

REGULATING COMPLACENCY: HUMAN LIMITATIONS AND LEGAL EFFICACY

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This Article examines how insights into limited human rationality can improve financial regulation. The Article identifies four categories of limitations—herd behavior, cognitive biases, overreliance on heuristics, and a proclivity to panic—that undermine the perfect-market regulatory assumptions that parties have full information and will act in their rational self-interest. The Article then analyzes how insights into these limitations can be used to correct resulting market failures. Requiring more robust disclosure and due diligence, for example, can help to reduce reliance on misleading information cascades that motivate herd behavior. Debiasing through law, such as requiring more specific, poignant, and concrete disclosure of risks and their consequences, can help to correct cognitive biases. Requiring firms to engage in more self-aware operational risk management and reporting can reduce the likelihood that parties will over-rely on heuristics. And legislating backstop market liquidity and other stabilizing controls can help to minimize panics. Regulation, however, can only partly overcome these limitations. Effective financial regulation should therefore be designed not only to address these limitations but also to try to mitigate the harm of inevitable financial failures.

| | |
|--------------------------------------------------------------------|------|
| INTRODUCTION | 1074 |
| I. TAXONOMY OF COMPLACENCY | 1077 |
| A. <i>Herd Behavior</i> | 1077 |
| B. <i>Cognitive Biases</i> | 1079 |
| C. <i>Over-reliance on Heuristics</i> | 1080 |
| D. <i>Proclivity to Panic</i> | 1082 |
| II. COMPLACENCY AS A TRIGGER OF FINANCIAL MARKET FAILURES | 1083 |
| A. <i>Herd Behavior and Market Failures</i> | 1083 |
| B. <i>Cognitive Biases and Market Failures</i> | 1085 |
| C. <i>Over-reliance on Heuristics and Market Failures</i> | 1086 |

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| | |
|-----------------------------------------------------------|------|
| D. <i>Proclivity to Panic and Market Failures</i> | 1086 |
| III. REGULATING COMPLACENCY | 1087 |
| A. <i>Regulating Herd Behavior</i> | 1088 |
| B. <i>Regulating Cognitive Biases</i> | 1091 |
| C. <i>Regulating Over-reliance on Heuristics</i> | 1094 |
| D. <i>Regulating the Proclivity to Panic</i> | 1097 |
| IV. ADDRESSING THE INEVITABLE FAILURES | 1098 |
| CONCLUSION | 1099 |
| APPENDIX: COMPENDIUM OF POTENTIAL REGULATORY IMPROVEMENTS | 1101 |
| A. <i>Regulating Herd Behavior</i> | 1101 |
| B. <i>Regulating Cognitive Biases</i> | 1101 |
| C. <i>Regulating Over-reliance on Heuristics</i> | 1102 |
| D. <i>Regulating the Proclivity to Panic</i> | 1103 |

INTRODUCTION

Our limitations as human beings impose critical constraints on the efficacy of law. In a law school seminar in legislation, my professor would frequently remind the class that laws will always be implemented imperfectly because we are human.¹

Since the 1970s, the field of behavioral psychology has been exploring limitations on human rationality.² Herbert Simon first outlined the theory of “bounded rationality,”³ which posits that we cannot access and process all the information needed to maximize our benefit. The human mind therefore “necessarily restricts itself” by relying on cognitive shortcuts.⁴ Around that time, psychologists Daniel Kahneman and Amos Tversky began researching the sources of bounded rationality and resulting cognitive errors.⁵ They used the term “prospect theory” to describe their “attempt to articulate some of the principles of perception and judgment that limit the rationality of choice.”⁶ Among other things, they found that people frequently make deci-

1 Frank P. Grad, Joseph P. Chamberlain Professor of Legislation, Seminar in Legislation at Columbia Law School.

2 See Joshua D. Wright & Judd E. Stone II, *Misbehavioral Economics: The Case Against Behavioral Antitrust*, 33 *CARDOZO L. REV.* 1517, 1530 (2012).

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

4 *Herbert Simon*, *ECONOMIST* (Mar. 20, 2009), <http://www.economist.com/node/13350892>; see also Wright & Stone, *supra* note 2, at 1530.

5 David Z. Hambrick & Alexander P. Burgoyne, Opinion, *The Difference Between Rationality and Intelligence*, *N.Y. TIMES* (Sept. 16, 2016), <http://www.nytimes.com/2016/09/18/opinion/sunday/the-difference-between-rationality-and-intelligence.html>; see also MICHAEL LEWIS, *THE UNDOING PROJECT: A FRIENDSHIP THAT CHANGED OUR MINDS* (2017) (discussing the relationship between Kahneman and Tversky).

6 Jon D. Hanson & Douglas A. Kysar, *Taking Behavioralism Seriously: The Problem of Market Manipulation*, 74 *N.Y.U. L. REV.* 630, 691 (1999) (quoting Amos Tversky & Daniel Kahneman, *Rational Choice and the Framing of Decisions*, in *RATIONAL CHOICE: THE CONTRAST*

sions based on intuition rather than reason, often reaching the wrong answer.⁷ Others found that human rationality only weakly correlates with IQ level.⁸

Behavioral law and economics adopted these findings, rejecting the traditional assumption that economic actors are wholly rational.⁹ Recent studies have shown, however, that rationality can be addressed and sometimes improved.¹⁰ Legal scholars are beginning to explore how regulatory intervention can help to counteract irrationality and correct cognitive error.¹¹

Little has been done, though, about using these insights to improve financial regulation. Even in financial markets, humans have bounded rationality.¹² The only scholar who, to date, has considered how these insights might improve financial regulation focused narrowly on consumer finance.¹³ This Article, in contrast, focuses more broadly on how insights into limited human rationality can improve (and thus references herein to financial regulation include) both “microprudential” financial regulation, which protects the stability of individual financial institutions,¹⁴ and “macroprudential” financial regulation, which is intended to protect the stability of the financial system itself¹⁵ by reducing systemic risk.¹⁶

BETWEEN ECONOMICS AND PSYCHOLOGY 67, 88–89 (Robin M. Hogarth & Melvin W. Reder eds., 1987)) (internal quotation marks omitted).

7 See, e.g., John Conlisk, *Why Bounded Rationality?*, 34 J. ECON. LITERATURE 669, 670 (1996) (surveying the literature on bounded rationality).

8 See Hambrick & Burgoyne, *supra* note 5 (discussing research by psychologist Keith Stanovich). In the financial crisis, for example, sophisticated institutional investors suffered from similar irrational tendencies as “widows and orphans.” Stephen J. Choi & A.C. Pritchard, *Behavioral Economics and the SEC*, 56 STAN. L. REV. 1, 2 (2003).

9 Choi & Pritchard, *supra* note 8, at 3.

10 Hambrick & Burgoyne, *supra* note 5 (describing a pair of studies published by psychologist Carey Morewedge and colleagues that found that computer training led to decreases in decision-making bias).

11 Barry Schwartz, *Why Not Nudge? A Review of Cass Sunstein’s Why Nudge*, PSYCH REP. (Apr. 17, 2014), <http://thepsychreport.com/essays-discussion/nudge-review-cass-sunsteins-why-nudge/>.

12 Steven L. Schwarcz, Essay, *Controlling Financial Chaos: The Power and Limits of Law*, 2012 WIS. L. REV. 815, 821. During periods of economic quietude, for example, financial actors grow complacent and underestimate both adverse and mundane low-probability events. *Id.* at 822; cf. GEORGE A. AKERLOF & ROBERT J. SHILLER, ANIMAL SPIRITS: HOW HUMAN PSYCHOLOGY DRIVES THE ECONOMY, AND WHY IT MATTERS FOR GLOBAL CAPITALISM (2009) (examining the role of psychology in economic decisionmaking).

13 See Oskari Juurikkala, *The Behavioral Paradox: Why Investor Irrationality Calls for Lighter and Simpler Financial Regulation*, 18 FORDHAM J. CORP. & FIN. L. 33 (2012).

14 See, e.g., Douglas J. Elliott et al., *The History of Cyclical Macroprudential Policy in the United States* 6 (Fed. Reserve Bd., Fin. and Econ. Discussion Series, Working Paper No. 2013-29, 2013), <http://www.federalreserve.gov/pubs/feds/2013/201329/201329pap.pdf>.

15 See *id.* (observing that the goal of macroprudential regulation “is to manage factors that could endanger the financial system as a whole, even if they would not be obvious as serious threats when viewed in the context of any single institution”); see also Daniel K. Tarullo, Member, Bd. of Governors of the Fed. Reserve Sys., Keynote Address at the Yale

For ease of reference and also to situate human limitations within nomenclature used to describe the range of market-failure triggers that can impair financial regulation, this Article refers to those limitations collectively as “complacency”¹⁷ in the expansive sense of that term.¹⁸ Complacency can create market failure by undermining at least two perfect-market assumptions—that parties have full information, and that they will act in their rational self-interest.¹⁹ These assumptions underlie financial regulation.²⁰

The Article proceeds as follows. Part I provides a taxonomy of complacency, dividing it analytically into four categories: herd behavior,²¹ cognitive biases,²² over-reliance on heuristics,²³ and a proclivity to panic.²⁴ Part II explains how these categories of complacency can trigger financial market failures. Part III examines how insights into these categories of complacency can improve financial regulation (and the Appendix to the Article provides a compendium of potential regulatory improvements). And Part IV analyzes how law should address the inevitable failures that occur notwithstanding these regulatory improvements.

Law School Conference on Challenges in Global Financial Services: Macroprudential Regulation (Sept. 20, 2013), in 31 *YALE J. ON REG.* 505 (2014); Janet L. Yellen, Chair, Bd. of Governors of the Fed. Reserve Sys., Address at the 2014 Michel Camdessus Central Banking Lecture, International Monetary Fund: Monetary Policy and Financial Stability (July 2, 2014); Frank Ahrens, *Obama: We're Moving Toward Broader Regulation*, *WASH. POST* (Mar. 18, 2009), http://voices.washingtonpost.com/economy-watch/2009/03/obama_were_moving_toward_broad.html.

16 Systemic risk is the risk that a cascading failure of financial system components (e.g., markets or firms) cripples the system’s ability to generate capital, or increases the cost of capital, thereby harming the real economy. Steven L. Schwarcz, *Systemic Risk*, 97 *GEO. L.J.* 193, 204 (2008); *cf. id.* at 207–08 (referring to systemic risk as risk to the financial system itself).

17 *Cf.* Steven L. Schwarcz, *Regulating Financial Change: A Functional Approach*, 100 *MINN. L. REV.* 1441, 1443–46 (2016) (identifying those market-failure triggers as complacency, complexity, conflicts, change, and a type of tragedy of the commons).

18 *Complacency*, *MERRIAM-WEBSTER DICTIONARY* (Dec. 28, 2017), <https://www.merriam-webster.com/dictionary/complacency> (defining “complacency” as “self-satisfaction especially when accompanied by unawareness of actual dangers or deficiencies”).

19 *Perfect Market Assumptions*, *FARLEX FREE FINANCIAL DICTIONARY* (2012), <http://financial-dictionary.thefreedictionary.com/Perfect%20market+assumptions> (discussing perfect-market assumptions, including that market participants have equal access to information and are completely rational).

20 *See, e.g.*, Johan den Hertog, *Review of Economic Theories of Regulation* 2, 5 (Utrecht Sch. of Econ., Discussion Paper Series 10-18, 2010) (observing that economic theories of regulation generally assume that parties pursue their own interest, and that at least some public interest theories of regulation proceed from an assumption of full information).

21 *See infra* Section I.A.

22 *See infra* Section I.B.

23 *See infra* Section I.C.

24 *See infra* Section I.D. The term complacency is sometimes used as an antonym of panic. Recall, however, that this Article’s use of the term complacency is broader, encompassing rationality failure. *See supra* notes 17–19 and accompanying text.

I. TAXONOMY OF COMPLACENCY

There is not yet a generally accepted way to categorize the limitations on human rationality. In analyzing behavioral limitations and law, however, Professors Thaler and Sunstein discuss the limitations associated with herd behavior,²⁵ cognitive biases,²⁶ and reliance on heuristics, which they call “rules of thumb.”²⁷ As shown below, these categories provide insights into improving financial regulation. This Article also proposes a fourth category: the human proclivity to panic, which is strongly connected to the stability of financial markets.²⁸

A. Herd Behavior

Herd behavior refers to the tendency of people to follow what others are doing. That tendency is not necessarily irrational. Herd behavior can improve financial markets if a firm’s managers follow the behavior of other firms whose managers have more or better information.²⁹ Some even argue that herd behavior may represent an evolutionary adaptation that allows individuals to take advantage of information gained by others.³⁰ Herd behavior becomes problematic, however, to the extent some followers may not be acting in their self-interest or the interest of the party for whom they are serving. The former tendency contradicts financial regulation’s perfect-market assumption that parties have full information.³¹

For example, a firm’s managers might follow the behavior of other firms’ managers, thinking the other managers have more or better informa-

25 See Richard H. Thaler & Cass R. Sunstein, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* 53–71 (2008).

26 See *id.* at 23–31.

27 Compare *id.* at 22 (“When we have to make judgments . . . we use simple rules of thumb to help us. We use rules of thumb because most of the time they are quick and useful.”), with Juurikkala, *supra* note 13, at 40 (defining heuristics as “mental devices that help to simplify cognitive tasks”).

28 See *infra* Section I.D (discussing how information overload can cause market participants to panic, triggering and transmitting systemic risk).

29 See Lynne L. Dallas, *Short-Termism, the Financial Crisis, and Corporate Governance*, 37 J. CORP. L. 265, 314 (2012).

30 See Sushil Bikhchandani et al., *Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades*, 12 J. ECON. PERSP. 151, 152 (1998). Herd behavior can also be rational to the extent a person chooses to neglect her own private information in order to profit from the irrational behavior of others, such as an investor knowing there is a bubble and profiting from it by selling her asset before the bubble bursts. See Dallas, *supra* note 29, at 310 (referring to this behavior as a collective action problem, an example of rational irrationality).

31 See *supra* note 19 and accompanying text. The former tendency also contradicts the game-theory assumption of rationality. See John F. Nash, Jr., *The Bargaining Problem*, 18 *ECONOMETRICA* 155, 155 (1950) (observing that game theory assumes that players are “highly rational, that each can accurately compare his desires for various things, that they are equal in bargaining skill, and that each has full knowledge of the tastes and preferences of the other”).

tion.³² In reality, they may be following a misleading information cascade—a convergence of action based on a belief that the prior actors have better information, whereas the convergence reflects imitation more than good information.³³ An information cascade “has the potential to occur when people make decisions sequentially, with later people watching the actions of earlier people and from these actions inferring something about what the earlier people know.”³⁴ For example, early diners who arbitrarily choose restaurant *A* over nearby restaurant *B* “convey[] information to later diners about what they knew. A cascade then develops when people abandon their own information in favor of inferences based on earlier people’s actions”—i.e., that restaurant *A* is better than restaurant *B*.³⁵

The people who follow the actions of earlier people are not mindlessly imitating the earlier behavior; instead, they are “drawing rational inferences from limited information.”³⁶ The frenzied worldwide demand to purchase certain highly leveraged mortgage-backed securities (MBS) in the years prior to the 2008–2009 financial crisis (the “financial crisis”) almost certainly represented, in whole or in part, the herd behavior of investors following a misleading information cascade about the value of such MBS.³⁷

A firm’s managers might also follow the behavior of other firms’ managers without recognizing that behavior benefits the other firms but not their firm. In this context, Professor Bainbridge observes that corporate managers have engaged to their detriment in “participatory management”—involving their employees in workplace decisionmaking—simply because they see other companies doing so successfully.³⁸

The latter problematic tendency—to follow the herd in order to protect self-interest but not necessarily the interest of the party for whom the follower is acting (hereinafter, “defensive” herd behavior)—again contradicts the perfect-market assumption that parties act in their rational self-interest. Resulting in part from risk aversion,³⁹ this tendency creates agency costs,

32 See *supra* note 30 and accompanying text (discussing that scenario).

33 Sushil Bikhchandani et al., *A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades*, 100 J. POL. ECON. 992, 993–94 (1992). Information cascades may partly reflect a “herd mentality” based on the somewhat unique nature of “financial assets,” which “are not like other goods; demand tends to increase when they rise in price.” Buttonwood, *What’s Wrong with Finance*, ECONOMIST (May 1, 2015), <https://www.economist.com/blogs/buttonwood/2015/05/finance-and-economics>.

34 DAVID EASLEY & JON KLEINBERG, NETWORKS, CROWDS, AND MARKETS: REASONING ABOUT A HIGHLY CONNECTED WORLD 425 (2010).

35 *Id.* at 426.

36 *Id.*

37 See *infra* notes 80–82 and accompanying text.

38 Stephen M. Bainbridge, *Privately Ordered Participatory Management: An Organizational Failures Analysis*, 23 DEL. J. CORP. L. 979, 1002–03 (1998) (observing that while participatory management might “work[] well for a sub-set of firms, [it] is often adopted by fad-following managers of firms for which it is poorly suited”).

39 See, e.g., Sam Ro, *We’re Witnessing Herding in the Markets, and the Consequences Could Be Devastating*, BUS. INSIDER (May 21, 2015), <http://www.businessinsider.com/sell-side-herding-career-risk-bubbles-2015-5> (quoting GMO’s Jeremy Grantham that “[t]he central truth

which are themselves a type of market failure⁴⁰ that occurs when an agent acts against its principal's self-interest. For example, a financial analyst (the agent) may recommend a particular investment for his firm (the principal), even though he is skeptical of its value, because other firms are choosing that investment. If the investment ultimately fails, the firm will be harmed, but the analyst's job and reputation will be protected by the fact that others, too, chose that investment.⁴¹

B. Cognitive Biases

As a psychological coping mechanism, we often implicitly simplify our perception of reality. There are at least two common such cognitive biases: availability bias⁴² and optimism bias.⁴³ Both of these biases violate the perfect-market assumption that parties have full information⁴⁴ by distorting the internalization of information.⁴⁵

Availability bias is the tendency of a recent or especially vivid event to be the most readily accessible example in a person's mind, such as overestimating the frequency or likelihood of an event when examples of, or associations

of the investment business is that investment behavior is driven by career risk . . . [which] creates herding, or momentum, which drives prices far above or far below fair price").

40 See, e.g., Frank Partnoy, *Financial Systems, Crises, and Regulation*, in THE OXFORD HANDBOOK OF FINANCIAL REGULATION 68 (Niamh Moloney et al. eds., 2015).

41 Stephen M. Bainbridge, *Mandatory Disclosure: A Behavioral Analysis*, 68 U. CIN. L. REV. 1023, 1038 (2000) (discussing how herd behavior may have a reputational payoff even if the chosen course of action fails, and arguing that where "the action was consistent with approved conventional wisdom, the hit to the manager's reputation from an adverse outcome is reduced"); see also Dallas, *supra* note 29, at 319 (observing that managers who invest unconventionally are more likely to lose their jobs).

42 See, e.g., Norbert Schwarz et al., *Ease of Retrieval as Information: Another Look at the Availability Heuristic*, 61 J. PERSONALITY & SOC. PSYCHOL. 195, 195 (1991) (noting that availability bias is "[o]ne of the most widely shared assumptions in decision making as well as in social judgment research").

43 See, e.g., Tali Sharot, *Optimism Bias: Why the Young and the Old Tend to Look on the Bright Side*, WASH. POST (Dec. 31, 2012), https://www.washingtonpost.com/national/health-science/optimism-bias-why-the-young-and-the-old-tend-to-look-on-the-bright-side/2012/12/28/ac4147de-37f8-11e2-a263-f0ebffed2f15_story.html ("The belief that the future will probably be much better than the past and present is known as the optimism bias, and most of us have this tendency to overestimate the likelihood of good events happening to us and underestimate the likelihood that bad events will come crashing down.").

44 See *supra* notes 19–20 and accompanying text.

45 See Christine Jolls & Cass R. Sunstein, *Debiasing Through Law*, 35 J. LEGAL STUD. 199, 204–05, 207 (2006). There are other cognitive biases, such as anchoring and status quo bias. Anchoring is the tendency of people to insufficiently estimate a quantity when they "start with . . . [a] number [they already] know." THALER & SUNSTEIN, *supra* note 25, at 23. Status quo bias is a person's "general tendency to stick with their current situation." *Id.* at 34. Because of the high level of technology used in industrial (i.e., nonconsumer) finance and the industry's intense competition and drive for innovation, those cognitive biases appear to be only marginally applicable to the microprudential and macroprudential financial regulation on which this Article focuses. See *supra* notes 13–16 and accompanying text.

with, similar events are easily brought to mind, and discounting the probability of an event's occurrence based on the length of time since it last occurred.⁴⁶ For example, people with recently divorced friends tend to overestimate the divorce rate.⁴⁷

Optimism bias is the tendency to be unrealistically optimistic when thinking about negative events with which one has no recent experience, and devaluing the likelihood and potential consequences of those events.⁴⁸ This bias helps to explain the reputed interpretation of the Delphic Oracle by King Croesus of Lydia, who wanted to make war on Cyrus. The Oracle advised that the war “would destroy a mighty kingdom.”⁴⁹ Croesus heard what he wanted to hear⁵⁰—that Cyrus would fall—but in fact, his empire was the one destroyed.⁵¹

C. *Over-reliance on Heuristics*

Over-reliance on heuristics refers to undue reliance on explicitly adopted simplifications of reality. These simplifications can distort the perfect-market assumption that parties have full information.⁵²

The heuristics category superficially overlaps with cognitive biases. Indeed, availability bias is sometimes referred to as the availability heuristic.⁵³ Logically, however, these categories should be distinguished by whether the simplification of reality is implicit or explicit.⁵⁴ Cognitive biases are simplifications of reality that *implicitly* occur as a psychological coping mechanism.⁵⁵

46 Iman Anabtawi & Steven L. Schwarcz, *Regulating Systemic Risk: Towards an Analytical Framework*, 86 NOTRE DAME L. REV. 1349, 1366–67 (2011).

47 *Id.* at 1367 n.72.

48 *Id.* at 1366.

49 T. DEMPSEY, *THE DELPHIC ORACLE: ITS EARLY HISTORY, INFLUENCE, AND FALL* 70 (1972).

50 In this sense, optimism bias incorporates the concept of confirmation bias—the tendency to interpret information in a way that confirms one's preconceptions.

51 DEMPSEY, *supra* note 49, at 71; *see also id.* at 71, 105–07 (discussing the historical method of the oracles as sheltering ignorance behind a “studied ambiguity” and vagueness). This same method of response is said also to be used today by fortune tellers. *See* J. Barkley Rosser Jr., *Alternative Keynesian and Post Keynesian Perspectives on Uncertainty and Expectations*, 23 J. POST KEYNESIAN ECON. 545, 554–57 (2001) (arguing that uncertainty leads to self-fulfilling mistakes).

52 *See supra* note 19 and accompanying text.

53 *See, e.g.*, April M. Perry, Comment, *Guilt by Saturation: Media Liability for Third-Party Violence and the Availability Heuristic*, 97 NW. U. L. REV. 1045, 1045 (2003) (explaining that the “availability heuristic causes people to overestimate the frequency of an event, resulting in inaccurate judgments of the foreseeability of that event's occurrence”).

54 *Cf.* Steven L. Schwarcz & Lucy Chang, Essay, *The Custom-to-Failure Cycle*, 62 DUKE L.J. 767, 768 n.2 (2012) (differentiating availability and optimism biases from more formal heuristic-based simplifications of reality that allow us to make decisions in spite of our limited ability to process information).

55 *See supra* text accompanying notes 46–51.

In contrast, heuristics usually refer to *explicitly* adopted “mental devices that help to simplify cognitive tasks.”⁵⁶

Heuristics are especially important in areas of complexity, such as complex financial markets.⁵⁷ Investors, for example, use rating-agency credit ratings⁵⁸ to help estimate risks associated with securities.⁵⁹ Financial firms routinely rely on mathematical modeling, such as value-at-risk (VaR), a model for measuring investment-portfolio risk, to evaluate and report market risk.⁶⁰ Without reliance on heuristics, financial markets could not operate.⁶¹ Appropriate reliance on heuristics is thus rational to that extent.

Problems can occur, however, when there is *over-reliance* on heuristics.⁶² As will be discussed, senior manager over-reliance on VaR enabled secondary managers to protect their self-interests, but not necessarily that of the firms for whom they were acting.⁶³ Similarly, investors often over-rely on credit ratings instead of also engaging in their own due diligence.⁶⁴ However, changes in the financial industry, which occur frequently because of the industry’s constant innovation and increasing complexity, can divorce credit ratings from reality.⁶⁵ Prior to the financial crisis, investors rarely questioned the accuracy of credit ratings.⁶⁶ Their faith was reinforced by the long

56 Juurikkala, *supra* note 13, at 40; *see also* Schwarcz & Chang, *supra* note 54, at 768 (defining heuristics as “simplifications of reality that allow us to make decisions in spite of our limited ability to process information”).

57 Schwarcz & Chang, *supra* note 54, at 769.

58 Rating agencies make their business in carefully assessing the creditworthiness of investment securities. *See generally* Steven L. Schwarcz, *Private Ordering of Public Markets: The Rating Agency Paradox*, 2002 U. ILL. L. REV. 1, 6. Investment grade technically means a rating of BBB- or better, indicating that full and timely repayment on the securities should not be speculative. *Id.* at 7–8.

59 Schwarcz & Chang, *supra* note 54, at 772.

60 *Id.*

61 *Id.* at 769; *see also* James P. Crutchfield, *The Hidden Fragility of Complex Systems: Consequences of Change, Changing Consequences*, in CULTURES OF CHANGE: SOCIAL ATOMS AND ELECTRONIC LIVES 98, 102–03 (Gennaro Ascione et al. eds., 2009) (noting the increasing structural complexity and fragility of modern markets, including financial markets, as part of “the world we built”); Manuel A. Utset, *Complex Financial Institutions and Systemic Risk*, 45 GA. L. REV. 779, 799–803 (2011) (discussing the complexity of financial markets and the bounded rationality of financial community members, as well as the need for heuristics to process and analyze financial information); Markus K. Brunnermeier & Martin Oehmke, *Complexity in Financial Markets* 5–8 (Sept. 10, 2009) (unpublished manuscript), <http://scholar.princeton.edu/markus/files/complexity.pdf> (noting that because financial community members have bounded rationality, they must simplify complex financial markets by using, for example, models and summaries).

62 This over-reliance appears to be more easily seen in retrospect than defined or identified in advance, making it even more difficult to solve.

63 *See infra* notes 89–93 and accompanying text.

64 Schwarcz & Chang, *supra* note 54, at 773–75; *see also* Timothy E. Lynch, *Deeply and Persistently Conflicted: Credit Rating Agencies in the Current Regulatory Environment*, 59 CASE W. RES. L. REV. 227, 283 (2009).

65 Schwarcz & Chang, *supra* note 54, at 776.

66 *Id.* at 772–73.

record that ratings had for reliably assessing the creditworthiness of relatively simple debt instruments, such as corporate bonds and basic securitization instruments.⁶⁷ That unquestioning faith continued even when ratings were extrapolated to new, much more complex and highly leveraged, high-yield MBS.⁶⁸

D. *Proclivity to Panic*

Financial markets can change rapidly.⁶⁹ Sudden changes and the influx of new information can cause an “information overload,” causing market participants to panic.⁷⁰ Market panic can also be triggered by new and worrying information that cannot be verified.⁷¹ These influences can impair the perfect-market assumption that parties have full information.⁷²

Panic can also activate a flight reflex, to remove oneself from a perceived danger.⁷³ Some engage in “collective flight,”⁷⁴ which can undermine financial markets—such as causing a run on a bank that is solvent but (as is typical) unable to repay all of its depositors at once.⁷⁵ Others respond to the flight reflex in the manner of *sauve qui peut*, an “every man for himself”

67 *Id.*

68 *Id.* at 774–75; *cf. infra* notes 80–85 and accompanying text (discussing this type of MBS).

69 Schwarcz, *supra* note 17, at 1445.

70 Geoffrey P. Miller & Gerald Rosenfeld, *Intellectual Hazard: How Conceptual Biases in Complex Organizations Contributed to the Crisis of 2008*, 33 HARV. J.L. & PUB. POL’Y 807, 820 (2010). The conceptual biases discussed by Professors Miller and Rosenfeld focus on the potential to interfere with accurate processing and analysis of information—what they call intellectual hazard. They identify three categories of such biases: complexity bias, incentive bias, and asymmetry bias. *Id.* at 813. Although they use different terminology, their categories are not inconsistent with (and can be generally mapped onto) the categories discussed in this Article: herd behavior, cognitive bias, over-reliance on heuristics, and the proclivity to panic.

71 *Cf.* GEORGE J. BENSTON, REGULATING FINANCIAL MARKETS: A CRITIQUE AND SOME PROPOSALS 24 (1999) (discussing how the “opaqueness” of bank loans and assets leads to depositor panic).

72 *See supra* notes 19–20 and accompanying text.

73 E. L. Quarantelli, *The Nature and Conditions of Panic*, 60 AM. J. SOC. 267, 269 (1954). Psychologists believe that panic is a reaction to feeling out of control, which violates “a basic human need.” Anat Bracha & Elke U. Weber, *A Psychological Perspective of Financial Panic* 9 (Fed. Reserve Bank of Bos., Pub. Policy Discussion Paper No. 12-7, 2012), <https://www.bostonfed.org/publications/public-policy-discussion-paper/2012/a-psychological-perspective-of-financial-panic.aspx>. Panic may well be related to cognitive biases and herd behavior, which are also influenced by the need for control. *Id.* at 9, 27; *cf.* ALEX PREDA, FRAMING FINANCE: THE BOUNDARIES OF MARKETS AND MODERN CAPITALISM 222 (2009) (discussing panic as a driver of herd behavior).

74 Quarantelli, *supra* note 73, at 269–70.

75 *See generally* Dion Harmon et al., *Anticipating Economic Market Crises Using Measures of Collective Panic*, 10 PLOS ONE 1 (2015).

scramble that can disrupt organized procedures⁷⁶—such as making it difficult to allocate lifeboats to passengers on a sinking ship.

Whichever way one responds to the flight reflex, a panicked person will rarely attempt to deal rationally with the threat.⁷⁷ That also distorts the perfect-market assumption that parties act in their rational self-interest.⁷⁸

II. COMPLACENCY AS A TRIGGER OF FINANCIAL MARKET FAILURES

Having categorized the human limitations that can violate financial regulation's perfect-market assumptions, this Part explains how those limitations can actually trigger financial market failures.

A. Herd Behavior and Market Failures

Regulators, including the U.S. Office of Financial Research, have identified herd behavior as a threat to financial stability.⁷⁹ Herd behavior can trigger financial market failures in several ways. In the years prior to the financial crisis, for example, institutional investors around the world “became euphoric about,” and stampeded to invest in, high-yield MBS.⁸⁰ Many of these investors were almost certainly following the herd,⁸¹ thinking other investors had more or better information, whereas they all turned out to be following a misleading “information cascade.”⁸² The increasing demand for MBS drove a race to the bottom, motivating mortgage lenders to make and then securitize poor-quality (including subprime) loans.⁸³ A subsequent

76 Jeffrey D. Sachs, *Creditor Panics: Causes and Remedies* 14 (Research Notes in Econ. & Statistics, Working Paper No. 98-4, 1998).

77 Cf. Quarantelli, *supra* note 73, at 270 (“[I]n panic behavior there is no overt attempt to deal directly with the danger itself. Instead, the only overt action taken is escape or personal removal from the threat.”).

78 See *supra* note 19 and accompanying text.

79 OFFICE OF FIN. RESEARCH, ASSET MANAGEMENT AND FINANCIAL STABILITY 2 (2013), https://www.financialresearch.gov/reports/files/ofr_asset_management_and_financial_stability.pdf (expressing particular concern about herd behavior that leads asset managers to invest in certain asset categories at the same time).

80 Randolph C. Thompson, *Mortgage Backed Securities, Wall Street, and the Making of a Global Financial Crisis*, 5 AM. U. BUS. L. BRIEF 51, 52 (2008).

81 Brett McDonnell, *Don't Panic! Defending Cowardly Interventions During and After a Financial Crisis*, 116 PENN. ST. L. REV. 1, 13 (2011).

82 See MARTIN NEIL BAILY ET AL., BROOKINGS INST., THE ORIGINS OF THE FINANCIAL CRISIS 16 (2008), https://www.brookings.edu/wp-content/uploads/2016/06/11_origins_crisis_baily_litan.pdf (observing that information cascades and herd behavior “can go a long way in describing how homeowners, mortgage originators, holders of mortgage-backed securities, regulators, ratings agencies—indeed everyone—could get swept up in a bubble that *ex post* was clearly bound to burst”).

83 See McDonnell, *supra* note 81, at 10–11 (stating that “[s]ub-prime mortgages to borrowers with poor credit became an increasingly large part of the mortgage market”); cf. Thompson, *supra* note 80, at 53 (explaining that as they became more economically successful, MBS “became increasingly complex and much riskier”).

decline in home prices caused many of the poor-quality loans to default, resulting in credit-rating downgrades and MBS defaults.⁸⁴ And that, in turn, led to a systemic collapse of financial markets and of firms, like Lehman Brothers, that invested heavily in MBS.⁸⁵

Similarly, prior to the financial crisis, secondary managers (such as analysts and vice presidents) at financial firms engaged in defensive herd behavior—following the herd in order to protect their self-interests but not necessarily the interests of the parties for whom they were acting.⁸⁶ These managers typically were (and unfortunately, usually continue to be) compensated for performing their assigned tasks, without regard to the long-term consequences of the tasks to their firms.⁸⁷ Notably, their firms paid them for choosing profitable investments with low apparent risks, as measured by VaR.⁸⁸ “Secondary managers therefore turned to [high-yield] investment products with low VaR risk profiles,” like complex MBS supported by credit default swaps that other financial firms were buying.⁸⁹

“The managers knew, but did not always explain to their seniors, that any losses that might eventually occur would be huge.”⁹⁰ The managers also knew that if and when those losses occurred, they would be protected by the fact that so many other financial firms chose that type of investment.⁹¹ And indeed, when huge losses on credit default swaps and MBS supported by those swaps triggered the systemic collapse that became the financial crisis,⁹² relatively few of those managers lost their jobs or were prosecuted.⁹³

84 Thompson, *supra* note 80, at 55.

85 Eamonn K. Moran, *Wall Street Meets Main Street: Understanding the Financial Crisis*, 13 N.C. BANKING INST. 5, 61–62 (2009).

86 Steven L. Schwarcz, Essay, *Conflicts and Financial Collapse: The Problem of Secondary-Management Agency Costs*, 26 YALE J. ON REG. 457, 460 (2009); *cf. supra* notes 39–41 and accompanying text (defining defensive herd behavior).

87 See Schwarcz, *supra* note 86, at 460. The rationale for compensating secondary managers without regard to long-term consequences to the firm is the belief that they “are subject to supervision and management control by top managers, who in turn are subject to the direction of the board of directors. Top managers therefore are supposedly responsible for ensuring, and thus monitoring, that the tasks performed by secondary managers take into account long-term consequences to the firm.” *Id.* at 460–61 (footnote omitted).

88 *Id.* at 460.

89 *Id.*

90 *Id.*; see also Joe Nocera, *Risk Mismanagement*, N.Y. TIMES MAG. (Jan. 2, 2009), <http://www.nytimes.com/2009/01/04/magazine/04risk-t.html>.

91 Schwarcz, *supra* note 86, at 462; *cf. supra* note 41 and accompanying text (making a similar observation).

92 See, e.g., John Grgurich, *Credit Default Swaps: Still Here, Still Able to Wreak Havoc*, AOL FIN. (May 11, 2012), <https://www.aol.com/2012/05/11/jpmorgan-credit-default-swaps-still-wreaking-havoc/> (“Credit default swaps were at the heart of the financial crisis.”).

93 See, e.g., Steven L. Schwarcz, *Excessive Corporate Risk-Taking and the Decline of Personal Blame*, 65 EMORY L.J. 533, 534 (2015); Jesse Eisinger, *Why Only One Top Banker Went to Jail for the Financial Crisis*, N.Y. TIMES MAG. (Apr. 30, 2014), <https://www.nytimes.com/2014/05/04/magazine/only-one-top-banker-jail-financial-crisis.html>.

B. *Cognitive Biases and Market Failures*

These cognitive biases can combine to create a tendency to define future events by the recent past. That tendency can obscure rare events of extreme impact, especially when the biases apply to a commercial activity that is seemingly routine⁹⁴—such as valuing collateral.⁹⁵ The parallels between the Great Depression and the financial crisis dramatically evidence how this can trigger financial market failures.

In the years preceding the Great Depression, banks lending “on margin”—a practice in which borrowers use proceeds of a loan to purchase shares of stock and then pledge that stock as collateral to the banks—assumed they were adequately protected, even for margin loans made to risky borrowers.⁹⁶ Although these loans were not initially overcollateralized—because the value of the pledged stock initially equaled, but did not exceed, the amount of the loan—banks expected the stock market to continue rising, as it had for decades. That expectation reflects the tendency to define future events by the recent past. If stock prices had continued rising, the increasing collateral value would have protected the loans.⁹⁷ In October 1929, however, the collapse in stock prices caused many of those risky borrowers to default on their now-undercollateralized margin loans, contributing to the bank failures that characterize the Depression.⁹⁸

Similarly, prior to the financial crisis, banks and private mortgage lenders made loans to risky, or “subprime,” borrowers who used the loan proceeds to purchase homes and then mortgaged their homes as collateral to the lenders. The lenders assumed these loans were adequately protected,⁹⁹ as did rating agencies and other parties who assessed risk on securities backed by these loans.¹⁰⁰ Although these mortgage loans were not originally overcollateralized—because the value of a mortgaged home initially equaled, but did not exceed, the amount of the loan—the parties expected housing prices to continue rising, as had been the case for decades.¹⁰¹ That expectation again reflects the tendency to define future events by the recent past. If housing prices had continued rising, the increasing collateral value would

94 Cf. Susanna Kim Ripken, *Paternalism and Securities Regulation*, 21 STAN. J.L. BUS. & FIN. 1, 17 (2015) (arguing that investors are taken by surprise and unprepared to react effectively to a rare event of extreme impact).

95 Anabtawi & Schwarcz, *supra* note 46, at 1367–68.

96 *Id.* at 1356.

97 *See id.*

98 *See id.* at 1357.

99 *See id.* at 1359–60.

100 Cf. Dallas, *supra* note 29, at 316 n.373 (quoting Alan Greenspan’s observation that “the data inputted into the risk management models generally covered only the past two decades, a period of euphoria,” whereas the data more appropriately should have reflected “historic periods of stress”).

101 *See* Anabtawi & Schwarcz, *supra* note 46, at 1359–60.

have protected the loans.¹⁰² In the fall of 2007, however, the collapse in housing prices caused many subprime borrowers to default on their now-undercollateralized mortgage loans, contributing to the loss of confidence and institutional failures that characterized the crisis.¹⁰³

C. *Over-reliance on Heuristics and Market Failures*

Over-reliance on heuristics can also trigger financial market failures. Prior to the financial crisis, senior manager overreliance on VaR enabled secondary managers to protect their self-interests but not necessarily that of the firms for whom they were acting.¹⁰⁴ Firms invested in highly leveraged MBS with low VaR, without senior managers realizing that in the unlikely event of default the losses would be huge.¹⁰⁵ The resulting losses caused many of these firms to fail or to need a bailout.¹⁰⁶

Similarly, overreliance on credit ratings can trigger financial market failures. As discussed, prior to the financial crisis investors rarely questioned the accuracy of credit ratings, often over-relying on them without performing their own due diligence.¹⁰⁷ This continued even when investment-grade ratings were extrapolated to leveraged, high-yield MBS.¹⁰⁸ Many of those MBS ultimately defaulted or were downgraded, however, devastating the investor community and contributing to the financial crisis.¹⁰⁹

D. *Proclivity to Panic and Market Failures*

Panic can trigger financial market failures, historically epitomized by a bank run.¹¹⁰ Professors Miller and Rosenfeld argue that the systemic shocks that led to the financial crisis spread when panicked market participants failed to properly acquire, process, transmit, and implement key risk-related information.¹¹¹ That information failure undermined “the healthy diversity

102 See Barry Ritholtz, *Case Shiller 100 Year Chart (2011 Update)*, BIG PICTURE (Apr. 13, 2011, 7:00 AM), <http://www.ritholtz.com/blog/2011/04/case-shiller-100-year-chart-2011-update>.

103 Anabtawi & Schwarcz, *supra* note 46, at 1360 (“When home prices began falling, some of these asset-backed securities began defaulting, requiring financial institutions heavily invested in these securities to write down their value, causing these institutions to appear, if not be, financially risky.” (footnote omitted)).

104 See *supra* notes 88–93 and accompanying text.

105 See *supra* note 90 and accompanying text.

106 See *supra* note 92 and accompanying text.

107 See *supra* notes 66–67 and accompanying text.

108 See *supra* note 68 and accompanying text.

109 See Schwarcz & Chang, *supra* note 54, at 778.

110 See *supra* notes 74–75 and accompanying text (describing a bank run); see also Schwarcz, *supra* note 12, at 821.

111 Miller & Rosenfeld, *supra* note 70, at 810.

of viewpoints that tends to keep intellectual hazard in check during normal times.”¹¹²

Thus, when the presumably safe investment-grade-rated MBS defaulted or were downgraded,¹¹³ the resulting uncertainty and loss of confidence in credit ratings as an indicator of risk caused investors to panic, fearing that other highly rated securities could likewise default.¹¹⁴ Their fear was compounded by the failure of regulatory agencies to quickly address the problem or reassure market participants that the problem was isolated.¹¹⁵ The panic caused a widespread collective flight by investors,¹¹⁶ in which they stopped investing not only in MBS—which caused prices in the MBS market to collapse even further¹¹⁷—but also in all debt securities.¹¹⁸ The resulting loss of credit affected every level of the financial system,¹¹⁹ eventually reducing spending and dragging down the stock market.¹²⁰

III. REGULATING COMPLACENCY

Because complacency can trigger financial market failures, it should be regulated—but how?¹²¹ Human nature cannot be easily changed. Contrary

112 *Id.* at 820 (noting that “[t]he very definition of a panic is that everyone . . . comes to evaluate market conditions in the same way and therefore rushes to reduce their exposure to risk, creating a vicious cycle in which losses of liquidity trigger even more panic and greater turmoil”).

113 *See supra* note 109 and accompanying text.

114 *See, e.g.,* Steven L. Schwarcz, *Regulating Complexity in Financial Markets*, 87 WASH. U. L. REV. 211, 225 (2009) (discussing financial markets’ susceptibility to contagion and how losses in securities with “investment grade” ratings caused investors to panic (internal quotation marks omitted)); Mortimer B. Zuckerman, *Preventing a Panic*, U.S. NEWS & WORLD REP. (Feb. 1, 2008), <https://www.usnews.com/opinion/mzuckerman/articles/2008/02/01/preventing-a-panic> (arguing that “the credit system has been virtually frozen” because “few people even know where the liabilities and losses are concentrated”).

115 FIN. CRISIS INQUIRY COMM’N, THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF THE FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES 436–37 (2011). The panic was thus caused by the type of information overload previously discussed, as well as the new and worrying information that cannot be verified. *See supra* notes 70–71 and accompanying text.

116 *Cf. supra* note 74 and accompanying text (discussing collective flight as one of the typical responses to panic).

117 Schwarcz, *supra* note 114, at 225; Schwarcz & Chang, *supra* note 54, at 778.

118 Schwarcz & Chang, *supra* note 54, at 778.

119 *See* Steven L. Schwarcz, Stanley A. Star Professor of Law & Bus., Duke Univ. Sch. of Law, *The Financial Crisis and Credit Unavailability: Cause or Effect?* (Aug. 27, 2017), in 72 BUS. LAW. 409, 409 (2017).

120 Brendan Sapien, Note, *Financial Weapons of Mass Destruction: From Bucket Shops to Credit Default Swaps*, 19 S. CAL. INTERDISC. L.J. 411, 438 (2010); *see also* DAMIAN TAMBINI, WHAT IS FINANCIAL JOURNALISM FOR? ETHICS AND RESPONSIBILITY IN A TIME OF CRISIS AND CHANGE 13 (2008), http://eprints.lse.ac.uk/21663/1/What_is_financial_journalism_for_%28author%29.pdf.

121 A related question is when complacency should be regulated. Thaler and Sunstein suggest an answer: “people will need nudges for decisions that are difficult and rare, for which they do not get prompt feedback, and when they have trouble translating aspects of

to the pessimistic views of noted behavioral psychologists such as Nobel Prize–winner Daniel Kahneman,¹²² some now believe that “[w]e have the means to overcome some of our [human] limitations, through education, through institutions, through enlightenment.”¹²³ At least one scholar has argued, for example, that certain “light-touch regulations” could help to combat human psychological limitations in consumer finance.¹²⁴ This Part examines how insights into complacency can be used to redesign financial regulation more broadly.

A. *Regulating Herd Behavior*

Consider how to regulate problematic types of herd behavior—when followers of the herd are not acting in their self-interest or, in the case of defensive herd behavior,¹²⁵ the interest of the party whom they are serving.¹²⁶ The first type of herd behavior is difficult to regulate precisely because it is individually irrational.¹²⁷ Regulators have also feared that attempts to regulate herd behavior could lead to regulatory arbitrage.¹²⁸ To the extent it results from misleading information cascades,¹²⁹ however, herd behavior could be regulated by addressing the cascades directly—such as by studying how information cascades develop in order to identify and correct them and reduce their occurrence.

the situation into terms that they can easily understand.” THALER & SUNSTEIN, *supra* note 25, at 72.

122 Cf. Robert A. Burton, *Black Box Thinking* and *Failure: Why Science Is So Successful*, N.Y. TIMES (Dec. 29, 2015), <http://www.nytimes.com/2016/01/03/books/review/black-box-thinking-and-failure-why-science-is-so-successful.html> (book review) (discussing Kahneman’s pessimistic view that the idea of human nature with inherent flaws is consistent with the tragedy of the human condition).

123 *Id.* (quoting Harvard psychologist Steven Pinker); cf. *supra* note 10 and accompanying text (referencing recent studies showing that rationality can be addressed and sometimes improved).

124 Juurikkala, *supra* note 13, at 51 (defining “light-touch regulations” as minimally intrusive “default rules, framing and information disclosure rules, cooling-off periods, and limitations on choice” (emphasis omitted)).

125 Cf. *supra* notes 38–40 and accompanying text (defining defensive herd behavior, in which followers of the herd are not necessarily acting in the interest of the party whom they are serving).

126 See *supra* notes 30–31 and accompanying text.

127 See *supra* notes 30–31 and accompanying text.

128 See Bartosz Gebka & Mark E. Wohar, *International Herding: Does It Differ Across Sectors?*, 23 J. INT’L FIN. MARKETS, INSTITUTIONS & MONEY 55, 83 (2013) (“[T]he best policy may be to refrain from regulating herding in selected industries; this would help to avoid inevitable responses from the market participants (regulatory arbitrage) which would potentially lead to suboptimal asset allocation, increased transaction costs and could damage the market efficiency even further.”).

129 Cf. *supra* notes 32–33 and accompanying text (observing that a firm’s managers might mistakenly follow the behavior of other firms’ managers, thinking those other managers have more or better information, whereas they are merely following a misleading information cascade).

In that spirit, Professors Kuran and Sunstein have argued for making information on market conditions public, thereby reducing the risk of misleading information being pushed into the mainstream.¹³⁰ Among other measures, they propose forming a congressional committee “entrusted with compiling information about a wide range of risk levels and empowered to set priorities.”¹³¹ They also propose creating an online “Risk Information Site” to centralize accurate and up-to-date information on financial market conditions.¹³² These measures implicitly assume that “informational cascades can be reversed easily when an individual with precision of information expresses his view publicly.”¹³³

The validity of that assumption has not, however, been rigorously tested, especially in light of the recent trend toward “fake news” and “alternative facts.” Increasingly, the stories that tend to be reported by the media, and the online websites that receive the most views, are those that are “novel, sensational, or emotional.”¹³⁴ As a result, public trust in the accuracy of even mainstream media reporting is at an unprecedented low.¹³⁵ This calls into question the public’s ability to differentiate precise and imprecise information.

Requiring increased due diligence might help to strengthen the reliability of market information,¹³⁶ thereby reducing reliance on a misleading information cascade.¹³⁷ Members of a firm’s risk committee could be tasked, for example, with reviewing market information to ascertain its reliability. Recognizing that even institutional investors are subject to herd behavior, Professor Dallas also proposes reassessing securities-law exemptions that are based on investor sophistication.¹³⁸

Defensive herd behavior may be easier to regulate. Consider, for example, the conflict of interest between financial firms and their secondary man-

130 Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 755 (1999) (discussing information cascades and pervasive misconceptions).

131 *Id.* at 752.

132 *See id.* at 755.

133 Louis Jaeck, *Information and Political Failures: To What Extent Does Rational Ignorance Explain Irrational Beliefs Formation?*, 22 CONST. POL. ECON. 287, 297 (2011).

134 ALICE MARWICK & REBECCA LEWIS, DATA & SOC’Y RESEARCH INST., MEDIA MANIPULATION AND DISINFORMATION ONLINE 42–43 (2017), https://datasociety.net/pubs/oh/DataAndSociety_MediaManipulationAndDisinformationOnline.pdf.

135 *Id.* at 40 (discussing a 2016 Gallup poll finding that Americans’ trust in the mass media to report the news fully, accurately, and fairly was only at thirty-two percent, the lowest in polling history).

136 *See Dallas, supra* note 29, at 362–63.

137 *Cf. supra* note 37 and accompanying text (explaining that individuals in an information cascade draw rational inferences from limited information).

138 Dallas, *supra* note 29, at 363 (“[T]he losses that sophisticated investors suffered as a result of the financial crisis require a rethinking of exemptions.”); *cf. Schwarz, supra* note 114, at 242–43 (“Government already takes a somewhat paternalistic stance by mandating minimum investor sophistication for investing in complex securities; yet sophisticated investors and qualified institutional buyers (QIBs) are the very investors who lost the most money in the subprime financial crisis.”).

agers.¹³⁹ This conflict could be reduced by requiring secondary-management compensation to be aligned with the long-term interests of the firm.¹⁴⁰ That could be accomplished by “retroactively recover[ing] [or ‘clawing back’] compensation paid to secondary managers who have structured, sold, or invested in market securities on behalf of the firm if, within some time period, the structure proves inadequate or the securities turn out to be poor investments.”¹⁴¹ Alternatively, “a firm might pay a portion of a secondary manager’s compensation contingently over time or in the form of equity securities with long-term lock-down constraints on selling the securities.”¹⁴²

Another approach to regulating defensive herd behavior would be to try to reduce the managerial risk aversion that motivates this type of herd behavior.¹⁴³ Incentive-based compensation makes managers more risk averse and more likely to imitate other firms’ behavior, especially if a manager’s compensation depends on how her firm’s performance compares to the performance of other firms.¹⁴⁴ Subject to appropriate consideration of costs and benefits, regulation might therefore be considered to discourage incentive-based compensation contracts that are tied to such relative performance.¹⁴⁵

It should also be noted that regulation itself can sometimes foster herd behavior. Because this type of herd behavior is neither individually nor socially irrational, it is only indirectly within this Article’s scope. Uniform rules on insurance-company holding of investment-grade-rated corporate bonds, for example, have the potential to correlate an industry-wide dumping of bonds that lose that rating, in turn causing a bond market collapse.¹⁴⁶ To discourage regulatory-motivated herd behavior, the government could treat subjects of regulation differently,¹⁴⁷ such as by offering market participants a range of regulatory menus—e.g., “simultaneously offer[ing] a higher-price,

139 See *supra* notes 86–91 and accompanying text.

140 Schwarcz, *supra* note 86, at 465.

141 *Id.* at 465.

142 *Id.* at 465–66.

143 See *supra* note 39 and accompanying text.

144 See David Hirshleifer, *Managerial Reputation and Corporate Investment Decisions*, 22 FIN. MGMT. 145, 154 (1993); see also Sushil Bikhchandani & Sunil Sharma, *Herd Behavior in Financial Markets*, 47 IMF STAFF PAPERS 279, 292 (2001).

145 Cf. Bikhchandani & Sharma, *supra* note 144, at 293 (arguing that such contracts are largely “inefficient, inconsistent with optimal risk sharing, and ineffective in overcoming moral hazard and adverse selection problems”).

146 See Daniel Schwarcz & Steven L. Schwarcz, *Regulating Systemic Risk in Insurance*, 81 U. CHI. L. REV. 1569, 1596, 1602 (2014); cf. ERIK F. GERDING, LAW, BUBBLES, AND FINANCIAL REGULATION, in THE ECONOMICS OF LEGAL RELATIONSHIPS 1, 13 (Nicholas Mercurio & Michael D. Kaplowitz eds., 2014) (arguing that regulations can create investment preferences for certain asset classes, setting the stage for asset bubbles and disastrous bank runs); Peter O. Mülbert, *Managing Risk in the Financial System*, in THE OXFORD HANDBOOK OF FINANCIAL REGULATION, *supra* note 40, at 364, 395 (observing that financial regulation that “causes banks to act in a (more) uniform way . . . will increase systemic risk”).

147 See Ian Ayres & Joshua Mitts, *Anti-Herding Regulation*, 5 HARV. BUS. L. REV. 1, 2 (2015). *But cf. id.* at 7 (cautioning that regulators need to be sensitive about balancing the costs and benefits of behavioral diversity and behavioral uniformity).

lower-regulation alternative and a lower-price, higher-regulation alternative.”¹⁴⁸ Menu-like regulation has been used in Delaware, for example, where some incorporating entities “choose the lower-price close corporation form while others opt for the higher-price, more responsive standard corporate form.”¹⁴⁹

B. *Regulating Cognitive Biases*

Professors Jolls and Sunstein have argued that cognitive biases can be regulated through an approach they call “debiasing through law.”¹⁵⁰ The goal is to give people more control over the process of information.¹⁵¹ Regulators could engage in debiasing through law by making an event more “available” to individuals, such as by exposing them to a concrete instance of the event’s occurrence.¹⁵²

For example, 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.¹⁵³ Foreign cigarette package warnings that are more pictorially graphic than U.S. text-only warnings have been found to discourage smoking more effectively.¹⁵⁴ In the context of offering credit cards to consumers, Professor Juurikkala has similarly suggested giving consumers “vivid—perhaps even shocking—information about real cases that have gone wrong.”¹⁵⁵

In making information more available, special attention should be paid to framing the information, which can bias perceptions.¹⁵⁶ Preferences are not constant, and choice may be manipulated depending on the way the information is presented.¹⁵⁷ For example, people usually weigh losses more

148 *Id.* at 25 (“Menus that simultaneously offer a higher-price, lower-regulation alternative and a lower-price, higher-regulation alternative can induce regulated entities to separate themselves based on whether the lower regulation is worth the cost of the higher price.”).

149 *Id.*

150 Jolls & Sunstein, *supra* note 45, at 200.

151 ROY F. BAUMEISTER & BRAD J. BUSHMAN, *SOCIAL PSYCHOLOGY AND HUMAN NATURE* 155 (2d ed. 2011); *cf.* Cass R. Sunstein, *People Prefer System 2 Nudges (Kind of)*, 66 *DUKE L.J.* 121, 131–32 (2016) (arguing that people are generally more receptive to requirements that allow them to exercise flexibility and agency than to more cut-and-dried rules such as requiring a display of graphics).

152 Jolls & Sunstein, *supra* note 45, at 210.

153 *Id.*

154 *See generally* Hua-Hie Yong et al., *Mediational Pathways of the Impact of Cigarette Warning Labels on Quit Attempts*, 33 *HEALTH PSYCHOL.* 1410 (2014) (comparing Canadian, Australian, British, and American cigarette-package warnings).

155 Juurikkala, *supra* note 13, at 56.

156 *See* THALER & SUNSTEIN, *supra* note 25, at 36–37; Jolls & Sunstein, *supra* note 45, at 210–11; Juurikkala, *supra* note 13, at 51.

157 *See generally* Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 *ECONOMETRICA* 263 (1979).

heavily than gains in evaluating potential risks and outcomes.¹⁵⁸ Thus, a person is more likely to choose to have an operation if told “[o]f one hundred patients who have this operation, ninety are alive after five years” than if told “[o]f one hundred patients who have this operation, ten are dead after five years.”¹⁵⁹

Social scientists have suggested additional debiasing strategies, including changing optimizing choice architecture, changing incentives, and training.¹⁶⁰ Changing optimizing choice architecture generally parallels the Jolls and Sunstein approach of framing the presentation of information.¹⁶¹ Changing incentives focuses on making people more accountable for their decisions by increasing the cost of making bad decisions or providing positive incentives for making good decisions.¹⁶² Training focuses on helping decisionmakers learn how to better process information and make more accurate decisions.¹⁶³

So what does that mean in terms of financial regulation? It suggests, for example, that regulators should consider making investor warnings in prospectuses and other securities offering materials more concrete, in order to reduce investor overconfidence (a form of optimism bias).¹⁶⁴ Regulators might also consider requiring investors to attend lectures that emphasize these warnings and caution against overconfidence; supplementing warnings with lectures has been shown to reduce investor overconfidence more effectively than merely providing warnings in offering materials.¹⁶⁵

Though less clear how to accomplish, overconfidence could be further reduced by integrating independent perspectives into financial decisionmaking.¹⁶⁶

158 See Markku Kaustia & Milla Perttula, *Overconfidence and Debiasing in the Financial Industry*, 4 REV. BEHAV. FIN. 46, 48 (2012). This “loss aversion” helps to explain conservatism in accounting, where profits are not recognized until they are certain whereas losses are often anticipated and recognized in advance. See David Hirshleifer & Siew Hong Teoh, *The Psychological Attraction Approach to Accounting and Disclosure Policy*, 26 CONTEMP. ACCT. RES. 1067, 1074 (2009).

159 THALER & SUNSTEIN, *supra* note 25, at 36; *see id.* at 36–37.

160 See Carey K. Morewedge et al., *Debiasing Decisions: Improved Decision Making with a Single Training Intervention*, 2 POL’Y INSIGHTS FROM BEHAV. & BRAIN SCI. 129, 130 (2015).

161 *See id.*

162 *See id.*

163 *See id.* at 131.

164 Cf. Juurikkala, *supra* note 13, at 54–56 (arguing, in the context of credit card agreements, that regulation should simplify the information presented to consumers because “[c]redit card users . . . find it difficult to understand the complex terms and implications of different offerings”).

165 See Kaustia & Perttula, *supra* note 158, at 47, 57.

166 Cf. HUMAN DIMENSION CAPABILITIES DEV. TASK FORCE, COGNITIVE BIASES AND DECISION MAKING: A LITERATURE REVIEW AND DISCUSSION OF IMPLICATIONS FOR THE US ARMY 21 (2015), http://usacac.army.mil/sites/default/files/publications/HDCDTF_WhitePaper_Cognitive%20Biases%20and%20Decision%20Making_Final_2015_01_09_0.pdf (arguing for an outsider’s perspective to reduce overconfidence and facilitate more analytical thinking). An obvious but costly and potentially awkward way of integrating independent per-

Regulators should also consider trying to correct the market misconceptions and factual errors caused by the availability bias.¹⁶⁷ The financial crisis may have been less likely to occur, for example, if regulators had required stronger financial market awareness “that loans that are not initially overcollateralized are inherently risky, given that a decline (or even a plateau) in collateral” value could jeopardize repayment.¹⁶⁸ Although some scholars question whether government officials could identify market misconceptions or factual errors that market participants do not themselves see,¹⁶⁹ such identification is part of the core mission of the U.S. Financial Stability Oversight Council (FSOC), created by the Dodd-Frank Act.¹⁷⁰

There is also a “meta” lesson about regulating cognitive biases. The tendency to define future events by the recent past makes it less likely that serious financial regulation will be adopted in good economic times. During the financial crisis, for example, everyone was focused on the problems at hand and on how to avoid them in the future.¹⁷¹ But once a crisis recedes from memory, few will want to sacrifice profits for the sake of regulation.¹⁷² A

spectives into financial decisionmaking would be to require one or more independent decisionmakers. Although not yet technologically feasible, future scientific advances might even enable an integration of artificial and human intelligence in decisionmaking.

167 Cf. Jolls & Sunstein, *supra* note 45, at 210, 228 (discussing debiasing).

168 Schwarcz & Chang, *supra* note 54, at 784 (making that argument). When banks made loans to subprime borrowers, lenders assumed they were adequately protected even though the loans were not initially overcollateralized because they expected housing prices to continue rising as had been the case for decades. In 2007, however, housing prices collapsed and many subprime borrowers defaulted on the now-undercollateralized loans. *See id.* at 780.

169 Cf. Juurikkala, *supra* note 13, at 36–37 (arguing that regulatory debiasing prospects are not very promising because public authorities’ track record of predicting crises is poor and they have far less resources and incentives for doing so than the private sector). This raises a question of whether the private sector should be subjected to monitoring and reporting duties.

170 *See, e.g.*, FIN. STABILITY OVERSIGHT COUNCIL, 2012 ANNUAL REPORT 120 (2012), <https://www.treasury.gov/initiatives/fsoc/Documents/2012%20Annual%20Report.pdf> (stating that FSOC “facilitates information sharing, coordination, and communication” in order to “help identify risks, promote market discipline, and respond to emerging threats” as part of its “central purpose[]” of identifying risks to financial stability); Randall D. Guynn, *The Financial Panic of 2008 and Financial Regulatory Reform*, HARV. L. SCH. F. ON CORP. GOVERNANCE & FIN. REG. (Nov. 20, 2010), <https://corpgov.law.harvard.edu/2010/11/20/the-financial-panic-of-2008-and-financial-regulatory-reform/> (observing that the FSOC was created “to serve as an early warning system identifying risks in firms and market activities, to enhance oversight of the financial system as a whole and to harmonise prudential standards across agencies”).

171 Steven L. Schwarcz, Stanley A. Star Professor of Law & Bus., Duke Univ. Sch. of Law, Keynote Address: Understanding the Subprime Financial Crisis (Oct. 24, 2008), *in* 60 S.C. L. REV. 549, 553–54 (2009).

172 Cf. Larry Light, *Bondholder Beware: Value Subject to Change Without Notice*, BUS. WK., Mar. 29, 1993, at 34 (discussing that within years after the “Marriott split,” investors favor higher interest rates over “event risk” covenants, once the examples of events justifying the covenants have receded from memory). “Bondholders can—and will—fuss all they like.

normative framework for determining when financial market changes should drive legal changes would help to counter this tendency.

I separately have proposed such a framework, building on a consequence-based inquiry (CBI).¹⁷³ Under CBI, the extent to which financial market changes should drive legal changes should depend both on the consequences of the market failures resulting from financial market changes and the consequences of changing the law to correct those market failures. This inquiry is broader in several ways than traditional cost-benefit analysis (CBA), which is currently used to assess regulatory changes.¹⁷⁴ Whereas traditional CBA assumes a decision, which may well be politically motivated, to implement specific proposed regulation if its benefits exceed its costs, CBI begins by identifying a financial market change through proactive regulatory monitoring of financial markets.¹⁷⁵ Regulators would then examine whether any such change causes market failures and, if so, would assess the consequences of those failures. If those consequences are significantly negative, regulators would be required to consider legal changes that could correct the harmful failures, to examine the consequences of making those changes, and finally to balance those consequences to choose the appropriate course of action.¹⁷⁶

C. *Regulating Over-reliance on Heuristics*

Regulation can help to decrease the likelihood that parties will over-rely on heuristics. Regulation might also help to increase the accuracy of heuristics. Regulation should not, however, ban reliance on heuristics; when the heuristic reasonably approximates reality, society benefits.¹⁷⁷

To decrease the likelihood that parties will over-rely on heuristics, regulation could require firms to engage in more self-aware operational risk management and reporting.¹⁷⁸ Even a simple reminder that negative economic shocks have occurred in the past can encourage more critical reflection and accurate risk assessments.¹⁷⁹ The Basel III capital-adequacy guidelines thus

But the reality is, their options are limited: Higher returns or better protection. Most investors will continue to go for the gold.” *Id.*

173 See generally Steven L. Schwarcz, *Changing Law to Address Changing Markets: A Consequence-Based Inquiry*, 80 *LAW & CONTEMP. PROBS.* 163 (2017) (analyzing why CBI could improve the current ad hoc and politically distorted lawmaking process, which often results in over-reactive or under-reactive legal changes that are made too late, after harm has occurred).

174 CBI is broader than cost-benefit analysis in that CBI addresses not only the “how” but also the “when” of regulation. *Id.* at 167–68.

175 Because CBI does not necessarily start with any specific proposal, it also avoids confirmation bias and is less subject to political distortions. *Id.* at 169.

176 See *id.* at 166.

177 See Schwarcz & Chang, *supra* note 54, at 769.

178 See *id.* at 783–84.

179 See Anabtawi & Schwarcz, *supra* note 46, at 1389.

require banks to engage in periodic financial “stress test” scenarios,¹⁸⁰ in order to motivate them to consider the possibility of, and to better prepare for, future periods when previously adequate liquidity and capital resources might prove inadequate.¹⁸¹ Officials from the Federal Reserve have similarly touted these tests in creating a “strong, accountable, and proactive risk culture.”¹⁸²

Although less rigorous a reminder, the Dodd-Frank Act also requires certain systemically important firms to prepare so-called living wills,¹⁸³ which are resolution plans that “describe the company’s strategy for rapid and orderly resolution in the event of material financial distress or failure of the company.”¹⁸⁴ To the extent these plans effectively require firms to contemplate their own mortality, they are reminiscent of the *memento mori*, an ancient Roman tradition designed to increase a victorious general’s self-awareness of his human limitations. During the victory parade, a slave would repeatedly whisper “*memento mori*” to the general—translated as “remember you will die.”¹⁸⁵

If these debiasing techniques are inadequate, regulators could also consider banning *over-reliance* on heuristics. The postcrisis attempt by regulators to reduce reliance on credit ratings illustrates a partial ban. Pointing to the “hard wiring” of credit ratings in regulations as a main factor in systemic disruptions and herd behavior, the Financial Stability Board (FSB), an international body established by the G20 nations to monitor and make recom-

180 BASEL COMM. ON BANKING SUPERVISION, BASEL III: A GLOBAL REGULATORY FRAMEWORK FOR MORE RESILIENT BANKS AND BANKING SYSTEMS 46–47 (2011), <http://www.bis.org/publ/bcbs189.pdf>.

181 See CHRIS BRUMMER, *SOFT LAW AND THE GLOBAL FINANCIAL SYSTEM: RULE MAKING IN THE 21ST CENTURY* 217 (2012).

182 Charles Evans, President and CEO, Fed. Reserve Bank of Chi., Address at the Chicago Banking Symposium: The Call for Proactive Risk Culture (June 3, 2015) (“It is incumbent on financial institutions to serve as their own first line of defense. A strong risk culture enables institutions to proactively identify and manage not only broad risks, but also risks that are specific to their business.”).

183 See, e.g., Clay R. Costner, Note, *Living Wills: Can a Flexible Approach to Rulemaking Address Key Concerns Surrounding Dodd-Frank’s Resolution Plans?*, 16 N.C. BANKING INST. 133, 138 (2012) (“[O]bservers recognize living wills as a tool to limit systemic risk and encourage prudential practices on the part of financial institutions before failure occurs.”); Guynn, *supra* note 170.

184 *Living Wills (or Resolution Plans)*, BD. GOVERNORS FED. RES. SYS., <http://www.federalreserve.gov/bankinforeg/resolution-plans.htm>, (last visited Oct. 30, 2017). Although the purpose of a living will is to reduce the need for a bailout, I have questioned its effectiveness in achieving that goal. See Steven L. Schwarcz, *Too Big to Fool: Moral Hazard, Bailouts, and Corporate Responsibility*, 102 MINN. L. REV. 761 (2017) (arguing that a firm’s failure rarely accurately reflects, much less closely resembles, expectations about the firm when it was profitable, and also that living wills do not prevent the concurrent failure of multiple otherwise systemically important firms from, collectively, having a systemic impact).

185 *Memento Mori: It’s Time We Reinvented Death*, NEW SCIENTIST (Oct. 17, 2012), <https://www.newscientist.com/article/mg21628872-900-memento-mori-its-time-we-reinvented-death/> (emphasis omitted).

mendations about the global financial system, has called for reducing the regulatory use of ratings, effectively requiring market participants to make their own credit-risk assessments.¹⁸⁶ The Dodd-Frank Act takes a somewhat parallel approach.¹⁸⁷

These attempts by regulators to reduce reliance on credit ratings illustrate, however, that a ban might be unrealistic. Even if market participants over-relied on credit ratings,¹⁸⁸ it may be impractical to suddenly restrict parties from using them. Credit-risk assessment is essential, but it is very complex; and most market participants, especially small- and medium-sized financial firms, cannot afford the resources to adequately perform it.¹⁸⁹ Even large financial institutions can find it difficult to perform their own credit-risk assessments.¹⁹⁰ Most market participants have little practical choice but to rely on credit ratings for assessing risk.¹⁹¹

Because of these limitations, regulating overreliance on heuristics should also focus on attempting to increase the accuracy of heuristics. The more closely the heuristic approximates reality, the less likely would reliance thereon devolve into problematic overreliance. Postcrisis regulatory attempts to try to improve the accuracy of credit ratings, such as by increasing the

186 See FIN. STABILITY BD. (FSB), PRINCIPLES FOR REDUCING RELIANCE ON CRA RATINGS (2010), http://www.fsb.org/wp-content/uploads/r_101027.pdf?page_moved=1. The FSB proposes that government could keep tabs on firms by requiring public disclosure about their credit-risk assessment approach and processes, including the extent to which they rely on credit ratings. *Id.* at 1–2, 6.

187 See Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, §§ 931–939H, 124 Stat. 1376, 1872–90 (2010) (codified as amended in scattered sections of 12, 15, and 22 U.S.C.) (restricting the use of credit ratings for regulatory exemptions).

188 Credit ratings are not necessarily imprecise heuristics. However, precrisis ratings on certain complex and highly leveraged MBS relied on assumptions that, in retrospect, turned out to be incorrect. For different perspectives, see FRANK PARTNOY, RETHINKING REGULATION OF CREDIT RATING AGENCIES: AN INSTITUTIONAL INVESTOR PERSPECTIVE 5, 15 (2009); Nan S. Ellis et al., *Is Imposing Liability on Credit Rating Agencies a Good Idea?: Credit Rating Agency Reform in the Aftermath of the Global Financial Crisis*, 17 STAN. J.L. BUS. & FIN. 175, 221 (2012).

189 See Francesco de Pascalis, *Reducing Overreliance on Credit Ratings: Failing Strategies and the Need to Start from Scratch*, 91 AMICUS CURIAE 17, 19 (2012) (“It is unlikely that smaller and less sophisticated investors can undertake the costs deriving from the set-up and development of an internal risk assessment model and thus they will continue to rely on the external credit quality information provided by CRAs.”).

190 *Id.*; cf. Steven L. Schwarcz, *Protecting Financial Markets: Lessons from the Subprime Mortgage Meltdown*, 93 MINN. L. REV. 373, 405 (2008) (observing that “investors will almost certainly continue to overrely on rating-agency ratings, so long as the cost of making independent credit investigations remains high”).

191 Cf. Andreas Kruck, *Resilient Blunderers: Credit Rating Fiascos and Rating Agencies’ Institutionalized Status as Private Authorities*, 23 J. EUR. PUB. POL’Y 753, 754 (2016) (“[D]espite their fiascos and regulatory reform efforts, CRAs [credit rating agencies] continue to co-determine access to capital markets and costs of borrowing for public and private debtors. Investors still follow CRAs’ standard of creditworthiness . . . CRAs’ status as transnational private authorities has been surprisingly resilient . . .”).

transparency of the rating process and addressing alleged conflicts of interest in the issue-pays model, reflect this type of regulatory approach.¹⁹²

D. *Regulating the Proclivity to Panic*

Regulation can address the proclivity to panic by promoting market stability and calming the out-of-control feeling that activates the flight reflex.¹⁹³

The classic example is a government guarantee of bank accounts to help deter the collective flight of depositors known as a bank run.¹⁹⁴

A market panic can also occur “when contractual counterparties rush to try to close out their positions, causing prices to drop so sharply that one or more capital markets stop functioning (at least temporarily), which in turn leads to a vicious cycle in which investors lose confidence.”¹⁹⁵ To help control this type of panic, the government could establish a market liquidity provider to invest in securities of systemically important markets in order to stabilize prices.¹⁹⁶ Governments might also consider suspending trading in financial markets when prices are in a freefall.¹⁹⁷

In principle, regulation that is designed to prevent panic ought to take into account “the magnitude of the consequences and should apply only to deter panics that trigger large consequences.”¹⁹⁸ “Without such a sorting mechanism, regulation can impede market growth or undermine the market

192 See, e.g., BD. OF INT’L ORG. OF SEC. COMM’NS, CODE OF CONDUCT FUNDAMENTALS FOR CREDIT RATING AGENCIES, at A-2 (2015), <https://www.iosco.org/library/pubdocs/pdf/IOS-COPD482.pdf>; cf. Gudula Deipenbrock & Mads Andenas, *Regulating and Supervising Credit Rating Agencies in the European Union* 1, 10 (Univ. of Oslo Faculty of Law, Legal Studies Research Paper Series No. 2016-15, 2016) (discussing efforts by the European Union to improve credit-rating accuracy by reducing conflicts of interest and making the rating procedures “more transparent”). It is uncertain, however, whether these attempts will actually improve rating accuracy. Cf. Schwarcz, *supra* note 190, at 402–04 (examining the reasons why rating agencies failed to predict the financial crisis, and observing that the “more likely explanation . . . is that ratings are judgment calls by human beings, and mistakes inevitably will be made”).

193 See *supra* note 73 and accompanying text; see also Schwarcz, *supra* note 16, at 215.

194 See *supra* notes 74–75 and accompanying text. In the United States, the Federal Deposit Insurance Corporation (FDIC), a government agency established after the Depression, provides this guarantee. 12 U.S.C. § 1811 (2012).

195 Schwarcz, *supra* note 16, at 215.

196 See *id.* (arguing that “regulation might . . . provide liquidity to keep [the capital markets] open” and also explaining how to accomplish that, through privatization, without creating moral hazard); cf. Michael D. Bordo et al., *Real Versus Pseudo-International Systemic Risk: Some Lessons from History* 19 (Nat’l Bureau of Econ. Research, Working Paper No. 5371, 1995) (observing that financial panic will not usually become contagious when a lender of last resort provides adequate liquidity). In the Great Depression, for example, economists believe that the negative effects would have been considerably muted through actions by the government central bank to provide the needed liquidity to maintain stability within the monetary supply. *Id.* at 21.

197 See Anabtawi & Schwarcz, *supra* note 46, at 1399–400.

198 Schwarcz, *supra* note 16, at 217.

experimentation and innovation on which growth depends.”¹⁹⁹ In practice, however, identifying such a sorting mechanism *ex ante* is difficult.²⁰⁰ That provides yet another reason, in addition to those next discussed, why failures will be inevitable.

IV. ADDRESSING THE INEVITABLE FAILURES

Notwithstanding the best regulatory efforts, we do not yet understand human nature well enough to fully solve the problem of complacency. We cannot even “anticipate all the causes of . . . panic[].”²⁰¹ Prior to the East Asian financial crisis, for example, “the financial markets did not signal alarm.”²⁰² Very few foresaw that a devaluation of the Thai baht would trigger a panic leading to a regional financial collapse.²⁰³ As Alan Blinder, vice chairman of the Federal Reserve from 1994 to 1996, observed, “These panics can be set off by any number of things and spread in many wondrous ways.”²⁰⁴

Irrationality can also exceed even the best regulatory controls. Federal deposit insurance, for example, has been a somewhat successful strategy for reducing systemic instability caused by panic-induced bank withdrawals.²⁰⁵ During the financial crisis, however, depositors did not feel their funds would be safe in any banking system.²⁰⁶

Because the financial system constantly changes, heuristics that approximate reality can easily lose their accuracy over time. The regulatory approaches to reduce overreliance on outdated heuristics, such as requiring firms to engage in more self-aware operational risk management and reporting, are not guaranteed.²⁰⁷ Regulatory bans on using heuristics would be counterproductive and unrealistic.²⁰⁸

For these and other reasons, preventative “*ex ante*” financial regulation will almost always be imperfect. Financial regulation should therefore be designed not only to try to prevent systemic shocks from occurring but also to try to mitigate their harm when they inevitably occur. Although a compre-

199 *Id.*

200 *Id.*

201 *Id.* at 216.

202 Steven Radelet & Jeffrey Sachs, *The Onset of the East Asian Financial Crisis*, in CURRENCY CRISES 105, 106–07, 119 (Paul Krugman ed., 2000).

203 Eduardo Porter, *Shanghai What-if: How a Shock Can Become a Shock Wave*, N.Y. TIMES (Mar. 4, 2007), <http://query.nytimes.com/gst/fullpage.html?res=9400E3DB1731F937A35750C0A9619C8B63>.

204 *Id.*

205 *See supra* note 194.

206 *See* James Bullard et al., *Systemic Risk and the Financial Crisis: A Primer*, 91 FED. RES. BANK ST. LOUIS REV. 403, 408 (2009) (“Although most money market mutual funds had ample reserves and good assets, investors interpreted the troubles of the Reserve Primary Fund (which held a large amount of Lehman Brothers debt) as a possible indicator of problems at other mutual funds.”).

207 *See supra* notes 177–88 and accompanying text.

208 *See supra* notes 185–90 and accompanying text.

hensive analysis of designing such ameliorative “ex post” financial regulation is beyond the scope of this Article, scholars have separately engaged that topic,²⁰⁹ arguing that such regulation should focus on trying to stabilize the afflicted financial system after a systemic shock has been triggered and is being transmitted.²¹⁰ This approach takes inspiration from chaos theory, which holds that in complex engineering systems—as well as in complex financial systems—failures are almost inevitable.²¹¹ Therefore remedies should focus on limiting the consequences of these failures.²¹²

For example, ex post regulation could establish a liquidity provider of last resort to help stabilize systemically important firms and markets that are impacted by systemic shocks.²¹³ Such a liquidity provider could also help to stabilize prices in panicked financial markets.²¹⁴ The costs of providing liquidity could be at least partly privatized by assessing healthy systemically important firms.²¹⁵ That would not only reduce the taxpayer expense of a bailout but would also help to control the so-called too-big-to-fail problem.²¹⁶

CONCLUSION

Human limitations impose critical constraints on the efficacy of law, undermining at least two perfect-market assumptions on which financial regulation is based—that parties have full information, and that they will act in their rational self-interest. This Article examines how insights into these limitations can be used to improve financial regulation.

Human nature cannot be easily changed. Contrary to pessimistic views, however, we may now be able to begin to overcome some of these limitations. For example, identifying and correcting misleading information cascades and requiring compensation schemes that help to align managerial and firm interests could reduce herd behavior. Requiring continuing investor education, including lectures, could help to reduce investor cognitive biases. Requiring more self-aware operational risk management and reporting might help to reduce overreliance on heuristics.

At present, though, regulatory responses to the problem of complacency are primarily psychological and imprecise. We do not know enough about

209 See Iman Anabtawi & Steven L. Schwarcz, *Regulating Ex Post: How Law Can Address the Inevitability of Financial Failure*, 92 TEX. L. REV. 75, 92 (2013). Ex post regulation can also reduce the danger that policymakers will overregulate financial markets. *Id.* at 102.

210 *Id.*

211 See Schwarcz, *supra* note 114, at 248–49. One aspect of chaos theory is deterministic chaos in dynamic systems, which recognizes that the more complex the system, the more likely it is that failures will occur. Thus, the most successful (complex) systems are those in which the consequences of failures are limited. In engineering design, for example, this can be done by decoupling systems through modularity that helps to reduce a chance that a failure in one part of the system will systemically trigger a failure in another part.

212 *Id.*

213 Anabtawi & Schwarcz, *supra* note 209, at 102–22.

214 See *supra* note 196 and accompanying text.

215 Anabtawi & Schwarcz, *supra* note 209, at 122–28.

216 See *id.*

the causes of panics, for example, to even begin to reliably prevent them. Financial regulation should therefore be designed not only to address behavioral limitations but also to try to mitigate the harm of inevitable financial failures.

Further research may help to reveal the biological basis of human limitations. Recent studies show, for example, that an individual's inclination to succumb to social pressure may have a biological origin and is not necessarily a learned behavior.²¹⁷ Observing corporate managers with the job of controller, scientists have found that the inclination to yield to managerial pressure is positively associated with what they call high mirror neuron system ("hMNS") functionality.²¹⁸

Scientists are trying to find ways to try to manipulate that functionality, which is governed in the brain, not consciously, but at the motor level.²¹⁹ Although biological behavior is difficult to control, scientists believe that hMNS functionality will ultimately be able to be manipulated.²²⁰ These types of insights from the future exploration of the biological basis of human limitations may help to improve the design of future regulation. At the same time, ironically, the power they provide to manipulate behavior may itself need to be regulated.

217 Philip I. Eskenazi et al., *Why Controllers Compromise on Their Fiduciary Duties: EEG Evidence on the Role of the Human Mirror Neuron System*, 50 ACCT., ORGS. & SOC'Y 41, 42 (2016).

218 *Id.*

219 See Giacomo Rizzolatti & Corrado Sinigaglia, *Understanding Action from the Inside*, in ACTION SCIENCE: FOUNDATIONS OF AN EMERGING DISCIPLINE 201, 205–07 (Wolfgang Prinz et al. eds., 2013).

220 See *id.* at 207 (finding that mirror neurons in the brain become active when executing an action, observing someone else execute that specific action, and in turn understanding the experiences associated with the action).

APPENDIX: COMPENDIUM OF POTENTIAL REGULATORY IMPROVEMENTS

This Appendix provides a compendium of how the Article's insights into complacency can be used to redesign financial regulation.

A. *Regulating Herd Behavior*

Herd behavior can result from misleading information cascades. Regulators, such as the U.S. Office of Financial Research, should consider studying how these cascades develop, to try to identify and correct them and reduce their occurrence.²²¹

Requiring increased due diligence might help to strengthen the reliability of market information, which would reduce reliance on misleading information cascades.²²² For example, members of a firm's risk committee could be tasked with reviewing market information to ascertain its reliability. Because even institutional investors are subject to herd behavior, regulators might also consider reassessing securities-law exemptions based on investor sophistication.²²³

Aligning manager compensation with the long-term interests of their firm (such as using retroactive compensation clawbacks) would reduce "defensive" herd behavior, in which managers are not necessarily acting in the interest of their firm and its investors.²²⁴ Discouraging incentive-based contracts that tie the compensation of a firm's managers to the relative performance of their firm with other firms would make managers less likely to engage in defensive herd behavior by imitating the behavior of managers at those other firms.²²⁵

Regulators should also consider offering market participants a range of regulatory menus. That could help to discourage regulatory-motivated herd behavior—exemplified by regulation requiring insurance companies to hold investment-grade-rated corporate bonds, which can correlate an industry-wide dumping of bonds that lose that rating.²²⁶

B. *Regulating Cognitive Biases*

Exposing market participants to specific, poignant, and concrete examples of problems caused by cognitive biases could reduce the effect of availability and optimism biases.²²⁷ Similarly, making prospectus warnings more specific, poignant, and concrete could reduce investor overconfidence.²²⁸

221 See *supra* notes 79 & 129–30 and accompanying text.

222 See *supra* notes 136–38 and accompanying text.

223 See *supra* notes 136–38 and accompanying text.

224 See *supra* notes 139–42 and accompanying text.

225 See *supra* notes 143–45 and accompanying text.

226 See *supra* notes 146–49 and accompanying text.

227 See *supra* notes 150–55 and accompanying text.

228 See *supra* notes 150–64 and accompanying text.

Investor warnings in prospectuses should be supplemented with lectures, or other forms of training, which have been shown to even more effectively reduce investor overconfidence.²²⁹

Regulators should also try to correct market misconceptions and factual errors caused by the availability bias, such as by requiring stronger market awareness that loans that are not initially overcollateralized are inherently risky. To this end, regulators should proactively attempt to identify such misconceptions and errors.²³⁰

Regulators should consider normative frameworks for determining when financial market changes should drive legal changes, in order to counter the tendency to define future events by the recent past.²³¹

C. *Regulating Over-reliance on Heuristics*

Regulation should be designed to decrease the likelihood that parties will over-rely on heuristics and also to increase the accuracy of heuristics.²³² Regulation should not ban reliance on heuristics per se; heuristics that reasonably approximate reality are beneficial.²³³

Requiring parties to engage in more self-aware operational risk management and reporting could decrease the likelihood they will over-rely on heuristics. This might consist of simple reminders, such as stress tests, that negative economic shocks have occurred in the past.²³⁴ Living wills or other resolution plans that effectively require firms to contemplate their own mortality can provide additional reminders, not unlike the ancient Roman tradition of *memento mori*, in which a slave would repeatedly remind the general in a victory parade of his mortal limitations.²³⁵

If self-aware risk management and reporting is inadequate, regulators might consider banning *overreliance* on heuristics. The postcrisis attempt to reduce overreliance on credit ratings illustrates, however, that a ban may not always be realistic.²³⁶

Regulatory responses to overreliance on heuristics should therefore also focus on increasing the accuracy of heuristics. The more closely a heuristic approximates reality, the less likely would reliance thereon become problematic.²³⁷

229 See *supra* notes 160–65 and accompanying text.

230 See *supra* notes 167–70 and accompanying text.

231 See *supra* notes 171–73 and accompanying text.

232 See *supra* note 177 and accompanying text.

233 See *supra* note 177 and accompanying text.

234 See *supra* notes 178–85 and accompanying text.

235 See *supra* notes 183–85 and accompanying text.

236 See *supra* notes 186–91 and accompanying text.

237 See *supra* notes 190–92 and accompanying text.

D. Regulating the Proclivity to Panic

To calm the out-of-control feeling that activates a flight reflex, regulation should be designed to promote market stability. This is epitomized by the FDIC guarantee of deposit accounts to help prevent bank runs.²³⁸

Regulation could also promote financial market stability by establishing a market liquidity provider to stabilize falling prices and by suspending financial market trading when prices are in a freefall.²³⁹

Regulation cannot completely prevent financial panics because, among other reasons,²⁴⁰ regulators cannot anticipate all the causes of panic.²⁴¹ Furthermore, the potential regulatory solutions discussed in this Article are primarily psychological and thus imprecise. Even the best current regulatory controls cannot fully control irrationality.

Regulation should therefore be designed not only to address behavioral limitations but also to try to mitigate the harm of inevitable financial failures.²⁴²

238 See *supra* notes 193–94 and accompanying text.

239 See *supra* notes 195–97 and accompanying text.

240 See *supra* notes 198–200 and accompanying text (observing that regulators lack a sorting mechanism to balance consequences deterred by the regulation against the potential of the regulation to impede market growth).

241 See *supra* note 201 and accompanying text.

242 See *supra* notes 207–16 and accompanying text.

