew it normally takes at least seven years to develop a new curriculum, but for some reason suggested they could do it in about two years. Why? It seems to be human nature to be excessively optimistic when planning.⁴² As Daniel Kahneman puts it, "[P]eople who have information about an individual case rarely feel the need to know the statistics of the class to which the case belongs."⁴³ Likewise, experience taught the project planners at Iridium, Microsoft, Boeing, and the Massachusetts Turnpike Authority that major projects typically

35. Dodd-Frank Act §§ 1011–13, 1017, 124 Stat. at 1964–73, 1975–79.

36. See Elizabeth Warren, *Unsafe at Any Rate*, DEMOCRACY, Summer 2007, available at <http://www.democracyjournal.org/5/6528.php?page=all>.

37. Warren stayed onboard in an advisory role. See Press Release, White House, Office of the Press Sec'y, President Obama Names Elizabeth Warren Assistant to the President and Special Advisor to the Secretary of the Treasury on the Consumer Financial Protection Bureau (Sept. 17, 2010), available at <http://www.whitehouse.gov/the-press-office/2010/09/17/president-obama-names-elizabeth-warren-assistant-president-and-special-a>. In 2012, Warren was elected to the U.S. Senate in Massachusetts.

38. Katharine Q. Seelye, *A New Senator, Known Nationally and Sometimes Feared*, N.Y. TIMES, Nov. 10, 2012, at A33.

39. See generally KAHNEMAN, *supra* note 1, at 249–52 (discussing the planning fallacy). For more information on the planning fallacy, see Avishalom Tor, *The Fable of Entry: Bounded Rationality, Market Discipline, and Legal Policy*, 101 MICH. L. REV. 482, 511 & nn.114–16 (2002).

40. HERSH SHEFRIN, *BEHAVIORAL CORPORATE FINANCE* (2006).

41. See David Brooks, *The Planning Fallacy*, N.Y. TIMES, Sept. 15, 2011, at A29. For a video of Daniel Kahneman explaining this story, see *A Short Course in Thinking About Thinking*, EDGE, http://www.edge.org/3rd_culture/kahneman07/kahneman07_index.html (last visited Apr. 9, 2013).

42. See Brooks, *supra* note 41 ("Most people overrate their own abilities and exaggerate their capacity to shape the future. That's fine. Optimistic people rise in this world. The problem comes when these optimists don't look at themselves objectively from the outside.")

43. KAHNEMAN, *supra* note 1, at 249.

take much longer and cost much more than they originally expected.⁴⁴ Moreover, the decision makers at these firms all had previous experience with projects being late and over budget, yet failed to adjust their forecasts for future projects. That is, they all experienced the planning fallacy—the “unknown unknowns.”⁴⁵

Recently, the media has reported stories about problems besetting Boeing's newest airplane, the 787 Dreamliner. In September 2011, three years overdue and billions of dollars over budget, Boeing began to deliver the 787 to Japan's All Nippon Airways and shortly thereafter to Japan Airlines.⁴⁶ United Airlines began to fly the 787 in 2012.⁴⁷

Although plagued by delays, the 787 held the promise of revolutionizing air travel. It still does.⁴⁸ Now that the 787 is in operation, however, major problems have surfaced. In December 2012, a United Airlines 787 traveling from Houston to Newark experienced mechanical problems and had to be diverted to New Orleans.⁴⁹ In January 2013, a Japan Airlines flight from Boston to Tokyo was forced to abort its takeoff after a pilot on another airplane noticed the 787 leaking fuel.⁵⁰ During the same month, a maintenance worker at Boston's Logan Airport discovered an electrical fire aboard an empty

44. See Jacob Silverman, *10 Construction Projects That Broke the Bank*, HOWSTUFFWORKS, <http://science.howstuffworks.com/engineering/structural/10-construction-projects.htm> (last visited Apr. 22, 2013). See also Ann Morales Olazábal, *Behavioral Science and Scierter in Class Action Securities Fraud Litigation*, 44 LOY. U. CHI. L.J. 1423, 1428 (2013) (“[A]s Langevoort points out, executives' commitment to failing projects or initiatives is likely to cause them to take larger and larger risks to avoid having to reverse course, either publicly or privately.” (citing Donald C. Langevoort, *Organized Illusions: A Behavioral Theory of Why Corporations Mislead Stock Market Investors (and Cause Other Social Harms)*, 146 U. PA. L. REV. 101, 142–43 & nn.146–47 (1997))).

45. KAHNEMAN, *supra* note 1, at 248.

46. Press Release, Boeing, Boeing, ANA Celebrate First 787 Dreamliner Delivery (Sept. 26, 2011), available at <http://boeing.mediaroom.com/index.php?s=43&item=1939>; Press Release, Boeing, Boeing Celebrates Deliver of Japan Airlines' First Two 787 Dreamliners (Mar. 26, 2012), available at <http://boeing.mediaroom.com/index.php?s=43&item=2186>.

47. Gregory Karp, *United Takes Delivery of First Dreamliner*, CHI. TRIB. (Sept. 24, 2012), http://articles.chicagotribune.com/2012-09-24/news/chi-united-takes-delivery-of-first-dreamliner-20120924_1_first-north-american-airline-dreamliners-larger-overhead-bins.

48. See Ben Mutzabaugh, *First Dreamliner Passengers Sing New Jet's Praises*, USA TODAY (Oct. 28, 2011), <http://travel.usatoday.com/flights/story/2011-10-27/First-Dreamliner-passengers-sing-new-jets-praises/50963896/1>; Natalie V. Osipova, *On a Plane of the Future*, N.Y. TIMES (Nov. 30, 2012), <http://www.nytimes.com/video/2012/11/30/travel/10000001931843/on-a-plane-of-future.html?ref=787dreamliner>.

49. Peter Cohan, *Can Boeing Contain the Dreamliner's Glitches?*, FORBES (Dec. 6, 2012), <http://www.forbes.com/sites/petercohan/2012/12/06/can-boeing-contain-the-dreamliners-technical-glitches/>.

50. Tom Gara, *Boeing Has Another Dreamliner Mishap: Fuel Leak in Boston*, WALL ST. J. (Jan. 8, 2013), <http://blogs.wsj.com/corporate-intelligence/2013/01/08/boeing-has-another-dreamliner-mishap-fuel-leak-in-boston/>.

Japan Airlines 787.⁵¹ The electrical fire was linked to a new type of battery in the 787.⁵² The 787 uses a lithium-ion battery system, which is the most extensive of its kind, while other airline battery systems are mostly powered by heavier nickel-cadmium cells. Soon after these incidents, U.S. and Japanese authorities ordered airlines to stop flying their Boeing 787s until they can show that the fire risk linked to the Dreamliners' battery failures has been quelled.⁵³ All Nippon Airways, Japan Airlines, and United Airlines grounded their 787 fleets while the National Transportation Safety Board (NTSB) investigated, a process that took several months.

Excessive optimism and overconfidence are central features of the planning fallacy. Disappointment is the typical consequence of being excessively optimistic, and surprise is the typical consequence of being overconfident. Initial reaction to the battery incidents was that it is normal for new aircraft to have problems during their first year of flight. Some described the incidents as "teething problems."⁵⁴ However, the NTSB was unable to identify a simple reason for the overheating of the lithium-ion battery, leading some to revise their opinions and suggest that the delay might be much longer than expected. Disappointment and surprise grew. Boeing officials had succumbed to the planning fallacy.

Excessive optimism and overconfidence can lead people to take unwarranted risks, as can the aversion to accepting a sure loss. In combination, these phenomena can prove fatal. For example, pharmaceutical firms facing the expiration of patents on blockbuster drugs are prone to taking imprudent safety risks in respect to introducing new drugs.⁵⁵ Notably, safety risks impact the health of

51. Tom Gara, *Boeing Dreamliner Battery Explodes, Airlines Watching Closely*, WALL ST. J. (Jan. 7, 2013), <http://blogs.wsj.com/corporate-intelligence/2013/01/07/boeing-dreamliner-battery-explodes-airlines-watching-closely/>.

52. W.J. Hennigan, *Boeing Says Planned 787 Dreamliner Battery Fixes Rid Fire Risk*, L.A. TIMES (Mar. 14, 2013, 8:51 PM), <http://www.latimes.com/business/money/la-fi-mo-boeing-dreamliner-fix-no-fire-20130314,0,1107134.story>.

53. *Id.* On Friday, April 22, 2013, the U.S. FAA approved Boeing's plans to install modifications to reduce the risk of fire for the Dreamliner's lithium-ion batteries. Nicola Clark, *Boeing Begins Modifying 787 Batteries*, N.Y. TIMES (Apr. 22, 2013), http://www.nytimes.com/2013/04/23/business/global/boeing-begins-modifying-787-batteries.html?_r=0.

54. Hiroko Tabuchi & Bettina Wassener, *Deepening Crisis for the Boeing 787*, N.Y. TIMES (Jan. 16, 2013), <http://www.nytimes.com/2013/01/17/business/global/deepening-crisis-for-the-dreamliner.html> ("Last week, Akbar Al Baker, the Qatar Airways chief executive, played down the recent string of Dreamliner incidents as 'teething issues with various components' and expressed confidence that Boeing would resolve any problems.").

55. See Hersh Shefrin, *Behavioral Corporate Finance*, 14 J. APPLIED CORP. FIN. 113, 117-18 (2001) (describing the case of Syntex Corporation, a pharmaceutical company, who developed

subjects and patients, not just the firms' bottom lines, which has serious ramifications for the legal issue of recklessness.

A case in point is the pharmaceutical firm Merck, which in 2004 withdrew its painkiller Vioxx from the market for side effects, including strokes and heart attacks. As a result, the company faced a series of suits for recklessly selling Vioxx, despite having knowledge of the risks, which it settled with plaintiffs for \$4.85 billion. As I pointed out in *Behavioral Corporate Finance*, Merck made its marketing decisions about Vioxx at a time when five of its blockbuster drugs were about to go off patent, thereby making the firm susceptible to aversion to a sure loss.⁵⁶

V. APPLICATIONS OF BEHAVIORAL FINANCE TO LAW

The study of all four of the topics above begins with Kahneman's insights, as do so many others in behavioral economics and finance. This Part briefly discusses some implications of behavioral finance for three additional legal issues in the securities fraud context: fraud-on-the-market, the fiduciary responsibility of financial advisers, and recklessness.

In practice, the notion of fraud-on-the-market facilitates the filing of class actions in cases of alleged security fraud.⁵⁷ It does so by providing plaintiffs with a means to argue that all participants to the class action relied in common on the misrepresentation or omission of information by the defendant.⁵⁸ The basis for the "reliance" argument is the presumption of market efficiency—i.e., that prices correctly reflect all information.⁵⁹ The behavioral position that markets cannot be

Enprostil, a stomach ulcer drug that showed negative side effects in lab trials, to offset the expiration of the patent on its other major drug, Naprosyn).

56. See SHEFRIN, *BEHAVIORAL CORPORATE FINANCE*, *supra* note 40, ch. 1. See also Matthew Herper, *Merck Could Return to Greatness if CEO Can Leave His Past Behind*, FORBES, May 6, 2013, <http://www.forbes.com/sites/matthewherper/2013/04/17/merck-could-return-to-greatness-if-ceo-can-leave-his-own-past-behind/>.

57. *Amgen Inc. v. Conn. Ret. Plans & Trust Funds*, 133 S. Ct. 1184, 1193 (2013); *Basic Inc. v. Levinson*, 485 U.S. 224, 245–46 (1988). See also William W. Bratton & Michael L. Wachter, *The Political Economy of Fraud on the Market*, 160 U. PA. L. REV. 69, 82 (2011) ("Fraud on the market under Rule 10b-5 takes the common law tort of misrepresentation from face-to-face dealings to faceless markets, remaking it into a vehicle for class action litigation against those who makes false and misleading statements about publicly traded securities.").

58. See *Amgen*, 133 S. Ct. at 1192–93.

59. As the *Amgen* court explained:

This presumption springs from the very concept of market efficiency. If a market is generally efficient in incorporating publicly available information into a security's market price, it is reasonable to presume that a particular public, material misrepresentation will be reflected in the security's price. Furthermore, it is reasonable to presume that most investors—knowing that they have little hope of outperforming

counted on to be efficient raises the question of whether fraud-on-the-market is built on a foundation of sand.

In a behavioral framework, prices need not correctly reflect all information, or indeed reflect some information at all. Unlike the neoclassical approach, which argues that risk arbitrage by smart money investors will quickly eliminate pricing inefficiencies,⁶⁰ the behavioral approach features limits to arbitrage. As a result, the behavioral framework potentially strikes at the heart of the fraud-on-the-market approach to class action certification in securities fraud litigation.

Behavioral asset pricing theory provides analytical results for the manner in which equilibrium prices aggregate the biases of market participants.⁶¹ In this respect, the neoclassical framework is effectively a special case of the behavioral framework, and obtains, for example, when the aggregate biases are zero. Because behavioral asset pricing theory extends neoclassical asset pricing theory, the behavioral approach provides frameworks for pricing bonds, stocks, and derivatives. Likewise, the behavioral approach provides frameworks for mean-variance portfolios, pricing kernels, factor structures, and factor loadings (the analogues of capital asset pricing model (CAPM) beta).

Behavioral asset pricing theory leads to the hypothesis that the composition of behavioral mean-variance portfolios is more complex and more volatile than the composition of their neoclassical counterparts. Empirical applications of behavioral asset pricing theory confirm this hypothesis.⁶² This makes it much more difficult to rely on stable factor structures to price securities.

The legal system will eventually confront the mounting evidence against market efficiency in respect to fraud-on-the-market. In doing so, the question will arise as to how serious are deviations from efficiency in respect to “reliance.” This approach will require both a

the market in the long run based solely on their analysis of publicly available information—will rely on the security’s market price as an unbiased assessment of the security’s value in light of all public information. Thus, courts may presume that investors trading in efficient markets indirectly rely on public, material misrepresentations through their “reliance on the integrity of the price set by the market.”

Id. (quoting *Basic*, 485 U.S. at 245).

60. See Alon Brov & J.B. Heaton, *Market Indeterminacy*, 28 J. CORP. L. 517, 533–35 (2003).

61. Hersh Shefrin & Meir Statman, *Behavioral Capital Asset Pricing Theory*, 29 J. FIN. & QUANTITATIVE ANALYSIS 323, 325–26 (1994).

62. *Id.* at 341–43. See, e.g., Joshua Rosenberg & Robert Engle, *Empirical Pricing Kernels*, 64 J. FIN. ECON. 341 (2002).

measurement for degree of inefficiency⁶³ and a close examination of what behavioral asset pricing models suggest about the manner in which markets aggregate information. To say that markets reflect information is vacuous. The real issue is the degree to which the information is efficiently aggregated. The behavioral aggregation issues are sufficiently complex that there is reason to doubt that participants to a security class action rely equally on the information impounded into market prices.⁶⁴

Consider next issues of suitability associated with fiduciary responsibilities for financial advisors.⁶⁵ When markets are efficient, most investors would be well advised to choose well-diversified portfolios and to limit their trading in order to avoid unnecessary transaction costs. As Professor Rapp notes, the “reasonable or rational investor does not place orders based on individual pieces of information about stocks. Any individual stock is selected based only on its relationship to the portfolio as a whole. ‘Stand-alone’ characteristics of individual investments matter only in relation to the portfolio.”⁶⁶

However, what are the implications for being well advised in a behavioral setting when market distortions allow for mispriced securities? In a behavioral setting, does it make sense for advisors to recommend that investors hold concentrated portfolios and trade frequently?

Market biases, such as excessive optimism and overconfidence, imply the mispricing of some asset classes, in the sense that prices do not coincide with fundamental value. In theory, when markets are inefficient, it is possible for sufficiently smart investors to exploit mispricing and earn positive, abnormal returns. Indeed, the efficient market position is that smart investors will do so, and in the course of doing so, will quickly restore efficiency.⁶⁷ For this reason,

63. Rajeev R. Bhattacharya and Stephen Jerome O'Brien have developed a procedure to estimate the degree of inefficiency in the prices of particular securities. See *Arbitrage Risk and Market Inefficiency* (Seventh Annual Conference on Empirical Research, Working Paper), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2099241. In their framework, efficiency is defined relative to the CAPM.

64. For a summary of *Basic's* rebuttable presumption of classwide reliance, see *In re Countrywide Fin. Corp. Sec. Litig.*, 273 F.R.D. 586, 609–10 (C.D. Cal. 2009).

65. The responsibilities of security brokers to their clients are governed by suitability rules. Although not explicitly specified within the Securities Exchange Act of 1934, such rules have been developed through FINRA (the Financial Industry Regulatory Authority, formerly the National Association of Securities Dealers (NASD)) and the exchanges themselves. See generally Arthur B. Laby, *Fiduciary Obligations of Broker-Dealers and Investment Advisors*, 55 VILL. L. REV. 701, 716–42 (2010).

66. Rapp, *supra* note 16, at 1482.

67. See Bradford Cornell & James C. Rutten, *Market Efficiency, Crashes, and Securities*

inefficiencies will be small and short-lived. The behavioral position is that prices move to their fundamental values in the long-run, but not necessarily in the short-run. Therefore, in the short-run, differences between prices and fundamental values can be large.

The question then becomes: if some securities are mispriced, would investors be well advised to seek to exploit the inefficiencies in the pursuit of a positive abnormal return? The answer is that it depends. Investors who are truly smart will understand that attempting to exploit price-value gaps brings with it exposure to sentiment risk as well as fundamental risk. A critical aspect of sentiment risk is that mispricing widens before it narrows, with liquidity issues forcing arbitrageurs to close out their positions at losses. This additional source of risk induces smart investors to avoid taking excessive positions, effectively limiting their arbitrage activities. In other words, limits to arbitrage can serve to keep prices from quickly moving to fundamental values.

Because of psychological pitfalls, truly smart investors might be few and far between.⁶⁸ Just because price and value differ does not mean that investors can easily exploit the price-value gap. If anything, doing so is difficult, because it means overcoming psychological pitfalls. Kahneman has taught us that these pitfalls are hardwired into our brains and difficult to circumvent.⁶⁹ Kahneman puts it like this:

Financial advising is a prescriptive activity whose main objective should be to guide investors to make decisions that best serve their interests. To advise effectively, advisors must be guided by an accurate picture of the cognitive and emotional weaknesses of investors that relate to making investment decisions: their occasionally faulty assessment of their own interests and true wishes, the relevant facts that they tend to ignore, and the limits of their ability to accept advice and to live with the decisions they make.⁷⁰

Despite the existence of market inefficiencies, behavioral economists largely recommend that most investors would be financially better off to choose portfolios *as if* markets are efficient.⁷¹ This means holding well-

Litigation, 81 TUL. L. REV. 443, 455–58 (2006).

68. For information on such pitfalls, see generally LARRY E. SWEDROE & RC BALABAN, INVESTMENT MISTAKES* EVEN SMART INVESTORS MAKE: *AND HOW TO AVOID THEM (2012); Donald C. Langevoort, *Chasing the Greased Pig Down Wall Street: A Gatekeeper's Guide to the Psychology, Culture, and Ethics of Financial Risk Taking*, 96 CORNELL L. REV. 1209 (2011); Lawrence A. Cunningham, *Behavioral Finance and Investor Governance*, 59 WASH. & LEE L. REV. 767 (2002).

69. See generally Daniel Kahneman & Mark W. Riepe, *Aspects of Investor Psychology*, 24 J. PORTFOLIO MGMT. 52 (1998).

70. *Id.*

71. See generally MEIR STATMAN, WHAT INVESTORS REALLY WANT: KNOW WHAT DRIVES INVESTOR BEHAVIOR AND MAKE SMARTER FINANCIAL DECISIONS (2010)

diversified portfolios in order to mitigate exposure to sentiment risk and, for that matter, fraud-on-the-market.⁷² Empirical behavioral asset pricing analysis suggests that at times the magnitude of sentiment risk is large, and comparable to the magnitude of fundamental risk.⁷³ In this regard, the large systemic risk created in the lead up to the global financial crisis was manufactured by biases more than by fundamental factors.

There is a two-sided coin here. One side of the coin displays investors actively trading financial securities on the basis of biased beliefs. The other side of the coin displays an inefficient financial market. Psychological forces are so strong that many investors resist the combined neoclassical-behavioral advice about refraining from active trading in an attempt to beat the market.

Of course, the laws of probability tell us that some investors will be lucky. Some lottery players do actually win the lottery, and some investors will beat the market for an extended period of time, even if they are not especially smart. By the same token, many others will underperform in the market. Indeed, their biases and heuristics will lead them to assign blame to other causes for their losses, meaning causes other than their own misguided actions. Doing so helps to reduce the psychological pain of regret. It also offers an opportunity to recapture a portion of their losses through legal action. At some point, courts will have to confront the question of whether the legal system effectively encourages excessive trading, because of the manner in which it deals with cases involving fraud-on-the-market, or the absence of sufficiently strong suitability rules.

Finally, consider the issue of recklessness. In a legal setting, a person accused of recklessness has taken risks that jeopardized the safety of others to such a degree that the accused is allegedly a social danger.⁷⁴

72. Cf. William J. Carney, *The Limits of the Fraud on the Market Doctrine*, 44 BUS. LAW. 1259, 1278–79 (1989) (“The only choice for investors who lack the resources to perform superior research is to select the level of market risk they are willing to accept in a diversified portfolio. The only relevant risk is that of the market.”). As Carney well states, “[o]rdinary investors reap no rewards from bearing the added risks of putting all their eggs in one basket; since diversification, which eliminates non-systematic risk, is available, *no premium is available for bearing that risk.*” *Id.* at 1279 n.101 (emphasis added).

73. See Hersh Shefrin, *Risk and Return in Behavioral SDF-Based Asset Pricing Models*, 6 J. OF INVESTMENT MGMT. 1, 6–15 (2008).

74. The Seventh Circuit has aptly defined recklessness in the context of Rule 10b-5:

[R]eckless conduct may be defined as a highly unreasonable omission, involving not merely simple, or even inexcusable negligence, but an extreme departure from the standards of ordinary care, and which presents a danger of misleading buyers or sellers that is either known to the defendant or is so obvious that the actor must have been aware of it.

Typically a person accused of recklessness was aware of the potential risks, and while he or she did not mean for harm to occur to others, still chose to disregard those risks in acting as he or she did.⁷⁵

With respect to recklessness in corporate decision making, studies in behavioral finance point to excessive optimism, overconfidence, aversion to a sure loss, and confirmation bias as key drivers of high risk decisions.⁷⁶ One of the key lessons of behavioral corporate finance is the importance of distinguishing agency costs and behavioral costs.⁷⁷ Although both agency costs and behavioral costs involve misaligned incentives between owners and managers, the treatment for each is different. For agency conflicts, the treatment is to restructure incentives. For behavioral conflicts, the treatment is debiasing and training.

As Kahneman keeps reminding us, debiasing is a huge challenge, a lesson to keep in mind as we grapple with the question of how to structure the law in order to address corporate recklessness.⁷⁸ The legal system addresses liability from recklessness by weighing subjective factors and objective factors. Subjective factors pertain to the intent of the accused,⁷⁹ while objective factors pertain to what a reasonable person might be expected to do in a similar situation with similar resources.⁸⁰ In this regard, recklessness features less culpability than

Sundstrand Corp. v. Sun Chem. Co., 553 F.2d 1033, 1045 (7th Cir. 1977) (citation omitted).

75. See SEC v. Lyttle, 538 F.3d 601, 603 (7th Cir. 2008) (describing the requisite scienter for Rule 10b-5 fraud as: “[D]efendants either knew that the representations they made to the investors were false or were reckless in disregarding a substantial risk that they were false”). Other courts have described recklessness disregard as “conscious recklessness—i.e., a state of mind approximating actual intent, and not merely a heightened form of negligence.” S. Cherry St., LLC v. Hennessy Grp. LLC, 573 F.3d 98, 109 (2d Cir. 2009) (citation omitted).

76. See SHEFRIN, BEHAVIORAL CORPORATE FINANCE, *supra* note 40, ch. 1; Edward Teach, *What Lies Behind Those “Rational” Decisions*, CFO MAG. (Sept. 1, 2006), http://www.cfo.com/article.cfm/7851781/c_7873404. Loss aversion describes the tendency for “losses to loom larger than gains.” KAHNEMAN, *supra* note 1, at 284. For an historical overview of loss aversion and its relationship to the legal field, see Eyal Zamir, *Loss Aversion and the Law*, 65 VAND. L. REV. 829 (2012). The confirmation bias indicates when “decision makers examine evidence expected to confirm [a] hypothesis rather than evidence that could disconfirm [a] hypothesis.” Gretchen B. Chapman & Eric J. Johnson, *Incorporating the Irrelevant: Anchors in Judgments of Belief and Value*, in HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT 120, 133 (Thomas Gilovich et al. eds., 2002).

77. Shefrin, *Behavioral Corporate Finance*, *supra* note 55, at 113, 117, 119.

78. See generally Baruch Fischhoff, *Debiasing*, in JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 422 (Daniel Kahneman et al. eds., 1982).

79. See *In re Smith & Wesson Holding Corp. Sec. Litig.*, 669 F.3d 68, 77 (1st Cir. 2012) (“Scienter . . . [requires] evidence of subjective bad intent, or, alternatively, misstatements or omissions so blatantly improper that bad intent or recklessness can be inferred.” (citations omitted)).

80. See *In re VeriFone Holdings, Inc. Sec. Litig.*, 704 F.3d 694, 702 (9th Cir. 2012)

intention, but more culpability than criminal negligence. Notably, natural biases make it more difficult to make operational what a reasonable person would do, as reasonable people are subject to psychological pitfalls, such as excessive optimism, overconfidence, and confirmation bias. As Professor Black observes, “Behavioral economists . . . do not observe real people investing in today’s markets behaving as the reasonable investors that federal securities laws expects them to be.”⁸¹ The solution may be that investors need more protection: protection from both their own cognitive mistakes and from predatory actions in the market that “exploit the laziness of System 2.”⁸²

Think back to the fire hazard associated with the batteries used in the new 787 airliner. Suppose a fire had broken out during a 787 flight and caused major injuries, if not loss of life. Would Boeing executives be charged with recklessness because of the planning fallacy?

When I wrote *Ending the Management Illusion*, I analyzed the corporate culture at energy firm BP.⁸³ The analysis led me to conclude that BP had a weak corporate culture that featured excessive cost cutting, excessive risk taking, and actions that were environmentally detrimental despite the firm’s public relations message that it was environmentally friendly. Two years after the publication of my book, BP’s oil drilling activities in the Gulf of Mexico produced the worst environmental disaster in the history of the United States. The report to the President by the committee charged with investigating the oil spill disaster concluded that BP’s risk management culture was highly problematic, and that BP was overly focused on cost cutting that led it to take excessive risk.⁸⁴ In September 2012, the Justice Department accused BP of gross negligence and a “culture of corporate recklessness” in a federal court filing.⁸⁵ A major civil trial continues in New Orleans.⁸⁶

(“[R]eckless conduct . . . presents a danger of misleading buyers or sellers that is either known to the defendant or is so obvious that the actor must have been aware of it. . . . [T]he danger of misleading buyers must be actually known or so obvious that *any reasonable man would be legally bound as knowing*” (first, third, and fourth alteration in original) (citations omitted)).

81. Black, *supra* note 16, at 1496.

82. Daniel Kahneman, *Behavioral Economics and Investor Protection: Keynote Address*, 44 *LOY. U. CHI. L.J.* 1333, 1340 (2013).

83. See Hersh Shefrin, *Ending the Management Illusion: How to Drive Business Results Using the Principles of Behavioral Finance* 93–96 (2008).

84. See NAT’L COMM. ON THE BP DEEPWATER HORIZON OIL SPILL & OFFSHORE DRILLING, *DEEP WATER: THE GULF OIL DISASTER AND THE FUTURE OF OFFSHORE DRILLING* (2011).

85. Ed Crooks, *US Accuses BP of Gross Negligence over Spill*, *FIN. TIMES*, <http://www.ft.com/cms/s/0/27327240-f6c9-11e1-827f-00144feabdc0.html#axzz2QgNUuUaI> (last updated Sept. 5, 2012, 9:17 AM).

86. Richard Thompson, *BP Oil Spill Trial Continues as Demonstrators Note Upcoming 3-*

In my book, I suggested that excessive optimism, overconfidence, confirmation bias, and aversion to a sure loss permeated BP's decisions.⁸⁷ With respect to recklessness, how should the legal system deal with corporate actions stemming from corporate cultures that nourish psychological pitfalls? It comes back to intent and reasonableness. There is no evidence of ill intent on the part of BP's managers. But did they act reasonably in their Gulf of Mexico drilling activities? Ex ante people prone to psychological pitfalls often do not see unreasonable risks as being unreasonable. My view is that BP's decisions in the Gulf were consistent with a problematic culture with deep roots that fostered taking unreasonable risks. These roots extend to BP's operations in Texas and Alaska and involve a major explosion at its Texas City refinery in 2005 that killed fifteen people,⁸⁸ the largest leaks in its Alaska pipeline in 2006 and 2010,⁸⁹ and a large string of serious OSHA violations in the period 2008 through 2010.⁹⁰

CONCLUSION

The behavioral perspective stemming from Kahneman's insights raises critical issues for the theory and practice of law. There is already considerable behavioral literature on fairness and financial market regulation. Issues of fraud-on-the-market, fiduciary responsibility of financial advisors, and recklessness are primary examples of areas ripe for the application of behavioral ideas.

As a general matter, my recommendation is that the legal system utilize the concept of recklessness to foster incentives that encourage organizations to cultivate cultures that mitigate vulnerability to psychological biases. Organizations with healthy risk management cultures recognize unreasonable risks as unreasonable. At its core, healthy risk management culture requires that the general counsel and the chief risk management officer both be behaviorally literate and both be on the same behavioral page. Debiasing is difficult, and the legal system can urge organizations to recognize vulnerability to psychological pitfalls by name, and take steps to deal with them. Courts

Year Anniversary of Disaster, TIMES-PICAYUNE (Apr. 16, 2013, 7:03 PM), http://www.nola.com/news/gulf-oilspill/index.ssf/2013/04/bp_oil_spill_draws_demonstrato.html.

87. SHEFRIN, *ENDING THE MANAGEMENT ILLUSION*, *supra* note 83, at 93–96.

88. Steven Greenhouse, *BP Faces Record for '05 Refinery Explosion*, N.Y. TIMES, Oct. 30, 2009, at B1.

89. Margaret Cronin Fisk & Amanda Coyne, *BP Pipeline Rupture May Force It to Pay More for 2006 Spill*, BLOOMBERG (Nov. 29, 2011, 8:56 PM), <http://www.bloomberg.com/news/2011-11-29/bp-pipeline-rupture-may-force-company-to-pay-more-for-2006-spill.html>.

90. See Pierre Thomas et al., *BP's Dismal Safety Record*, ABC NEWS (May 27, 2010), <http://abcnews.go.com/WN/bps-dismal-safety-record/story?id=10763042#.UXc5ZbU4tI4>.

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have a bully pulpit.

This recommendation for recklessness mirrors the recommendation I made earlier with respect to fraud-on-the-market. In its current form and implementation, my sense is that fraud-on-the-market encourages excessive trading and legal settlements based on unwarranted assumptions about market efficiency. Instead of assuming that market efficiency is the base case, with legal action required to redress departures from efficiency, courts can use their bully pulpit. Specifically, they can explicitly articulate the behavioral position to discourage excessive trading, let alone provide restitution for investors whose losses stem from excessive trading and the acceptance of sentiment-based risk that proponents of the efficient market position downplay, if not outright deny.