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Regulating Complacency: Human Limitations and Legal Efficacy[1]

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Abstract: *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 overrely 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.*

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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.[3]

Since the 1970s, the field of behavioral psychology has been exploring limitations on human rationality.[4] Herbert Simon first outlined the theory of "bounded rationality,"[5] 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.[6] Around that time, psychologists Daniel Kahneman and Amos Tversky began researching the sources of bounded rationality and resulting cognitive

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[3] Seminar in Legislation taught by Frank P. Grad, the Joseph P. Chamberlain Professor of Legislation, Columbia Law School.
[4] Joshua D. Wright & Judd E. Stone II, *Misbehavioral Economics: The Case Against Behavioral Antitrust*, 33 CARDOZO L. REV. 1517, 1530 (2012).
[5] *See, e.g.*, Herbert A. Simon, Nobel Memorial Lecture, "Rational Decision-Making in Business Organizations" (Dec. 8, 1978) (discussing bounded rationality).
[6] Wright & Stone, *supra* note 4, at 1530. *See also Herbert Simon*, THE ECONOMIST (May 20, 2009), *available at* http://www.economist.com/node/13350892.

errors.[7] 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."[8] Among other things, they found that people frequently make decisions based on intuition rather than reason, often reaching the wrong answer.[9] Others found that human rationality only weakly correlates with I.Q. level.[10]

Behavioral law and economics adopted these findings, rejecting the traditional assumption that economic actors are wholly rational.[11] Recent studies have shown, however, that rationality can be addressed and sometimes improved.[12] Legal scholars are beginning to explore how regulatory intervention can help to counteract irrationality and correct cognitive error.[13]

Little has been done, though, about using these insights to improve financial regulation. Even in financial markets, humans have bounded rationality.[14] The only

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[7] David Z. Hambrick & Alexander P. Burgoyne, *The Difference between Rationality and Intelligence*, N. Y. TIMES (Sept. 16, 2016), *available at* 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 (2016) (discussing the relationship between Kahneman and Tversky).

[8] Jon D. Hanson & Douglas A. Kysar, *Taking Behavioralism Seriously: The Problem of Market Manipulation*, 74 N.Y.U. L. REV. 630, 691 (1999).

[9] *See, e.g.*, John Conlisck, *Why Bounded Rationality?*, 34 J. ECON. LIT. 669, 670 (1996) (surveying the literature on bounded rationality).

[10] Hambrick & Burgoyne, *supra* note 7 (discussing research by psychologist Keith Stanovich). In the financial crisis, for example, sophisticated institutional investors suffered from similar irrational tendencies as "widows and orphans." *Id*.

[11] Stephen J. Choi & A.C. Pritchard, *Behavioral Economics and the SEC*, 56 STAN. L. REV. 1, 3 (2003).

[12] Hambrick & Burgoyne, *supra* note 7 (describing a pair of studies published by psychologist Carey Morewedge and colleagues that found that computer training led to decreases in decisionmaking bias).

[13] Barry Schwartz, *Why Not Nudge? A Review of Cass Sunstein's Why Nudge*, PSYCH REPORT, Apr. 17, 2014, available at http://thepsychreport.com/essays-discussion/nudge-review-cass-sunsteins-why-nudge/.

[14] Steven L. Schwarcz, *Controlling Financial Chaos: The Power and Limits of Law*, 2012 WIS. L. REV. 815, 821 (2012). During periods of economic quietude, for example, financial actors grow complacent and underestimate both adverse and mundane low-

scholar who, to date, has considered how these insights might improve financial regulation focused narrowly on consumer finance.[15] 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,[16] and "macroprudential" financial regulation, which is intended to protect the stability of the financial system itself[17] by reducing systemic risk.[18]

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"[19] in the expansive

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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).

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

[16] *See, e.g.*, Douglas J. Elliott, et al., *The History of Cyclical Macroprudential Policy in the United States* 6 (Fed. Reserve Bd., Finance and Economics Discussion Series No. 2013-29, 2013), http://www.federalreserve.gov/pubs/feds/2013/201329/201329pap.pdf.

[17] *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* Frank Ahrens, *Obama: We're Moving Toward Broader Regulation*, WASH. POST (Mar. 18, 2009, 12:38 PM), http://voices.washingtonpost.com/economy-watch/2009/03/obama_were_moving_toward_broad.html; Daniel K. Tarullo, U.S. Fed. Reserve Governor, Address at the Yale Law School Conference on Challenges in Global Financial Services: Macroprudential Regulation (Sept. 20, 2013); Janet Yellen, U.S. Fed. Reserve Chair, Address at the 2014 Michel Camdessus Central Banking Lecture, International Monetary Fund: Monetary Policy and Financial Stability (July 2, 2014).

[18] 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).

[19] *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).

sense of that term.[20] 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.[21] These assumptions underlie financial regulation.[22]

The Article proceeds as follows. Part I provides a taxonomy of complacency, dividing it analytically into four categories: herd behavior,[23] cognitive biases,[24] overreliance on heuristics,[25] and a proclivity to panic.[26] Part II of the Article explains how these categories of complacency can trigger financial market failures. Part III of the Article 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). Part IV of the Article analyzes how law should address the inevitable failures that occur notwithstanding these regulatory improvements.

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

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[20] *Cf.* Merriam-Webster Dictionary online (2017), available at https://www.merriam-webster.com/dictionary/complacency (defining "complacency" as "self-satisfaction when unaccompanied by awareness of actual dangers or deficiencies").
[21] *Cf.* FARLEX FINANCIAL DICTIONARY (2012) (discussing perfect-market assumptions, including that market participants have equal access to information and are completely rational), available at http://financial-dictionary.thefreedictionary.com/Perfect+market+assumptions.
[22] *See, e.g.*, JOHAN DEN HERTOG, REVIEW OF ECONOMIC THEORIES OF REGULATION 2, 5 (Dec. 2010), also available as Discussion Paper Series 10-18, Utrecht School of Economics, Tjalling C. Koopmans Research Institute, Utrecht University (observing that economic theories of regulation generally assume that parties pursue their own interest, and also observing that at least some public interest theories of regulation proceed from an assumption of full information).
[23] *See* Part I.A, *infra*.
[24] *See* Part I.B, *infra*.
[25] *See* Part I.C, *infra*.
[26] *See* Part I.D, *infra*. 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 19-21 and accompanying text.

Sunstein discuss the limitations associated with herd behavior,[27] cognitive biases,[28] and reliance on heuristics, which they call "rules of thumb."[29] 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.[30]

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.[31] Some even argue that herd behavior may represent an evolutionary adaptation that allows individuals to take advantage of information gained by others.[32] 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.[33]

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[27] RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS 53–73 (2008).
[28] *See id.* at 23–31.
[29] *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 infra* note 58 and accompanying text (defining heuristics as "mental devices that help to simplify cognitive tasks").
[30] *See* Part I.D, *infra* (discussing how information overload can cause market participants to panic, triggering and transmitting systemic risk).
[31] Lynne L. Dallas, *Short-Termism, The Financial Crisis, and Corporate Governance*, 37 J. CORP. L. 265, 314 (2012).
[32] Sushil Bikchandani, David Hirshleifer, & Ivo Welch, *Learning from the Behavior of Others: Conformity, Fads, and Information 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. *Cf.* Dallas, *supra* note 31, at 310 (referring to this behavior as a collective action problem, an example of rational irrationality).
[33] *See supra* notes 21-22 and accompanying text. The former tendency also contradicts the game-theory assumption of rationality. *Cf.* John F. Nash Jr., *The Bargaining Problem*, 18 ECONOMETRICA 155 (1950) (observing that game theory assumes that players are

For example, a firm's managers might follow the behavior of other firms' managers, thinking the other managers have more or better information.[34] 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.[35] 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."[36] 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.[37]

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."[38] The frenzied worldwide demand to purchase certain highly leveraged mortgage-backed securities ("MBS") in the years prior to the 2008-09 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 that MBS.[39]

"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").

[34] *Cf. supra* note 31 and accompanying text (discussing that scenario).

[35] Sushil Bikchandani, David Hirshleifer, & Ivo Welch, *A Theory of Fads, Fashion, Custom, and Cultural Change as Information Cascades*, 100 J. POL. ECON. 992, 993–994 (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).

[36] DAVID EASLEY & JON KLEINBERG, NETWORKS, CROWDS, AND MARKETS: REASONING ABOUT A HIGHLY CONNECTED WORLD 484 (2010).

[37] *Id.*

[38] *Id.*

[39] *See infra* notes 82-84 and accompanying text.

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.[40]

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,[41] this tendency creates agency costs, which are themselves a type of market failure[42] 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.[43]

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[40] Stephen M. Bainbridge, *Privately Ordered Participatory Management: An Organizational Failures Analysis*, 23 DEL. J. CORP. L. 979, 1003 (1998). *Cf. id*. at 1002 (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").

[41] *See, e.g.*, Sam Ro, *We're Witnessing Herding in the Markets and the Consequences could be Devastating*, BUS. INSIDER, May 21, 2015, *available at http://www.businessinsider.com/sell-side-herding-career-risk-bubbles-2015-5* (quoting GMO's Jeremy Grantham, "The central truth of the investment business is that investment behavior is driven by career risk . . . . This creates herding, or momentum, which drives prices far above or far below fair price.").

[42] *See, e.g.*, Frank Partnoy, *Financial Systems, Crises, and Regulation, in* THE OXFORD HANDBOOK OF FINANCIAL REGULATION 76 (Niamh Moloney ed., 2015).

[43] 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"). *Cf.* Dallas, *supra* note 31, at 319 (observing that managers who invest unconventionally are more likely to lose their jobs).

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 bias[44] and optimism bias.[45] Both of these biases violate the perfect-market assumption that parties have full information[46] by distorting the internalization of information.[47]

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 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.[48] For example, people with recently divorced friends tend to overestimate the divorce rate.[49]

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[44] *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 decisionmaking as well as in social judgment research").

[45] *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.").

[46] *See supra* notes 21-22 and accompanying text.

[47] *See* Christine Jolls & Cass R. Sunstein, *Debiasing Through Law*, 35 J. LEGAL STUD. 199, 204–205, 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 27, 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., non-consumer) 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 15-17 and accompanying text.

[48] Iman Anabtawi & Steven L. Schwarcz, *Regulating Systemic Risk: Towards an Analytical Framework*, 86 NOTRE DAME L. REV. 1349, 1366-67 (2011) (hereinafter, *Regulating Systemic Risk*).

[49] *Id*. at 1367 n. 72.

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.[50] 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.'"[51] Croesus heard what he wanted to hear[52]—that Cyrus would fall—but in fact, his empire was the one destroyed.[53]

C. Overreliance on Heuristics

Overreliance 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.[54]

The heuristics category superficially overlaps with cognitive biases. Indeed, availability bias is sometimes referred to as the availability heuristic.[55] Logically, however, these categories should be distinguished by whether the simplification of reality is implicit or explicit.[56] Cognitive biases are simplifications of reality that *implicitly*

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[50] *Id*. at 1366.
[51] REV. T. DEMPSEY, THE DELPHIC ORACLE: ITS EARLY HISTORY, INFLUENCE, AND FALL 70 (1972).
[52] In this sense, optimism bias incorporates the concept of confirmation bias—the tendency to interpret information in a way that confirms one's preconceptions.
[53] DEMPSEY, *supra* note 51, at 71. *See also id.* at 107 (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).
[54] *See supra* note 21 and accompanying text.
[55] *See, e.g.*, April M. Perry, *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").
[56] *Cf*. Steven L. Schwarcz & Lucy Chang, *The Custom-to-Fail Cycle*, 62 DUKE. L. J. 767, 768 n. 2 (2012) (hereinafter, *The Custom-to-Fail Cycle*) (differentiating availability and

occur as a psychological coping mechanism.[57] In contrast, heuristics usually refer to *explicitly* adopted "mental devices that help to simplify cognitive tasks."[58]

Heuristics are especially important in areas of complexity, such as complex financial markets.[59] Investors, for example, use rating-agency credit ratings[60] to help estimate risks associated with securities.[61] Financial firms routinely rely on mathematical modelling, such as value-at-risk (VaR), a model for measuring investment-portfolio risk, to evaluate and report market risk.[62] Without reliance on heuristics, financial markets could not operate.[63] Appropriate reliance on heuristics is thus rational to that extent.

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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).

[57] *See* text accompanying notes 48-49, *supra*.

[58] Juurikkala, *supra* note 15, at 40. *See also The Custom-to-Fail Cycle*, *supra* note 56, at 768 (defining heuristics as "simplifications of reality that allow us to make decisions in spite of our limited ability to process information"); *supra* notes 49-50 and accompanying text.

[59] *The Custom-to-Fail Cycle*, *supra* note 56, at 769.

[60] 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.

[61] *The Custom-to-Fail Cycle*, *supra* note 56, at 772.

[62] *Id.* at 772.

[63] *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 (Princeton Univ., Working Paper, 2009), *available at* 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).

Problems can occur, however, when there is *overreliance* on heuristics.[64] As will be discussed, 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.[65] Similarly, investors often overrely on credit ratings instead of also engaging in their own due diligence.[66] 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.[67] Prior to the financial crisis, investors rarely questioned the accuracy of credit ratings.[68] Their faith was reinforced by the long record that ratings had for reliably assessing the creditworthiness of relatively simple debt instruments, such as corporate bonds and basic securitization instruments.[69] That unquestioning faith continued even when ratings were extrapolated to new, much more complex and highly leveraged, high-yield MBS.[70]

D. Proclivity to Panic

Financial markets can change rapidly.[71] Sudden changes and the influx of new information can cause an "information overload," causing market participants to panic.[72]

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[64] This overreliance appears to be more easily seen in retrospect than defined or identified in advance, making it even more difficult to solve.
[65] *See infra* notes 90-95 and accompanying text.
[66] *The Custom-to-Fail Cycle*, *supra* note 56, 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).
[67] *The Custom-to-Fail Cycle*, *supra* note 56, at 776.
[68] *Id.* at 773.
[69] *Id.* at 773.
[70] *Id*. at 774-75. *Cf. supra* note 82 and accompanying text (discussing this type of MBS).
[71] *Regulating Financial Change*, *supra* note 19, at 1445.
[72] 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. 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, overreliance on heuristics, and the proclivity to panic.

Market panic can also be triggered by new and worrying information that cannot be verified.[73] These influences can impair the perfect-market assumption that parties have full information.[74]

Panic can also activate a flight reflex, to remove oneself from a perceived danger.[75] Some engage in "collective flight,"[76] 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.[77] Others respond to the flight reflex in the manner of *sauve qui peut*, an "every man for himself" scramble that can disrupt organized procedures[78]—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.[79] That also distorts the perfect-market assumption that parties act in their rational self-interest.[80]

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[73] *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).
[74] *See supra* notes 21-22 and accompanying text.
[75] 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*, (Federal Reserve Bank of Boston Public Policy Discussion Paper No.12–7, at 9) (2012), available at 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).
[76] Quarantelli, *supra* note 75.
[77] Dion Harmon et al., *Predicting Economic Market Crises Using Measures of Collective Panic* (2011), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1829224&download=yes.
[78] Jeffery Sachs, "Creditor Panics: Causes and Remedies," Research Notes in Economics & Statistics No. 98-4, Deutsche Bank Research 14 (1998).
[79] *Cf*. Quarantelli, *supra* note 75, 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.").
[80] *See supra* note 21 and accompanying text.

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.[81] 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.[82] Many of these investors were almost certainly following the herd,[83] thinking other investors had more or better information, whereas they all turned out to be following a misleading information cascade.[84] The increasing demand for MBS drove a race to the bottom, motivating mortgage lenders to make and then securitize poor quality (including subprime) loans.[85] A subsequent decline in home prices caused many of the

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[81] Office of Financial Research, Asset Management and Financial Stability 2 (2013), available at 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).

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

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

[84] *See* Martin Neil Baily, Robert E. Litan, & Matthew S. Johnson, *The Origins of the Financial Crisis*, THE BROOKINGS INSTITUTION 1, 16 (Nov. 2008), *available at* 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, rating agencies—indeed everyone— could get swept up in a bubble that *ex post* was clearly bound to burst.").

[85] *See* McDonnell, *supra* note 83, at 10–11 (2011) (stating that "[s]ub-prime mortgages to borrowers with poor credit became an increasingly large part of the mortgage market").

poor quality loans to default, resulting in credit-rating downgrades and MBS defaults.[86] And that, in turn, led to a systemic collapse of financial markets and of firms, like Lehman Brothers, that invested heavily in MBS.[87]

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.[88] 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.[89] Notably, their firms paid them for choosing profitable investments with low apparent risks, as measured by VaR.[90] Secondary managers therefore turned to high-yield investment products with low VaR risk profiles, like the complex MBS supported by credit-defaults swaps that other financial firms were buying.[91]

The managers knew, but did not always explain to their seniors, that any losses that might eventually occur would be huge.[92] The managers also knew that if and when

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Cf. Thompson, *supra* note 82, at 53 (explaining that as they became more economically successful, MBS "became much riskier and more complex").

[86] *Id.* at 55.

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

[88] Steven L. Schwarcz, *Conflicts and Financial Collapse: The Problem of Secondary-Management Agency Costs*, 26 YALE J. REG. 457, 460 (2009). *Cf. supra* notes 40-43 and accompanying text (defining defensive herd behavior).

[89] *Conflicts and Financial Collapse*, *supra* note 88. 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.

[90] *Id*. at 460.

[91] *Id*.

[92] *Id*. *See also* Joe Nocera, *Risk Mismanagement*, N.Y. TIMES, Jan. 4, 2009 (Magazine), at 46.

those losses occurred, they would be protected by the fact that so many other financial firms chose that type of investment.[93] And indeed, when huge losses on credit-default swaps and MBS supported by those swaps triggered the systemic collapse that became the financial crisis,[94] relatively few of those managers lost their jobs or were prosecuted.[95]

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 routine[96]—such as valuing collateral.[97] 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.[98] 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

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[93] *Conflicts and Financial Collapse*, *supra* note 88, at 460. *Cf. supra* note 43 and accompanying text (making a similar observation).
[94] *See, e.g.*, John Grgurich, *Credit Default Swaps: Still Here, Still Able to Wreak Havoc*, DAILYFINANCE (May 11, 2012, 3:00 PM), http://www.dailyfinance.com/2012/05/11/jpmorgan-credit-default-swaps-still-wreaking-havoc ("Credit default swaps were at the heart of the financial crisis.").
[95] *See, e.g.*, Jesse Eisinger, *Why Only One Top Banker Went to Jail for the Financial Crisis*, N.Y. TIMES (Apr. 30, 2014); Steven L. Schwarcz, *Excessive Corporate Risk-Taking and the Decline of Personal Blame*, 65 EMORY L.J. 533, 534 (2015).
[96] *Cf.* Susanna Kim Ripken, *Paternalism and Securities Regulation*, 21 STAN. J. L. BUS. & FIN. 1, 17, 25 (2015) (arguing that investors are taken by surprise and unprepared to react effectively to a rare event of extreme impact).
[97] *Regulating Systemic Risk*, *supra* note 48, at 1367.
[98] *Id*. at 1356.

recent past. If stock prices had continued rising, the increasing collateral value would have protected the loans.[99] 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.[100]

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,[101] as did rating agencies and other parties who assessed risk on securities backed by these loans.[102] 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.[103] 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 have protected the loans.[104] 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 characterize the crisis.[105]

C. Overreliance on Heuristics, and Market Failures

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[99] *Id.*
[100] *Id.* at 1357.
[101] *Id.* at 1359–60.
[102] *Cf.* Dallas, *supra* note 31, 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").
[103] *Regulating Systemic Risk*, *supra* note 48, at 1359–60.
[104] 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.
[105] *Regulating Systemic Risk*, *supra* note 48, 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." (citation omitted)).

Overreliance 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.[106] 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.[107] The resulting losses caused many of these firms to fail or to need a bailout.[108]

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 overrelying on them without performing their own due diligence.[109] This continued even when investment-grade ratings were extrapolated to leveraged, high-yield MBS.[110] Much of that MBS ultimately defaulted or were downgraded, however, devastating the investor community and contributing to the financial crisis.[111]

D. Proclivity to Panic, and Market Failures

Panic can trigger financial market failures, historically epitomized by a bank run.[112] 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.[113] That information failure undermined "the healthy diversity of viewpoints that tends to keep intellectual hazard in check during normal times."[114]

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[106] *See supra* notes 90-95 and accompanying text.
[107] *See supra* note 92 and accompanying text.
[108] *See supra* note 94 and accompanying text.
[109] *See supra* notes 68-69 and accompanying text.
[110] *See supra* note 70 and accompanying text.
[111] *The Custom-to-Fail Cycle*, *supra* note 56, at 778.
[112] *See supra* notes 76-77 and accompanying text (describing a bank run). *See also Controlling Financial Chaos*, *supra* note 14, at 821.
[113] Miller & Rosenfeld, *supra* note 72, at 810.
[114] *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 reduces their exposure to risk, creating a vicious cycle in which losses or liquidity trigger even more panic and greater turmoil.").

Thus, when the presumably safe investment-grade rated MBS defaulted or were downgraded,[115] 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.[116] Their fear was compounded by the failure of regulatory agencies to quickly address the problem or reassure market participants that the problem was isolated.[117] The panic caused a widespread collective flight by investors,[118] in which they stopped investing not only in MBS—which caused prices in the MBS market to collapse even further[119]—but also in all debt securities.[120] The resulting loss of credit affected every level of the financial system,[121] eventually reducing spending and dragging down the stock market.[122]

III. REGULATING COMPLACENCY

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[115] *See supra* note 111 and accompanying text.
[116] *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); Mortimer B. Zuckerman, *Preventing a Panic*, U.S. NEWS & WORLD REP., Feb. 11, 2008, at 63–64 (arguing that "the credit system has been virtually frozen" because "few people even know where the liabilities and losses are concentrated").
[117] Financial Crisis Inquiry Commission, THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF THE FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES 436-437 (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 72-73 and accompanying text.
[118] *Cf. supra* note 76 and accompanying text (discussing collective flight as one of the typical responses to panic).
[119] *Regulating Complexity in Financial Markets*, *supra* note 116; *The Custom-to-Fail Cycle*, *supra* note 56, at 778.
[120] *Id.*
[121] *See* Steven L. Schwarcz, *The Financial Crisis and Credit Unavailability: Cause or Effect?*, 72 BUS. LAW. 409 (Spring 2017).
[122] Brendan Sapien, *Financial Weapons of Mass Destruction: From Bucket Shops to Credit Default Swaps*, 19 S. CAL. INTERDISC. L.J. 411, 438 (2010); Damian Tambini, *What Is Financial Journalism For?: Ethics and Responsibility in a Time of Crisis and Change*, POLIS, London School of Economics and Political Science Working Paper 1, 13 (2008).

Because complacency can trigger financial market failures, it should be regulated—but how?[123] Human nature cannot be easily changed. Contrary to the pessimistic views of noted behavioral psychologists such as Nobel Prize winner Daniel Kahneman,[124] some now believe that "[w]e have the means to overcome some of our [human] limitations, through education, through institutions, through enlightenment."[125] At least one scholar has argued, for example, that certain "light-touch regulations" could help to combat human psychological limitations in consumer finance.[126] 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,[127] the interest of the party for whom they are serving.[128] The first type of herd behavior is difficult to regulate precisely because it is individually irrational.[129] Regulators have also

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[123] 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 the situation into terms that they can easily understand." THALER & SUNSTEIN, *supra* note 27, at 74.

[124] *Cf.* Robert A. Burton, *'Black Box Thinking' and 'Failure: Why Science is so Successful*, N.Y. TIMES, Dec. 29, 2015, *available at* http://www.nytimes.com/2016/01/03/books/review/black-box-thinking-and-failure-why-science-is-so-successful.html?_r=0 (discussing Kahneman's pessimistic view that the idea of human nature with inherent flaws is consistent with the tragedy of the human condition).

[125] *Id.* (quoting Harvard psychologist Steven Pinker). *Cf. supra* note 12 and accompanying text (referencing recent studies showing that rationality can be addressed and sometimes improved).

[126] Juurikkala, *supra* note 15, at 51 (defining "light-touch regulations" as minimally intrusive "default rules, framing and information disclosure rules, cooling-off periods, and limitations on choice").

[127] *Cf.* text accompanying notes 40-41 (defining defensive herd behavior, in which followers of the herd are not necessarily acting in the interest of the party for whom they are serving).

[128] *See* text accompanying notes 32-33, *supra*.

[129] *See id.*

feared that attempts to regulate herd behavior could lead to regulatory arbitrage.[130] To the extent it results from misleading information cascades,[131] 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.

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.[132] 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."[133] They also propose creating an online Risk Information Site, to centralize accurate and up-to-date information on financial market conditions.[134] These measures implicitly assume that "informational cascades can be reversed easily when an individual with precision of information expresses his view publicly."[135]

The validity of that assumption has not, however, been rigorously tested, especially in light of the recent trend towards "fake news" and "alternative facts." Increasingly, the stories that tend to be reported by the media, and the online websites

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[130] *See* Bartosz Gebka & Mark E. Wohar, *International Herding: Does it Differ Across Sectors?*, 23 INT'L. FIN. MARKETS, INST. & MONEY 55, 83 (2013) ("[T]he best policy may be to refrain from regulating herding in selected industries; 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.").

[131] *Cf. supra* notes 34-35 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).

[132] Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 739 (1999) (discussing information cascades and pervasive misconceptions).

[133] *Id*. at 752.

[134] *Id*. at 755.

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

that receive the most views, are those that are "novel, sensational, or emotional."[136] As a result, public trust in the accuracy of even mainstream media reporting is at an unprecedented low.[137] 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,[138] thereby reducing reliance on a misleading information cascade.[139] 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.[140]

Defensive herd behavior may be easier to regulate. Consider, for example, the conflict of interest between financial firms and their secondary managers.[141] This conflict could be reduced by requiring secondary-management compensation to be aligned with the long-term interests of the firm.[142] 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

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[136] *See* Alice Marwick & Rebecca Lewis, *Media Manipulation and Disinformation Online*, DATA & SOCIETY RESEARCH INSTITUTE 40, 42-43 (2017).
[137] *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 32%, the lowest in polling history).
[138] Dallas, *supra* note 8, at 362.
[139] *Cf. supra* note 39 and accompanying text (explaining that individuals in an information cascade draw rational inferences from limited information).
[140] Dallas, *supra* note 8, at 363 ("[T]he losses that sophisticated investors suffered as a result of the financial crisis require a rethinking of exemptions . . ."). *Cf. Regulating Complexity in Financial Markets*, *supra* note 58, at 242–243 ("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.").
[141] *See supra* notes 88-91 and accompanying text.
[142] *Conflicts and Financial Collapse*, *supra* note 88, at 465.

period, the structure proves inadequate or the securities turn out to be poor investments."[143] 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."[144]

Another approach to regulating defensive herd behavior would be to try to reduce the managerial risk aversion that motivates this type of herd behavior.[145] 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.[146] 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.[147]

It should also be noted that regulation itself can sometimes foster herd behavior. Because this type of herd behavior is neither individually nor societally 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.[148] To discourage regulatory motivated herd behavior, the government could

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[143] *Id.* at 465.
[144] *Id.* at 465–66.
[145] *See supra* note 41 and accompanying text.
[146] David Hirschleifer, *Managerial Reputation and Corporate Investment Decisions*, 22 FIN. MGMT. 145, 154 (1993). *See also* Sushil Bikchandani & Sunil Sharma, *Herd Behavior in Financial Markets – A Review*, 47 IMF STAFF PAPERS 279, 292 (2001).
[147] *Cf.* Bikchandani & Sharma, *supra* note 146, at 293 (arguing that such contracts are largely "inefficient, inconsistent with optimal risk sharing, and ineffective in overcoming moral hazard and adverse selection problems").
[148] Daniel Schwarcz & Steven L. Schwarcz, *Regulating Systemic Risk in Insurance*, 81 U. CHICAGO L. REV. 1569, 1596, 1602 (2014). *Cf.* ERIK F. GERDING, LAW, BUBBLES, AND FINANCIAL REGULATION 13 (2014) (arguing that regulations can create investment preferences for certain asset classes, setting the stage for asset bubbles and disastrous bank runs); Peter O. Muelbert, *Managing Risk in the Financial System*, *in* THE OXFORD HANDBOOK OF FINANCIAL REGULATION 364, 395 (Niamh Moloney, Eilis Ferran, &

treat subjects of regulation differently,[149] such as by offering market participants a range of regulatory menus—e.g., "simultaneously offer[ing] a higher-price, lower-regulation alternative and a lower-price, higher-regulation alternative."[150] 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."[151]

B. Regulating Cognitive Biases

Professors Jolls and Sunstein have argued that cognitive biases can be regulated through an approach they call "debiasing through law."[152] The goal is to give people more control over the process of information.[153] 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.[154]

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.[155] Foreign cigarette-package warnings that are more pictorially graphic than U.S. text-only warnings have been found to be more effective to

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Jennifer Payne, eds. 2015) (observing that financial regulation that "causes banks to act in a (more) uniform way . . . will increase systemic risk").

[149] 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).

[150] Ayres & Mitts, *supra* note 149, at 25 (discussing "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.").

[151] *Id.*

[152] *See* Jolls & Sunstein, *supra* note 47, at 200.

[153] ROY F. BAUMEISTER & BRAD J. BUSHMAN, SOCIAL PSYCHOLOGY AND HUMAN NATURE: INTERNATIONAL EDITION 155 (2010). *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).

[154] Jolls & Sunstein, *supra* note 47, at 210.

[155] *Id.*

discourage smoking.[156] 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."[157]

In making information more available, special attention should be paid to framing the information, which can bias perceptions.[158] Preferences are not constant, and choice may be manipulated depending on the way the information is presented.[159] For example, people usually weigh losses more heavily than gains in evaluating potential risks and outcomes.[160] 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."[161]

Social scientists have suggested additional debiasing strategies, including changing optimizing choice architecture, changing incentives, and training.[162] Changing optimizing choice architecture generally parallels the Jolls-and-Sunstein approach of framing the presentation of information.[163] 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.[164] Training focuses

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[156] *See, e.g.*, Yong et al., *Mediational Pathways of the Impact of Cigarette Warning Labels on Quit Attempts*, 33 HEALTH PSYCHOLOGY 1410 (2014) (comparing Canadian, Australian, United Kingdom, and U.S. cigarette-package warnings).
[157] Juurikkala, *supra* note 15, at 56.
[158] THALER & SUNSTEIN, *supra* note 27, at 36–37; Jolls & Sunstein, *supra* note 47, at 210–211; Juurikkala, *supra* note 15, at 51.
[159] *See* Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision under Risk*, 47 ECONOMETRICA 263 (1979).
[160] Kaustia & Pertula, *supra* note 167, at 205. 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).
[161] THALER & SUNSTEIN, *supra* note 27, at 36–37.
[162] Carey K. Morewedge et. al, *Debiasing Decisions: Improved Decision Making with a Single Training Intervention*, 2 POL'Y INSIGHTS BEHAV. & BRAIN SCI. 129, 130 (2015).
[163] *Id.*
[164] *Id.*

on helping decisionmakers learn how to better process information and make more accurate decisions.[165]

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).[166] 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.[167] Though less clear how to accomplish, overconfidence could be further reduced by integrating independent perspectives into financial decisionmaking.[168]

Regulators should also consider trying to correct the market misconceptions and factual errors caused by the availability bias.[169] 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

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[165] *Id.*

[166] *Cf.* Juurikkala, *supra* note 15, 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").

[167] Markku Kaustia & Milla Pertula, *Overconfidence and Debiasing in the Financial Industry*, 4 REV. BEHAV. FIN. 46, 47, 57 (2012).

[168] *Cf.* Cognitive Biases and Decision Making: A Literature Review and Discussion of Implications for the US Army, *available at* 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 perspectives 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.

[169] *Cf.* Jolls & Sunstein, *supra* note 47, at 210 & 228 (discussing debiasing).

that a decline (or even a plateau) in collateral value could jeopardize repayment.[170] Although some scholars question whether government officials could identify market misconceptions or factual errors that market participants do not themselves see,[171] such identification is part of the core mission of the U.S. Financial Stability Oversight Council ("FSOC"), created by the Dodd-Frank Act.[172]

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.[173] But once a crisis recedes from memory, few will want to sacrifice profits for

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[170] *Cf. The Custom-to-Fail Cycle*, *supra* note 56, 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 over-collateralized 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.

[171] *Cf.* Juurikkala, *supra* note 15, 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 whether the private sector should be subjected to monitoring and reporting duties.

[172] *See, e.g.*, Financial Stability Oversight Council, Report 2012 at 120, *available at* 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 Guynn, *The Financial Panic of 2008 and Financial Regulatory Reform*, Harvard Law School Forum on Corporate Governance and Financial Regulation (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").

[173] Steven L. Schwarcz, *Keynote Address: Understanding the Subprime Financial Crisis*, 60 S.C. L. REV. 549, 503 (2009).

the sake of regulation.[174] A 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").[175] 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.[176] 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.[177] Regulators would then examine whether any such change causes market failures and, if so, they 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.[178]

C. Regulating Overreliance on Heuristics

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[174] *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 in memory). "Bondholders can—and will—fuss all they like. But the reality is, their options are limited: Higher returns or better protection. Most investors will continue to go for the gold." *Id.*

[175] *See Changing Law to Address Changing Markets: A Consequence-Based Inquiry*, 80 L. & 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).

[176] CBI is broader than cost-benefit analysis in that CBI addresses not only the "how" but also the "when" of regulation. *Id.*

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

[178] *See id.*

Regulation can help to decrease the likelihood that parties will overrely 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.[179]

To decrease the likelihood that parties will overrely on heuristics, regulation could require firms to engage in more self-aware operational risk management and reporting.[180] Even a simple reminder that negative economic shocks have occurred in the past can encourage more critical reflection and accurate risk assessments.[181] The Basel III capital-adequacy guidelines thus require banks to engage in periodic financial "stress test" scenarios,[182] 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.[183] Officials from the Federal Reserve have similarly touted these tests in creating a "strong, accountable, and proactive risk culture."[184]

Although less rigorous a reminder, the Dodd-Frank Act also requires certain systemically important firms to prepare so-called living wills,[185] which are resolution

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[179] *The Custom-to-Fail Cycle*, *supra* note 56, at 769.
[180] *Id*. at 780.
[181] *Regulating Systemic Risk*, *supra* note 48, at 1389.
[182] Bank for Int'l Settlements, Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems 8–9 (2011), *available at* http://www.bis.org/publ/bcbs189.pdf.
[183] CHRIS BRUMMER, SOFT LAW AND THE GLOBAL FINANCIAL SYSTEM: RULE MAKING IN THE 21ST CENTURY 217 (2012).
[184] Charles L. Evans, *The Call for Proactive Risk Culture*, Federal Reserve Bank of Chicago, June 3, 2015, *available at* https://www.chicagofed.org/publications/speeches/2015/06-03-call-for-proactive-risk-culture ("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.").
[185] *See, e.g.*, Guynn, *supra* note 172; Clay R. Costner, *Living Wills: Can a Flexible Approach to Rulemaking Address Key Concerns Surrounding Dodd-Frank's Resolution Plans?*, 16 N.C. BANKING INST. 133, 139 (2012) ("observers recognize living wills as a tool to limit systemic risk and encourage prudential practices on the part of financial institutions before failure occurs").

plans that "describe the company's strategy for rapid and orderly resolution in the event of material financial distress or failure of the company."[186] 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."[187]

If these debiasing techniques are inadequate, regulators could also consider banning *overreliance* on heuristics. The post-crisis 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 recommendations about the global financial system, has called for reducing the regulatory use of ratings, effectively requiring market participants to make

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[186] *Resolution Plans*, Board of Governors of the Federal Reserve System, http://www.federalreserve.gov/bankinforeg/resolution-plans.htm. Although the purpose of a living will is to reduce the need for a bailout, I have questioned its effectiveness to achieve that goal. *See* "Too Big to Fool: Moral Hazard, Bailouts, and Corporate Responsibility," available at http://ssrn.com/abstract=2847026 (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).

[187] *Memento Mori: It's Time We Reinvented Death*, NEW SCIENTIST (Oct. 17, 2012), available at https://www.newscientist.com/article/mg21628872-900-memento-mori-its-time-we-reinvented-death/.

their own credit-risk assessments.[188] The Dodd-Frank Act takes a somewhat parallel approach.[189]

These attempts by regulators to reduce reliance on credit ratings illustrate, however, that a ban might be unrealistic. Even if market participants overrelied on credit ratings,[190] 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.[191] Even large financial institutions can find it difficult to perform their own credit-risk assessments.[192] Most market participants have little practical choice but to rely on credit ratings for assessing risk.[193]

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[188] *See* FINANCIAL STABILITY BOARD (FSB), *Principles for Reducing Reliance on CRA Ratings* (Oct. 27, 2010, *available* at 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 2, 6.

[189] Dodd-Frank Act §§ 931-939H (restricting the use of credit ratings for regulatory exemptions).

[190] Credit ratings are not necessarily imprecise heuristics. However, pre-crisis ratings on certain complex and highly leveraged mortgage-backed securities 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*, COUNCIL OF INSTITUTIONAL INVESTORS WHITE PAPER 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. BUS. & FIN. 175, 221 (2012).

[191] Francesco de Pascalis, *Reducing Overreliance on Credit Ratings: Failing Strategies and the Need to Start from Scratch*, 91 AMICUS CURIAE 1, 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 the CRAs.")

[192] *Id*. *Cf*. *Understanding the Subprime Financial Crisis*, *supra* note 173, at 563 (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").

[193] *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

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. Post-crisis regulatory attempts to try to improve the accuracy of credit ratings, such as by increasing the transparency of the rating process and addressing alleged conflicts of interest in the issue-pays model, reflect this type of regulatory approach.[194]

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.[195] The classic example is a government guarantee of bank accounts to help deter the collective flight of depositors known as a bank run.[196]

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private debtors. Investors still follow CRAs' standard of creditworthiness . . . . CRAs' status as transnational private authorities has been surprisingly resilient.").

[194] *See, e.g.*, International Organization of Securities Commissions, Code of Conduct Fundamentals for Credit Rating Agencies (Final Report, March 2015), *available at* https://www.iosco.org/library/pubdocs/pdf/IOSCOPD482.pdf. *Cf.* Gudula Deipenbrock & Mads Andenas, *Regulating and Supervising Credit Rating Agencies in the European Union*, University of Oslo Faculty of Law Legal Studies Research Paper Series No. 2016-15 1, 10 (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 ratings accuracy. *Cf.* Steven L. Schwarcz, *Protecting Financial Markets: Lessons from the Subprime Mortgage Meltdown*, 93 MINN. L. REV. 373, 402-04 (2008) (examining the reasons why rating agencies failed to predict the financial crisis, and observing, *id*. at 403, that the "more likely explanation . . . is that ratings are judgment calls by human beings, and mistakes inevitably will be made").

[195] *See supra* note 75 and accompanying text. *See also Systemic Risk*, *supra* note 18, at 215.

[196] *See supra* notes 76-77 and accompanying text. In the United States, the Federal Deposit Insurance Corporation (FDIC), a post-Depression established government agency, provides this guarantee. 12 U.S.C. § 1811.

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."[197] 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.[198] Governments might also consider suspending trading in financial markets when prices are in a freefall.[199]

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."[200] Without "such a sorting mechanism, regulation can impede market growth or undermine the market experimentation and innovation on which growth depends."[201] In practice, however, identifying such a sorting mechanism *ex ante* is difficult.[202] 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

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[197] *Systemic Risk*, *supra* note 18, at 215.
[198] *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, Bruce Misrach, & Anna Schwartz, *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.
[199] *Regulating Systemic Risk*, *supra* note 48, at 1399-1400.
[200] *Systemic Risk*, *supra* note 18, at 217.
[201] *Id.*
[202] *Id.*

"anticipate all the causes of [] panic."[203] Prior to the East Asian financial crisis, for example, "the financial markets did not signal alarm."[204] Very few foresaw that a devaluation of the Thai baht would trigger a panic leading to a regional financial collapse.[205] 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."[206]

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.[207] During the financial crisis, however, depositors did not feel their funds would be safe in any banking system.[208]

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.[209] Regulatory bans on using heuristics would be counterproductive and unrealistic.[210]

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[203] *Id.* at 216.
[204] Steven Radelet & Jeffrey Sachs, *The Onset of the East Asian Financial Crisis, in* CURRENCY CRISES 107, 119 (Paul Krugman ed., 2000).
[205] Eduardo Porter, *The World: Shanghai What-if: How a Shock Can Become a Shock Wave,* N.Y. TIMES, March 4, 2007, *available at* *http://query.nytimes.com/gst/fullpage.html?res=9400E3DB1731F937A35750C0A9619C8B63*.
[206] *Id.*
[207] *See supra* note 196 and accompanying text.
[208] James Bullard, et al, *Systemic Risk and the Financial Crisis: A Primer (Part One),* FEDERAL RESERVE BANK OF 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.").
[209] *See supra* notes 179-187 and accompanying text.
[210] *See supra* notes 187-192 and accompanying text.

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 comprehensive analysis of designing such ameliorative "ex post" financial regulation is beyond the scope of this Article, scholars have separately engaged that topic,[211] 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.[212] 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.[213] Therefore remedies should focus on limiting the consequences of these failures.[214]

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.[215] Such a liquidity provider could also help to stabilize prices in panicked financial markets.[216] The costs of providing liquidity could be at least partly privatized by assessing healthy systemically important firms.[217] That not only would reduce the

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[211] Iman Anabtawi & Steven L. Schwarcz, *Regulating Ex Post: How Law Can Address the Inevitability of Financial Failure*, 92 TEXAS L. REV. 75, 92 (2013). Ex post regulation can also reduce the danger that policymakers will overregulate financial markets. *Id*. at 91, 102.
[212] *Id*. at 102.
[213] *See Regulating Complexity in Financial Markets*, *supra* note 116, 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.
[214] *Id.*
[215] Anabtawi & Schwarcz, *supra* note 211, at 102-22.
[216] *See supra* note 198 and accompanying text.
[217] Anabtawi & Schwarcz, *supra* note 211, at 122-28.

taxpayer expense of a bailout but also would help to control the so-called too-big-to-fail problem.[218]

CONCLUSIONS

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 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

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[218] *Id.*

pressure may have a biological origin and is not necessarily a learned behavior.[219] 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.

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.[220] Although biological behavior is difficult to control, scientists believe that hMNS functionality will ultimately be able to be manipulated.[221] 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.

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[219] Philip Eskanazi, Wim Rietdijk, & Frank Hartmann, *Why Controllers Compromise on their Fiduciary Duties: EEG Evidence on the Role of the Human Mirror Neuron System*, 50 ACCT. ORG. SOC'Y 41, 42 (2016).
[220] *See* Giacomo Rizzolatti & Corrado Sinigaglia, *Understanding Action from the Inside*, *in* ACTION SCIENCE: FOUNDATIONS OF AN EMERGING DISCIPLINE 205-207 (Wolfgang Prinz, et al., eds. 2013).
[221] *Id.* at 43 (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.[222]

Requiring increased due diligence might help to strengthen the reliability of market information, which would reduce reliance on misleading information cascades.[223] 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.[224]

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.[225] 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.[226]

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[222] *See supra* notes 81 & 131-132 and accompanying text.
[223] *See supra* notes 138-140 and accompanying text.
[224] *See id.*
[225] *See supra* notes 141-144 and accompanying text.
[226] *See supra* notes 145-147 and accompanying text.

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.[227]

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.[228] Similarly, making prospectus warnings more specific, poignant, and concrete could reduce investor overconfidence.[229]

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.[230]

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.[231]

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.[232]

C. Regulating Overreliance on Heuristics:

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[227] *See supra* notes 148-151 and accompanying text.
[228] *See supra* notes 152-157 and accompanying text.
[229] *See supra* notes 152-161 and accompanying text.
[230] *See supra* notes 161-167 and accompanying text.
[231] *See supra* notes 169-172 and accompanying text.
[232] *See supra* notes 173-175 and accompanying text.

Regulation should be designed to decrease the likelihood that parties will overrely on heuristics and also to increase the accuracy of heuristics.[233] Regulation should not ban reliance on heuristics per se; heuristics that reasonably approximate reality are beneficial.[234]

Requiring parties to engage in more self-aware operational risk management and reporting could decrease the likelihood they will overrely on heuristics. This might consist of simple reminders, such as stress tests, that negative economic shocks have occurred in the past.[235] 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.[236]

If self-aware risk management and reporting is inadequate, regulators might consider banning *overreliance* on heuristics. The post-crisis attempt to reduce overreliance on credit ratings illustrates, however, that a ban may not always be realistic.[237]

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.[238]

D. Regulating the Proclivity to Panic:

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[233] *See supra* note 179 and accompanying text.
[234] *See supra* note 179 and accompanying text.
[235] *See supra* notes 180-187 and accompanying text.
[236] *See id.*
[237] *See supra* notes 188-192 and accompanying text.
[238] *See supra* notes 192-194 and accompanying text.

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.[239]

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.[240]

Regulation cannot completely prevent financial panics because, among other reasons,[241] regulators cannot anticipate all the causes of panic.[242] 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.[243]

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[239] *See supra* notes 195-196 and accompanying text.
[240] *See supra* notes 197-199 and accompanying text.
[241] *See supra* notes 200-202 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).
[242] *See supra* note 203 and accompanying text.
[243] *See supra* note 208-218 and accompanying text.