

THE EPISTEMOLOGY OF THE FINANCIAL CRISIS: COMPLEXITY, CAUSATION, LAW, AND JUDGMENT

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ABSTRACT

The focus on complexity as a problem of the financial meltdown of 2008–2009 suggests that crisis is in part epistemological: we now know enough about financial and economic systems to be threatened by their complexity, but not enough to relieve our fears and anxieties about them. What marks the current crisis is anxiety that the financial world has evolved to the point that there are hidden structures, like "too big to fail" institutions or credit default swaps, that have widespread and adverse downsides. I propose an analogy between medicine and law in the sense of "regulatory technology." If bubbles are the disease, then the analogy is to bipolar syndrome—exuberance, or even a little hypomania is okay on the upswing, but true mania is bad, as is the resulting swing to depression. Good regulation, then, would be something like lithium, which keeps us on an even keel. There are two questions. The first is: do we really understand the forces well enough to regulate them? Regulation is a function of prediction; prediction is a function of observed regularity; observed regularities invoke the problem of scientific (not legal) causation; causation returns us to the question whether the human system being analyzed is capable of being reduced to helpful predictive models. The second question is: Who does the understanding? What we are dealing with is a crisis of confidence in those who purport to be experts in what we cannot fathom merely through our own common sense. The conundrum, of course, is that if it takes an expert to see the problem caused by complexity, how are we, possessing merely common sense, supposed to do anything but rely on

^{*} Associate Professor, Suffolk University Law School. While I have been thinking about many of these issues for a long time, the real spur to this article was a provocative symposium entitled *Complexity and Collapse: The Credit Crisis* hosted by the Temple University Beasley School of Law on April 28, 2009. I want to thank David Hoffman (who also provided comments on this paper), Peter Huang, and Jonathan Lipson for inviting me to participate in the symposium, and Barry Schwartz, Joe Grundfest, and Steve Schwarcz, among others, for sharing their insights during the day. Some of the arguments here have previously appeared briefly in my symposium essay, *Disclosure and Judgment: We Have Met Madoff and He is Ours*, 35 U. DAYTON L. REV. (forthcoming 2010), as well as my other article *Law's Illusion: Scientific Jurisprudence and the Struggle with Judgment* (Suffolk University Law School Research Paper 08-20 2008), <http://ssrn.com/abstract=1163256>. I am also grateful to Kent Greenfield for letting me test some of these arguments on his class in the theory of business decisions at Boston College. Pat Shin, Jessica Silbey, Joe Franco, and Peter Oh have also provided thoughtful criticism. My stubbornness in not incorporating all of their insights is the cause of most of the remaining flaws in this discussion.

their judgment? The epistemological crisis arises from our own judgments to rely on, believe in, trust, or have faith in that judgment.

I. INTRODUCTION

Somewhere between "everything's under control" and blissful ignorance is, "We don't know what we don't know," a kind of twilight knowledge. When we know enough to say, "We don't know what we don't know," it is all the more ominous because we perceive enough to be threatened but not enough to control the threat. I think of the butterflies one has before a performance. The waiting is worse than anything; once we are on stage, or making the speech, or playing the game, or examining witnesses, we are able to act. The issues of complexity and systemic risk in the financial crisis of 2008–2009 are in part epistemological in an analogous way: we now know enough about financial and economic systems to be threatened by their complexity, but not enough to relieve our fears and anxieties about them. I recently attended a daylong conference, largely of law professors, on complexity and the credit crisis. I wondered out loud about our ultimate aims.¹ The credit bubble burst. Do we think we have the capacity of putting regulations in place that will prevent future bubbles? Do we think the systemic complexity is capable of reduction to behavioral models with clear inflection points, akin to aircraft collision avoidance software, that say, in effect: "We are approaching the speculative point of no return; pull back, pull back!" If we do not understand the dynamics of the financial system, we cannot put legal regulation (or, at least, of a benign sort) in place to control them.² This inability is scary; we don't know what we don't know.

¹ For purposes of this discussion, this is what I mean by the evidence (not the definition) of "complexity." Steven Schwarcz, who I think is the foremost legal theorist extant on the interplay of law and finance in sophisticated securities markets, has assembled a systematic presentation of the various social science hypotheses on the cause of the financial crisis, all for the purpose of explaining, predicting, and suggesting fruitful areas of regulation. These include: (i) descriptive categories of securities disclosure, the nature of the structured finance industry, systemic market risk, market actor discipline, and rating agency failure, and (ii) analytic categories of conflict, complacency, and complexity. Steven L. Schwarcz, *Protecting Financial Markets: Lessons from the Subprime Mortgage Meltdown*, 93 MINN. L. REV. 373, 405 (2008) (discussing anomalies arising from, and protections failing to deter, the subprime mortgage meltdown). As to the theme of complexity, Professor Schwarcz observed:

Complexity can deprive investors and other market participants of the information needed for markets to operate effectively. It was responsible for the failure of disclosure in the subprime crisis. Even beyond disclosure, complexity is increasingly a metaphor for the modern financial system and its potential for failure, illustrated further by the tight coupling that causes markets to move rapidly into a crisis mode; the potential convergence in quantitatively constructed investment strategies; the layers inserted between obligors on loans and other financial assets and the assets' beneficial owners, which make it difficult to work out underlying defaults; and the problem of adverse selection, in which investors, uncertain which investments or counterparties are sound, begin to shun all investments. Solving problems of financial complexity may well be the ultimate twenty-first century market goal.

² *Id.* at 405 (footnote omitted).

² Donald Langevoort captured this recently:

The lessons [of the current economic crisis] will readily show the dangers of too little regulation or legal intervention, but leave open the question of whether regulation truly has the capacity to succeed - when, why and how will it overcome its familiar pathologies? I

What marks the current crisis is anxiety that the financial world has evolved to the point that there are hidden structures, like "too big to fail" institutions and credit default swaps that have widespread and adverse downsides. I will return often in this essay to an analogy between medicine and law in the sense of "regulatory technology." The medical analogy to bubbles would be bipolar syndrome—exuberance, or even a little hypomania is okay on the upswing, but true mania is bad, as is the resulting swing to depression. Good regulation, then, would be something like lithium, which keeps us on an even keel. Getting from here to there, however, is not easy.³ In this article, I focus on two separate problems.

The first, which I explore in Part II, is what we mean by a crisis of complexity. This particular crisis means much more to us because it is *ours*, but it is not the first time that Western societies have faced off with complexity. These crises occur when we (or, at least, the intelligentsia) are forced to reconcile what we seem to know as a matter of common sense and everyday experience with what appears to be the non-intuitive knowledge that science offers. I do not propose here to solve the issues of financial complexity; my goal is to put them in historical and philosophical context, as if to say, "don't worry so much about 'we don't know what we don't know,' because it has happened before and it will happen again."⁴ The

suspect that corporate law scholarship should turn more to two disciplines that certainly have had some impact over the last twenty years, but maybe not enough: political science and sociology . . . [T]here is interesting work on the sociology of knowledge that speaks to how actors "make sense" of uncertainty and complexity in ways that might be more adaptive than accurate, and naturally limit regulation's capacity to induce compliance.

Donald C. Langevoort, *Trends in Business Law Scholarship - What's Next?*, AALS CONFERENCE ON BUSINESS ASSOCIATIONS: TAKING STOCK OF THE FIELD AND CORPORATE SOCIAL ACCOUNTABILITY 105 (June 7–10, 2009). I think this is an accurate statement of the problem, but I would look to epistemology, the study of knowledge itself, not sociology, to provide guidance.

³ A recent commentary by Simon Nixon in the *Wall Street Journal* summarizes the problem. The only way to manage financial bubbles, if at all, is through what has come to be known as "macroprudential supervision." The reason is that individual banks lend into the booms because asset values are inflated, there is more money floating around, and the perception of risk has diminished. Regulators therefore need to be able to "remove the punch bowl" when they see a bubble. The problem is "neither the models nor the data required" exist by which the worldwide central banks can identify the linkage among asset classes and counterparties and also calculate the likelihood of the bubble being just about to burst. Moreover, if the models do not work, the recourse is discretionary regulation. Nixon asks, "Will policy makers really be willing to pit their judgments against the markets? Would it have made much difference to the crisis if the [Bank of England] had tried to cool the U.K. housing market earlier in the decade? . . . What's more, policy makers would need teams of bubble-spotters analyzing classes as diverse as U.S. housing, tech stocks and emerging-market currencies. And that would need global coordination." Finally, adding to the complexity, even bank macro-supervision would be insufficient to prevent instability because of the role of monetary policy. Simon Nixon, *Taming Bubbles for Financial Stability*, WALL ST. J., Sept. 5–6, 2009, at B10.

⁴ Indeed, this article represents part of a larger on-going project on what I have referred to previously as "scientific jurisprudence" and its relationship to the exercise of judgment. See Jeffrey M. Lipshaw, *Law's Illusion: Scientific Jurisprudence and the Struggle with Judgment* (Suffolk University Law School Research Paper 08-20 2008), <http://ssrn.com/abstract=1163256>. My broad thesis is that forward-looking judgment for lawyers is so difficult because it asks us to deal with the following:

(a) An objective assessment, based on what we know, of what we think will happen, within the context of,

(b) Our simultaneous assessment of what ought to happen, compounded by

(c) Whether the particular set of rules with which we are dealing are a reflection of reality or are the reality, and all subject to

(d) Our willingness to, or perhaps our inability to keep ourselves from, rationalizing the outcome we want.

As my colleague Joe Franco rightly points out, it happens that the financial crisis gives me an opportunity to expand on point (a) in a particular context, even if the project is not wholly complete. To

eighteenth century insight was that there are systematic laws of nature, unseen and largely unknown by ordinary people (as distinguished from scientists), which explain the workings of the physical world apart merely from the will of God or divine intervention.⁵ In short, what common sense interprets as cause-and-effect may be wrong. These heady insights into the way the world really worked, as opposed to mere appearance, suggested that we truly had glimpsed into the mind of God. Hence, Leibniz famously capsuled the belief that everything could be explained rationally in the idealistic view of this as "the best of all possible worlds."⁶

As I discuss in Part IIA, for many of the Enlightenment thinkers, the great Lisbon Earthquake of 1755 shattered that idealism, and provoked an epistemological reassessment of the attribution of "goodness" to the natural order. The current crisis is similarly epistemological in that it forces us to reassess faith in our ability to reduce the complexities of the world into understandable systems, and to use algorithms based on those regularities to predict and control the future. The problem is not the complexity of economic models and financial algorithms, but the fact that they, by necessity, must imperfectly simplify a complex world. It is our Panglossian faith in them that deserves to be shattered.⁷

Having dealt with the context in which our perception of the complexity of financial bubbles arises, the question becomes whether there is sufficient science of financial bubbles and busts to serve as a basis for regulating them. Stripping away the normative rhetoric, the political haymaking, and the attribution of blame in favor of an assessment of causes and effect for purposes of regulatory medicine is a difficult task. Regulation is a function of prediction; prediction is a function of observed regularity; observed regularities invoke the problem of scientific (not legal) causation; causation returns us to the question of whether the social system being analyzed is capable of being reduced to helpful predictive models.⁸ But, complexity is itself relative; what seemed inordinately complex to ordinary people, much less deep thinkers, in 1787 or 1887 might not seem at all complex to us now. It seems a bit premature to hold our present view of undue complexity as the source of the current problem.

be absolutely clear about it, the financial crisis illustrates ideas about which I have been thinking rather than it being the case that my theorizing about the financial crisis led me to the particular ideas expressed.

⁵ KARL AMERIKS, KANT AND THE FATE OF AUTONOMY (Robert B. Pippin ed., 2000).

⁶ See SUSAN NEIMAN, EVIL IN MODERN THOUGHT 21–27 (2002).

⁷ Richard Posner observed the following: "Economists can't be blamed for having an imperfect understanding of depressions; these are immensely complex events. But they can be blamed for exaggerating their understanding of them [I]n his [2003] presidential address to the American Economic Association, Robert Lucas announced that the problem of depressions had been solved and macroeconomists should move on to other subjects, such as economic growth." Richard A. Posner, *An Economist Tries to Defend His Profession—And Fails*, http://correspondents.theatlantic.com/richard_posner/2009/05/an_economist_defends_his_profession.php [hereinafter *An Economist Tries to Defend His Profession*].

See the further discussion of Judge Posner's views on the financial crisis, *infra* notes 163–168.

⁸ See ALEXANDER ROSENBERG, PHILOSOPHY OF SOCIAL SCIENCE 8–9 (Norman Daniels & Keith Lehrer eds., 1995). "It's pretty clear that technological control and predictive success come only through the discovery of general regularities. For only they enable us to bend the future to our desires by manipulating present conditions and, perhaps more important, enable us to prevent future misfortunes by rearranging present circumstances."⁷ *Id.*

Part IIB thus addresses the question: What can be known as a matter of legal and economic social science? Technology works by understanding the theoretical cause and effect of the physical world, and then harnessing the predictive power of the science in human-created interventions, whether a bridge across a gorge, for which engineering relies on the predictive power of physics, or a recombinant DNA based drug, whose effectiveness depends on the predictive power of molecular biology. If law as regulatory technology is effective in this area it is because we understand through social science how the financial world works and then intervene through laws based on the predictive power of social science: "if human beings are so restricted in their activities, *this* will be the effect."

Moreover, as discussed in Part IIC, when we turn to law as forward-looking regulation of that complexity, rather than law as a source of backward-looking adjudication of responsibility, we see the way lawyers usually think about cause and effect is not particularly helpful. Lawyers think about cause and effect retrospectively in connection with singular events and for the purpose of attributing blame or responsibility. That becomes particularly clear from an examination of the two most significant treatments of legal causation in the last fifty years, by A.M. Honoré and H.L.A. Hart in 1959, and Michael Moore in 2008. Pinning down causation for purposes of effective regulation means approaching knowledge in the manner of science; pinning it down for purposes of liability has far more to do with custom, metaphysics, or pragmatics.

The second question, which I explore in Part III, layers an additional complexity upon the problem of complexity. Just who is the "we" in the questions I am posing? Is it experts, ordinary people, or some class of people whose job it is to intermediate between experts and ordinary people? The financial crisis is not just a problem that seems complex, but additionally a crisis of confidence in those who purport to be experts in what we cannot fathom merely through common sense. The conundrum, of course, is that if it takes an expert to see the problem caused by complexity, how are the rest of us (ordinary people as well as the intermediates) who possess merely common sense supposed to do anything but rely on their judgment? To press the analogy further, what happens when we lose confidence in our doctors' ability to prescribe the right medicine for the right disease?⁹ The essence of the problem is that we have become a lot smarter. The gap between what the experts know and what we know has shrunk, while at the same time our faith in science as a substitute for judgment has increased. If regulatory technology is a medicine, somebody

⁹ As an example of the relationship between causation as a matter of scientific regularity and judgment in this context, consider the administration of electric shock therapy. Psychiatrists still prescribe it for treatment of severe depression, even though they still do not know conclusively why it works. Jason Williams, *Shock Treatment Works? The benefits of electric shock therapy*, PSYCHOLOGY TODAY, March 1, 2003. Indeed, from its invention by Felix Hoffman (a chemist working for Bayer) in 1897 until a discovery by pharmacologist John Vane in 1971, nobody knew how acetylsalicylic acid (otherwise known as aspirin) worked. John Hopkins Medicine, *A Paradox Helps Explain How Aspirin Works*, <http://www.hopkinsmedicine.org/press/2001/MARCH/010305.HTM>. In other words, we make sound judgments to use therapies shown to work, even if we do not fully understand *how* they work. As a philosophical matter, this invokes a discussion of the difference, if any, between *reasons* and *causes*. See *infra* notes 56–91 and accompanying text.

(Alan Greenspan or Ben Bernanke or the Systemic Risk Czar) is responsible for making an individual judgment to administer it. Thus, the epistemological crisis also arises from our own judgments to rely on, believe in, trust, or have faith in that judgment.¹⁰ Not surprisingly, a *Time* columnist summarized the problem saying:

The financial crisis came about because we got complacent, depending on all-knowing financial experts—mortgage lenders, Wall Street sharpers, the Federal Reserve—to run our system expertly. But then the experts did the same thing, imagining that they had laid off all their risks on other experts. Until finally, the last expert down the line turned out to be just another greater fool, and the system crashed.

We still need experts. But we can no longer abdicate judgment to them or to the system they have cobbled together.¹¹

Part III thus deals not with the problem of how we know but instead who knows it. It is not just a question of whether there is predictive power in social science but who acts upon it that predictive power. One of the most unnerving aspects of the present financial crisis is the fact that the fall of AIG and its cascading effects throughout the world was the result of the activities of one relatively small London office.¹² There is an historical context in which we pose questions like, "How much judgment do we take back from the professionals?" Social science professionals developed a theory in the late 1800s that there was a division of labor with respect to knowledge, particularly in view of the rapidly increasing complexity of human society. Social science suggested there was systematicity in our human interaction capable of being analyzed like physical science and we came increasingly to delegate judgments to professionals.¹³ Our present crisis questions that delegation.

Finally, in Part IV, I touch on what we might reasonably expect to achieve by way of law and regulation and, more importantly, what will always remain beyond our ability to control. In this context, I assess Adrian Vermeule's recent book, *Judging Under Uncertainty*.¹⁴ There is indeed irreducibility (not indeterminacy, which is a key distinction) to judgment that can never be excised, whether on a micro-basis as in the reliance of a corporate board on the judgments of officers and employees, or on a

¹⁰ It does not help matters, analytically speaking, that the Madoff affair happened to break at the same as the subprime crisis, although the contraction of the market no doubt had a lot to do with the bursting of that particular Ponzi scheme. What I want to address are the really difficult regulatory questions, such as when the Federal Reserve should pull back on the credit throttle, and not mere regulatory competence issues, such as the allegations that the SEC staff simply ignored Harry Markopolos' warnings about Madoff. See Gregory Zuckerman & Kara Scannell, *Madoff Misled SEC in '06, Got Off*, WALL ST. J., Dec. 18, 2008, available at <http://online.wsj.com/article/SB122956182184616625.html>.

¹¹ Kurt Andersen, *The Avenging Amateur*, TIME, Aug. 10, 2009, at 68.

¹² Gretchen Morgenson, *Behind Insurer's Crisis, Blind Eye to a Web of Risk*, N.Y. TIMES (Sept. 27, 2008), available at <http://www.nytimes.com/2008/09/28/business/28melt.html>.

¹³ THOMAS L. HASKELL, THE EMERGENCE OF PROFESSIONAL SOCIAL SCIENCE: THE AMERICAN SOCIAL SCIENCE AND THE NINETEENTH-CENTURY CRISIS OF AUTHORITY (Johns Hopkins 2000) [hereinafter SOCIAL SCIENCE]; THOMAS L. HASKELL, OBJECTIVITY IS NOT NEUTRALITY: EXPLANATORY SCHEMES IN HISTORY (1998) [hereinafter OBJECTIVITY].

¹⁴ See *infra* note 184.

macro-basis as in reliance on those professionals to whom we have delegated the judgment call for systemic regulation. Yet judgment is inevitable, whether we make it ourselves or make the judgment to delegate it to others.

The overriding theme is that regulation needs to have an epistemological modesty about it, a certain lack of presumptuousness which is belied by disciplines that think that complex causes can be reduced to: (a) simple and singular utility functions (rational actor economics); (b) complex functions that can actually model the world's almost infinite contingencies (behavioral economics); or (c) an after-the-fact ascription of blame (law). The right answer, I suggest, is that broad policy requires relatively simple models, the necessary downside being there is only so much that regulation of a complex world can accomplish. The crisis of epistemology in 1755 was that even after Newton's accomplishments in physical science, an earthquake still destroyed Lisbon.¹⁵ The crisis of epistemology in 2009 is that all the algorithms in the world are not going to stop financial bubbles. The problem is endemic to all forward-looking judgments. Nobody knows until after-the-fact whether the entrepreneur is a peerless visionary or a self-deluded wacko, just as I don't really know until after-the-fact that today is the day I should jump ship from the public securities markets because *today* they became a bubble.

II. COMMON SENSE, SYSTEMATICITY, AND LAW

A. IS ECONOMIC TURMOIL AN EVIL THAT CAN BE CONTROLLED BY THE SCIENCE OF LAW?

Anyone with a fair amount of money invested in equities in late 2008 likely had a conversation similar to the one I had with my trusted investment advisor. My wife and I have reached the point in our lives where we subsidize our lifestyle, which we based on income we earned in the for-profit corporate world, by drawing off of our investments, in the same way that a university draws off its endowment to fund present operations. The rule of thumb, based on historical long-term returns on investment over the last hundred years, is that you will continue to grow the principal as long as you draw off no more than five percent each year. As the Dow Jones Industrial Average dipped toward 6,500 and the value of our account sank below the magic level at which our annual needs equaled five percent of the account I confess to multiple moments of panic. The nadir of the entire experience was the thirty-minute conversation with my advisor in which he confessed he was waking up in the middle of the night with the same panic as me. We had no idea if this was the bottom or not. He said, "I wonder if we should just sell everything for right now. I found myself in the odd position of counseling him back, akin to holding hands, and saying, "No, let's ride it out." I do not claim any investment wisdom, the lesson is that both of us thought we understood how markets worked

¹⁵ Paul Krugman seems to agree with this. *See infra* note 71.

and both of us understood that as a result of the crash in housing values there was massive deleveraging going on all over the world. Nevertheless, we shared a sensation of an imminent end of the world. I am willing to posit that many otherwise smart and sophisticated people felt the same way.

Let us compare this newer kind of catastrophe to a type with which we largely become more reconciled over the last three hundred years or so. I propose a parallel between reactions to the 1755 Lisbon earthquake, and our present reactions to the crisis of complexity in financial markets. Before the Enlightenment (and, in some cases, even today), it made perfectly good sense to think that God would punish a society for its licentious ways by causing an earthquake. What Newton and others had upset over the years preceding the Lisbon disaster was the idea that the common sense view of things was the truth. People were used to apples falling to the ground but what Newton was saying was that the cause-and-effect underlying the relationship of apple and ground was the same as that underlying the relationship of earth and moon, or sun and planets.

At the end of the eighteenth century, the question of why natural events occurred and how we could predict them was a far fresher issue than it is today. Hume and Kant sought to reconcile systematically the "manifest images" we know as a matter of ordinary common sense, and these non-obvious "scientific images"— predictions about how the physical world works.¹⁶ Hume and Kant shared a distrust of "common sense" as a means of explaining worldly events because common sense is just the ordinary exercise of reason and may or may not actually explain things.¹⁷ Common sense might result in a Ptolemaic view of the workings of the heavens.¹⁸ As Kant observed, finding laws of nature is a difficult task while the oft-misconceived metaphysics of "common sense," like dogmatism are easy, and "float to the top."¹⁹ What we really want is a good answer, somewhere between the casual and thoughtless dogmatism of what Kant would have seen in political sound bites, had they existed then, and of radical skepticism that there are any answers at all.²⁰

The crisis of faith after the Lisbon earthquake was, in essence, that Newton had revealed the ability to understand God's design of the world by way of science to be limitless; this is indeed the best of all possible worlds. So what happened? It was a groundbreaking concept that an earthquake destroyed Lisbon not because its people were evil or flouting God's law, but because of physical conditions wholly unrelated to morality. We now take for granted that presumption of natural systematicity and no one but the most fundamental religionists would ascribe the AIDS virus or the Indian Ocean tsunami to God's desire to punish the wicked.²¹

¹⁶ AMERIKS, *supra* note 5, at 41.

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ IMMANUEL KANT, PROLEGOMENA TO ANY FUTURE METAPHYSICS 21–24 (Paul Carus ed., Open Court 1949) [hereinafter PROLEGOMENA].

²¹ It is still hard to predict earthquakes. A researcher, Giampaolo Giuliani, predicted, based on small tremors and radon readings, an earthquake would occur near L'Aquila, Italy on March 29, 2009. When it failed to occur, the Italian Civil Protection Agency made him take down his warnings, only to have

Does the Enlightenment reaction to Lisbon help us understand our own loss of faith in economic models like Value at Risk?²² Lawrence Douglas, Austin Sarat, and Martha Merrill Umphrey observed that the Lisbon earthquake and other catastrophes had the effect of eroding the belief in a normative order that the world is operating as it should operate.²³ I take issue with them in restricting the definition of catastrophe (at least as it causes the erosion of belief in a normative order) to events bringing about mass loss of life. It seems to me that faith in the normative order is as much or more at risk when one is left homeless from the foreclosure of a subprime mortgage as from Hurricane Katrina. The problem is something Linda Meyer acknowledges in her essay in the same volume:²⁴ the blurring between natural and human evils that has troubled philosophers since Voltaire's observation that the people of Lisbon no more deserved their fate than the people of Paris and London,²⁵ and Rousseau's observation that the catastrophe involved at least some human failure, for example how the people of Lisbon constructed their houses.²⁶ Meyer builds on a distinction Judith Shklar made between misfortune and injustice: "Injustices are wrongs done to one by others—overtunings of normative expectations. Misfortunes are all the 'left over' bad things that happen that are not injustices."²⁷ Shklar's point was that the boundary between the two shifted over time, and that many things seen as misfortunes ought to be considered injustice, particularly of the passive kind, or of the kind of evil Hannah Arendt so memorably classified as banal.²⁸ Meyer's contribution is that a catastrophe is something different than either misfortune or injustice. It is an event so staggering that it forces us to engage in an epistemological

the quake occur on April 6. Susan Hough, a geophysicist at the United States Geological Survey, discounted Giuliani's prediction as merely fortuitous, and not good science for purposes of predicting quakes by "narrow windows in time, location, and magnitude." In short, after an earthquake occurs, you can always go back and find patterns of data that might be predictive, but going forward, it turns out that all that data looks like noise. There has yet to be found any reliable precursor of an impending major quake, not radon levels, nor warping of the crust, nor animal behavior. That is not to say that scientists will never be able to predict earthquakes, but they cannot do it now. Susan Hough, *Confusing Patterns with Coincidences*, N.Y. TIMES, Apr. 11, 2009, at 10.

²² "Value at Risk" is an algorithm widely used by financial professionals that purports to measure the risk in a portfolio. Since the collapse of the subprime lending market and the onset of the financial crisis of 2008–2009, there has been widespread assessment of the limitations in the "Value at Risk" formula, including, for example, that even if it tells you that the likelihood of a disaster is very, very low, it does not predict the magnitude of the disaster. See generally Nocera, *infra* note 33.

²³ Lawrence Douglas, Austin Sarat & Martha Merrill Umphrey, *A Jurisprudence of Catastrophe: An Introduction*, in LAW AND CATASTROPHE 2 (Stanford, 2007).

²⁴ Linda Ross Meyer, *Catastrophe, Plowing Up the Ground of Reason*, in LAW AND CATASTROPHE, *supra* note 23, at 19–32.

²⁵ Douglas, Sarat & Umphrey, *supra* note 23, at 2.

²⁶ *Id.*, at 5. Rousseau observed that the houses in Lisbon were six or seven stories high, and thus contributed to the destruction. Douglas, Sarat & Umphrey, *supra* at 23. Compare this to the possibility that the destruction of New Orleans might have been averted if the levees had been sound. I have personal experience of a somewhat more fatalistic reaction. I spent the school year of 2006–2007, the year following Hurricane Katrina, visiting at the Tulane University Law School. My wife and I made a visit in April 2006 to look for housing. We were walking through Audubon Park on a glorious Saturday morning, chatting with the soccer moms and dads about post-Katrina life. One of them said to us, "You know, it's at least partly our fault. The houses are built on stilts and nobody is supposed to use the first floor. But the space is just too inviting not to be used, so everybody builds into it."

²⁷ Meyer, *supra* note 24, at 19.

²⁸ HANNAH ARENDT, *EICHMANN IN JERUSALEM: A REPORT ON THE BANALITY OF EVIL* (Penguin Books 1994).

reassessment.²⁹ Meyer states, "Catastrophes are normative overturnings, yet not injustices, because they challenge the very categories that form our judgment of just and unjust."³⁰

A catastrophe is, in my view, not merely something involving massive loss of life. The critical aspect is the normative overturning. But one must be careful with the term "normative." Ordinarily we would associate the term "normative" with a moral or value judgment. We might say that we measure injustice by the gap between the descriptive "is" and the normative "ought" of a just world. Normativity is an epistemological problem as well, or put otherwise, it is how much we trust what we seem to know about cause and effect. This ability to know the future depends on the ability to hypothesize from past regularities. The hypothesis is an educated guess about the unknown which is analogized from the known. The source of the hypothesis is a sense that there is order in the universe capable of supporting our analogies whether or not future experience bears out the particular analogy which was the basis of the hypothesis. We have a sense of what *ought* to happen as a matter of prediction of the "is" apart from any separate normative judgment about the desirability of the anticipated outcome.

Is the bursting of a credit bubble an evil akin to an earthquake? I think so, at least epistemologically speaking. The present crisis of faith (brought home as, in a metaphorical sense, I held hands and prayed with my broker) is, in essence, this: "Modern economics, social science, and regulation have revealed to us that our ability to understand markets is limitless; this is indeed the best of all possible worlds. What happened?" Using apocalyptic imagery like "a failure of capitalism," Richard Posner, among others, has taken economists and regulators to task for their failure to understand and deal with the crisis.³¹ Pundits question modern management science³² as well as the accepted algorithms of what was thought to be sound investment portfolio management.³³ I cannot help sensing that Judge Posner may be a modern-day Rousseau, coming to terms with the limits of

²⁹ Meyer, *supra* note 24, at 22–23.

³⁰ *Id.* at 20.

³¹ RICHARD A. POSNER, A FAILURE OF CAPITALISM: THE CRISIS OF '08 AND THE DESCENT INTO DEPRESSION (2009) [hereinafter A FAILURE OF CAPITALISM]. Judge Posner summarized the primary arguments of the book and updated his thinking in a series of blog posts for the online version of *The Atlantic* between May 15 and 27, 2009, available at http://correspondents.theatlantic.com/richard_posner/2009/05/. In a similar vein, the French President Nicolas Sarkozy and others proclaimed the end of laissez-faire capitalism. See, e.g., Elitsa Vucheva, *France: Laissez-Faire Capitalism is Over*, BUS. WEEK (Sep. 29, 2008), available at http://www.businessweek.com/globalbiz/content/sep2008/gb20080929_019959.htm.

³² Consider *In Search of Excellence*, the classic "how-to" management tome by Peters and Waterman that purported to derive essential conditions for business success, such as bias for action, customer focus, and "simultaneous loose-tight properties." TOM PETERS & ROBERT WATERMAN, IN SEARCH OF EXCELLENCE (2004). The recent criticism is that these are not predictive factors at all, and that there is far more serendipity in business success than the management consultants would have us believe. Drake Bennett, *Luck, Inc. - The 7 Secrets of Really, Really Lucky Companies*, BOSTON GLOBE, Apr. 12, 2009, http://www.boston.com/bostonglobe/ideas/articles/2009/04/12/luck_inc/.

³³ See, e.g., NASSIM NICHOLAS TALEB, THE BLACK SWAN: THE IMPACT OF THE HIGHLY IMPROBABLE (2007) [hereinafter THE BLACK SWAN]. See also NASSIM NICHOLAS TALEB, FOOLED BY RANDOMNESS: THE HIDDEN ROLE OF CHANCE IN LIFE AND IN THE MARKETS (2008) [hereinafter FOOLED BY RANDOMNESS]. See also Joe Nocera, *Risk Mismanagement*, N.Y. TIMES SUNDAY MAGAZINE, Jan. 4, 2009.

a newer science and its human practitioners. One does not often think about how we know what we know, nor do we need to, but nothing provokes common sense epistemology like a gaping breach between what is and what we think ought to be.

There is presently substantial debate over whether it is possible to know that the market is in a bubble, much less regulate against its bursting.³⁴ Public policy debates turn on the assessment of the predictive power of the disciplines of economics, psychology, law, and sociology among others. What caused the financial crisis of 2008 and 2009? What laws and policies, if any, will keep similar meltdowns from occurring in the future? In Kant's day, making judgments about manifest matters of everyday life did not seem to be mysterious, but Newton's judgments about the gravitation pull of earthly and celestial objects posed fundamental questions about how we could know what we could not observe. Today, there sometimes seems to be less mystery about physics than there is about whether to invest in equities or T-bills. The one constant is trying to balance, not just when dealing with the "ought" but when dealing with the "is," among the poles of radical positivism, radical skepticism, and radical foundationalism.³⁵ That is the epistemological issue I want to unpack: how we come to know the causes of financial crises, particularly when some of the first reactions are to point simply to "complexity" as a problem.

I have one note before digging in. At least one goal for epistemology is the gold at the end of the rainbow, metaphorically speaking, in terms of foundational knowledge. Foundationalism is the position that "all knowledge and justified belief rest ultimately on a foundation of non-inferential knowledge or justified belief,"³⁶ in other words, foundationalism is the position that something true cannot be proven merely by resort to experience. That quest is a difficult one for secular thinkers. Those inclined to religious belief will not have much of a problem finding foundational knowledge in a deity. Neither will this be much of a problem for hard-core empiricists, as they will generally be satisfied that anything outside of observable experience has minimal explanatory value anyway. However, those who are skeptical enough to reject a brute religious explanation, but intuitively suspicious of saying there is no foundational knowledge (i.e., a priori knowledge, or something you know purely by operation of your reason apart from any experience), are in the same position as Kant when he read Hume and awoke from his "dogmatic slumbers." As Steven Winter

³⁴ See Ben S. Bernanke, *Asset Price "Bubbles" and Monetary Policy, Remarks Before the New York Chapter of the National Association for Business Economics*, Oct. 15, 2002, <http://www.federalreserve.gov/BoardDocs/Speeches/2002/20021015/default.htm>. Similarly, Alan Greenspan responded to Stanford Professor John Taylor's criticism of the Federal Reserve's decision not to temper the housing bubble by raising short-term interest rates in 2003–2005 as follows:

[W]hile I believe the "Taylor Rule" is a useful first approximation to the path of monetary policy, its parameters and predictions derive from model structures that have been consistently unable to anticipate the onset of recessions or financial crises. Counterfactuals from such flawed structures cannot form the sole basis for successful policy analysis or advice, with or without the benefit of hindsight.

Alan Greenspan, *The Fed Didn't Cause the Housing Bubble*, WALL ST. J., Mar. 11, 2009.

³⁵ See AMERIKS, *supra* note 5, at 41–55.

³⁶ Richard Fumerton, *Foundationalist Theories of Epistemic Justification*, STAN. ENCYC. OF PHIL. (2005), available at <http://plato.stanford.edu/entries/justep-foundational/>.

observes in his study of the interaction of cognitive science and law, "the claim of radical indeterminacy is itself theory dependent; it is, moreover, dependent on theoretical assumptions that are themselves quite foundationalist."³⁷ In other words, even hard-core non-foundationalists have something that smacks of foundational belief, even if it is as simple as believing that there is some answer somewhere even if it hasn't been found yet.

My outlook is a modest Kantianism of the kind articulated by Karl Ameriks, to the effect that:

More is possible—and desired by us now—than a simple reliance on a chaos of popular truths or an absolutized set of quantitative theories. Part and parcel of this stress on systematicity is Kant's rejection of foundationalism and naive representationalism: he understood and argued more influentially than anyone else, that knowledge is anything but a 'mirror of nature,' a matter of isolated tokens magically picturing transcendent correlates; it is a web of judgments, tied together by an order of conceptual 'knots' that hold up over and over again in all kinds of arguments.³⁸

In other words, Kant's key (and to some most objectionable) insight was his subtle move away from Hume. Kant acknowledged a priori sources for knowledge of experience or possible experience, but simultaneously held there are some ultimate questions—those as to which reason provides an insight but no empirical foundation—we would never be able to answer as a matter of knowledge.³⁹

Nevertheless, the quest for non-theistic foundational knowledge continues.⁴⁰ This is the art of making conceptual assertions that cannot really be

³⁷ STEVEN L. WINTER, *A CLEARING IN THE FOREST: LIFE, LAW, AND MIND* xvi (2001). Indeed, the cognitive science approach to law, which Professor Winter explicates so well, is based on its own systematicity, namely that its insights lead to otherwise overlooked "sensible, predictable patterns" in the understanding of mind and reason. *Id.* at xiv.

³⁸ AMERIKS, *supra* note 5, at 60–61.

³⁹ PROLEGOMENA, *supra* note 20, at 29. Kant's warning was that you could not expect to have any credibility as a metaphysician if you posited metaphysics merely as a matter of the conjecture of pure reason. The problem is extending the "reasoning" of common sense beyond experience or the possibility of experience. Wise men, observed Kant, know that common sense can be deceptive.

⁴⁰ This is less a concern in the physical sciences, where "presumptions about agency, normativity, and value—those ghostly qualities thought to constitute and animate us" are not required to "fit with the idea of a science of the social, of society as a stable, regularity-manifesting machine." Stephen P. Turner & Paul A. Roth, *Introduction to Ghosts and the Machine: Issues of Agency, Rationality, and Scientific Methodology in Contemporary Philosophy of Social Science*, in *THE BLACKWELL GUIDE TO THE PHILOSOPHY OF THE SOCIAL SCIENCES* 1, 2 (Stephen P. Turner & Paul A. Roth, eds., 2003). The problem and paradoxes of knowledge in the social sciences stem from the participation of the observer in the systems observed, and the difficulty engendered thereby in arriving at any absolute presuppositions. Philosophers have always wrestled with "insoluble problems of objectivity." *Id.* at 10. This includes, for example, more recent debates about "an endpoint of explanation that is not itself grounded in nature." *Id.* at 11.

Law, when conceived as one of the social sciences, is not immune from this search for (or negation of, as the case may be) foundational principles somewhere between brute intuition and scientific fact. On one hand, there is a plausible view that the paradoxes and inconsistencies within the law itself reflect its limitations as a cognitively created model, or "cognitive overcommitment": "We regard more as plausible than the realm of fact and reality is able to accommodate, as is attested by our falling into contradiction." Oren Perez, *Law in the Air: A Prologue to the World of Legal Paradoxes*, in *PARADOXES AND INCONSISTENCIES IN THE LAW* 3, 7 (Oren Perez & Gunther Teubner, eds., 2006) (quoting Derrida's deconstructionist view of law as human institution and correspondingly metaphysical view of justice (whatever else one might think of post-modernist thought generally)). This view has

proved or disproved as in the physical sciences is one in which we ought to tread lightly and humbly, but as to which the nature of rhetoric (and lawyers' rhetorical style, whether practical or academic) wants to treat assertively.⁴¹ My goal is to think through fundamentally how intelligent non-experts make sense of the economic world, what they are capable of knowing in advance about financial meltdowns, and hence what they are able to remedy through regulation. I want to avoid what Meyer describes as law's default response to catastrophe, the attribution of blame, as in tort law, in which we judge retrospectively (by means of legal argumentation) what was prospectively foreseeable or not.⁴² It means, as Steven Winter observed, traveling intellectually within the paradoxical contingency of knowledge, where we should be reasonably skeptical both of claims of objective foundations and radical skepticism itself.⁴³

What follows, then, is an unpacking of the issues that underlie an economic or legal science of regulating complex financial markets. It is far more mysterious than engineers, economists, or lawyers generally want to concede, and thinking about it requires us to dip into the philosophy of science, particularly when we make the jump from physical science to the study of human affairs. There are four sub-themes. First, when we say "science," we usually think "formula" or "theorem" or "physical law." The goal of science is causal systematicity: to continue to reduce events and

some appeal: "since the idea of justice is necessarily connected with the idea of infinity, it is not deducible from established criteria and rules of the legal machine While the law belongs to the element of calculation, justice demands for the incalculable." Fatima Kastner, *The Paradoxes of Justice: The Ultimate Difference Between a Philosophical and a Sociological Observation of Law*, in PARADOXES AND INCONSISTENCIES IN THE LAW, *supra* at 179. See also JOHN CAPUTO, DEMYTHOLOGIZING HEIDEGGER 192–200 (1993). Contrast this with the view that there are objective moral "facts" or that conceptions of objectivity for ethics ought not differ from conceptions of objectivity in the sciences. For example, Dworkin argues that there are objective ethical and moral truths, but they are not derivable by way of any kind of scientific method. Ronald Dworkin, *Objectivity and Truth: You'd Better Believe It*, 25 PHIL. & PUB. AFF. 87 (1996).

Reflecting what is known as "scientific naturalism," which simply declines to engage with the epistemic justification of scientific knowledge, Brian Leiter is a skeptic as to any natural or non-natural basis for the rightness or wrongness of judgment. He takes the *a posteriori* view that the one thing we know has a pretty good track record of success in the search for truth is scientific method (indeed, a "scientific epistemology"). Accordingly, the only way we ought to conduct the inquiry is in the manner of that successful method; in other words, to err on the side of the "knowable and the real" by constructing our arguments with logical consistency and factual accuracy answerable to an external point of view. Brian Leiter, *Objectivity, Morality, and Adjudication*, in OBJECTIVITY IN LAW AND MORALS 77–78, 91 (Brian Leiter, ed., 2001). What this view entails, however, is the acceptance of judgment as having something to do with "fact" or "objects." It moots any further inquiry into the mysteries of judgment with an implicit precondition on the "knowable and the real." What if something is accessible to us (like consciousness or concept) but is not an object or a fact that is knowable in the scientific way? For a critique of Leiter's scientific epistemology, see Andrew Halpin, *Methodology and the Articulation of Insight: Some Lessons from MacCormick's Institutions of Law*, in LAW AS INSTITUTIONAL NORMATIVE ORDER (Zenon Bankowski & Maksymilian Del Mar eds., 2008).

⁴¹ Pierre Schlag, *Spam Jurisprudence, Air Law, and the Rank Anxiety of Nothing Happening (A Report on the State of the Art)*, 97 GEO. L. J. 803 (2009). I no doubt deserve Professor Schlag's scorn for citing his essay in this manner (including the small cap. font, *id.*, at 832, n.67), but I have in mind this observation: "The law review article is an imitation of the legal brief and the judicial opinion. . . . Even interdisciplinary scholarship typically submits to this legalist form. That scholarship occasionally escapes the advocacy orientation, the rule of legalist arguments, and the deference to judicial concerns, but not often."

⁴² Meyer, *supra* note 24, at 21.

⁴³ WINTER, *supra* note 37, at xvi. For an example of the kind of "unhumble" assertion of secular metaphysics to which I refer, see the discussion of Michael Moore's rejection of "libertarian metaphysics" *infra* notes 120–24, and accompanying text.

processes to their most fundamental rules and regularities. Second, even science involves judgment in the forming of hypotheses. Of all the various rules and regularities, when we come up with a hypothesis, we are choosing one—we are making a judgment, and that part of science remains mysterious and irreducible. Third, law as it has come to be taught, and in many ways as practiced, is as a social science, which presents its own particular problems of intelligibility and predictive power. Finally, even if law is science, the scientific judgments we are called on to make are still incapable of reduction to anything more fundamental.

B. LAW AS REGULATORY TECHNOLOGY (OR MEDICINE)

If we were to analyze the subprime mortgage industry meltdown in terms of assigning civil or criminal legal responsibility, causation, even the limited kind of causation the law employs, would be an element of liability. There is no shortage of hypotheses as to underlying causes. In his thorough assessment of the lessons of the meltdown, Steven Schwarcz describes fourteen causes of the meltdown, divided alternatively into (i) descriptive categories of securities disclosure, the nature of the structured finance industry, systemic market risk, market actor discipline, and rating agency failure, and (ii) analytic categories of conflict, complacency, and complexity.⁴⁴ In order to regulate prospectively, we need to explain retrospectively. The reaction of regulators will be to reduce the financial crisis to cognizable (if not legally cognizable) instances of social scientific cause and effect, so as to impose the technological cure of a regulatory scheme. I do not attempt to determine the actual causes or the appropriate regulatory reactions; my meta-issue is the epistemological challenge of the inquiry itself.

C. THE KNOWLEDGE REVOLUTION: SYSTEMATICITY AND CAUSATION

The first issue, then, in using the regulatory technology afforded by "law as social science" to avert financial crises is whether we can identify systematicity and causation. We want to reduce events and processes to their most fundamental rules and regularities. The reason is because we are going to opt for rules rather than ad hoc determinations. As Fred Schauer has explained, rules are entrenched generalizations.⁴⁵ It may well be that someone is capable of organizing a subprime mortgage syndication with thirty-to-one leverage, but if our science shows that, by and large, such leverage ratios create undue instability, then everyone will be subject to the rule, even if the rule does not dictate the best result for any particular situation.⁴⁶ The process of setting such rules entails having a fair amount of confidence in our ability to predict the effects of such regulation. In

⁴⁴ Schwarcz, *supra* note 1, generally, and at 404.

⁴⁵ FREDERICK SCHAUER, PLAYING BY THE RULES: A PHILOSOPHICAL EXAMINATION OF RULE-BASED DECISION MAKING IN LAW AND LIFE 17–77 (1991).

⁴⁶ See generally FREDERICK SCHAUER, THINKING LIKE A LAWYER: A NEW INTRODUCTION TO LEGAL REASONING (2009).

science, "explanation and prediction are two sides of the same coin."⁴⁷ To put it otherwise, a patient with metastasized brain cancer is sufficiently assured that medical science (in the person of her oncologist) can explain the effect of radiation and poison on fast-growing cells to allow her brain to be beset with otherwise toxic medicines. That is a leap of faith we take for granted and the question now is whether we are in a position to take equivalent leaps in the regulation of financial markets. These are questions of cause-and-effect: What are the facts, events, actions, or conditions necessary for the onset of a bubble or its bursting, and what can we do to intervene? My thesis is that the epistemology of social science, much less the epistemology of law as a social scientific enterprise, is significantly less settled than the epistemology of the physical sciences. No wonder, then, that legal regulation as an answer to putative issues of complexity often has the feel of "ready, fire, aim."⁴⁸

1. THE ASSUMPTION OF SYSTEMATICITY: WHITHER METAPHYSICS?

To return to earthquakes and economics, we need to start with Hume and Kant, largely because understanding their respective epistemologies sets the stage, as well as the competing positions, for thinking about scientific knowledge and judgment in the present day. The great breakthrough of Hume and the empiricists was to do away with singular causes (at least in the sense of divine or mystical ones) in favor of systematicity, and its "glue," causation, that "lies *wholly* in the fact that the particular events with which they are concerned exemplify some generalization asserting that kinds of classes of events are invariably connected."⁴⁹ The tough question Kant added to the conversation was a matter of metaphysics: whether we can know, a priori, *synthetic* in addition to *analytic* truths. Analytic truths are true by definition—all bachelors are unmarried. Synthetic truths are all others. For example, "water is a compound comprised of two hydrogen atoms for every oxygen atom" is a synthetic truth. To know something a priori is to know it apart from any experience; it is something accessible and true solely by exercise of reason. To know something *a posteriori* is to know it because it happened. The classic point of comparison is the caroming of a billiard ball off another. Hume's rejection of synthetic a priori truths led him to conclude that there is no reason, other than long experience, to believe that particular combinations of speed, angle, and mass will lead inexorably to the ball traveling in a particular direction.⁵⁰

Kant disagreed, concluding that there are a priori concepts by which we order our experience—causality, numerosity, substantiality, and others—

⁴⁷ ROSENBERG, *supra* note 8, at 11.

⁴⁸ There was a similar academic assessment of Sarbanes-Oxley as a knee-jerk reaction to the particular wrongdoings of Enron and WorldCom. See Roberta Romano, *The Sarbanes-Oxley Act and the Making of Quack Governance*, 114 YALE L.J. 1521 (2005). See also Jeffrey M. Lipshaw, *Sarbanes-Oxley, Jurisprudence, Game Theory, Insurance, and Kant: Toward a Moral Theory of Good Governance*, 50 WAYNE L. REV. 1083 (2005).

⁴⁹ H.L.A. HART & A.M. HONORÉ, CAUSATION IN THE LAW 8–12 (1959). See ROSENBERG, *supra* note 8, at 8–9.

⁵⁰ See PROLEGOMENA, *supra* note 20, at 28.

that align with the way the universe works.⁵¹ Knowledge then, to Kant, was the result of the interaction of what he called the “understanding”—specifically, these a priori concepts—with our empirical sensibility. To paraphrase, I am sensible to the barking ball of yellow fur outside my window that I know as my dog Annie. Kant said that the concept of “dog” signifies a rule according to which my imagination can delineate the figure of a four-footed animal in a general manner, without limitation to any single determinate figure that I actually encounter in experience. But Kant did not concede that there is some kind of deeper Platonic reality such as a “form” of the dog. Rather, he accepted this interaction of concept and sensibility as something of a mystery, “a hidden art in the depths of the human soul, whose true operations we can divine from nature and lay unveiled before our eyes only with difficulty.”⁵² All we can say is we have a mental engine able to construct schema of generalities that in turn produce new, specific mental images that we know are related in some way to the last. That engine that allows me to generate the next image of a dog, one perhaps unlike Annie, and perhaps a kind of dog that has never existed, but identifiable nevertheless to me as falling within the concept of a dog, is a priori and not itself a product of experience.

What Kant denied, however, was that this engine could be turned upon itself to have pure knowledge of cause, or substance, or numerosity detached from any sensible experience.⁵³ *Reason* may take the application of the mental engine beyond that of which we are sensible in experience, to posit, for example, God, but that is not *knowledge*.⁵⁴ We are, indeed,

⁵¹ *Id.* at 60–61.

⁵² IMMANUEL KANT, CRITIQUE OF PURE REASON 273 (Paul Guyer & Allen W. Wood eds. & trans., Cambridge Univ. Press 1998) (1781) [hereinafter CRITIQUE OF PURE REASON]. In the *Prolegomena*, Kant emphasized that Hume was justified in saying that we cannot comprehend things like causality by reason, and agreed that he, Kant himself, was mystified by what causality, subsistence, and community really are, yet Kant was not therefore prepared to concede that the concepts are merely the product of experience “and the necessity represented in them, to be imaginary and a mere illusion produced in us by long habit.” PROLEGOMENA, *supra* note 20, at 70.

⁵³ What we can know a priori was a subtle move on Kant’s part. He criticized Hume first for failing to acknowledge that mathematics involves synthetic a priori knowledge, i.e., concepts not otherwise self-evident that can be derived purely through the exercise of reason. The question then is not whether synthetic a priori knowledge is possible (because it is with respect to mathematics), but how, and whether we might have synthetic a priori knowledge beyond the examples of mathematics. PROLEGOMENA, *supra* note 20, at 21–24. The answer is a cautious “yes.” We can have metaphysical knowledge of synthetic a priori concepts like substance or causality “on which alone experience is possible, but never of the laws to which things may in themselves be subject, without reference to possible experience.” *Id.* at 53–54. Kant emphasized this point later in the PROLEGOMENA, *supra* note 20, at 72–73:

Hence if the pure concepts of the understanding do not refer to objects of experience but things in themselves (*noumena*), they have no significance whatever. They serve, as it were, only to decipher appearances, that we may be able to read them as experience. The principles which arise from their reference to the sensible world, only serve our understanding for empirical use. Beyond this they are arbitrary combinations, without objective reality, and we can neither cognise their possibility a priori, nor verify their reference to objects, let alone make it intelligible by any example. . . .”

⁵⁴ It is probably not necessary to invoke Kant for the idea that concepts precede our interaction with the empirical world. For example, while undoubtedly agreeing with that simple principle, Dennis Patterson would, I think, object to this particular presentation, contending that knowing and thinking are actions, and should not be confused by the images of a mental engine. That is, one unreflectively employs concepts (linguistic and otherwise) in judging what is correct or incorrect. I do not veer to the right in the car to avoid one that is oncoming because I do an analysis or because a cranial central processing unit cranks out an answer; I just do it. There is nothing inherently meaningful in the move to the right;

observers and synthesizers of a multitude of inputs from experience. What makes *us* is our inner sense, not divorceable from the self, that takes concepts of causality and substance and unity and plurality, applies these concepts to what we experience, and churns out either what we know, or what we might possibly know.⁵⁵

The importance of this discussion lies in the different views of causal "glue." Hume took the view there was no "glue"; causation was simply the repeated conjunction of events without exception. Kant, however, wrestled with the role of the observer: whether or not there was a metaphysical causal glue, the observer's concept of cause and effect needed to precede observation of actual events for the observer even to say that one was the cause and one was the event. Hume's view of causation obviates the need to assess the subject's internal synthesis of the objects of experience while Kant's view puts the subject's mind into play along with those objects. This aspect of the intertwining of the observer and the observed, of the possibility of objectivity when we observe ourselves, either individually or socially, will become crucial in our assessment of the possibility of a science of legal regulation of financial crises.

2. *Cause, Reasons, and Explanation in Social Science and Law*

Causation is such a fundamental concept to lawyers that it bears some unpacking with respect to the epistemology of economic crises and the regulatory response, particularly to complexity. In other words, is the prototypical legal treatment of causation appropriate for dealing with catastrophe? I believe this question arises because what lawyers and legal scholars mean by causation is only tenuously related to what scientists (and, presumably, social scientists) mean by causation. Lawyers generally use causation within legal casuistry as a means of assigning blame. "But for" causation is not the interesting issue; we take for granted that there are infinite causes for the traffic accident in which Mary ran a red light and hit Joe. Joe "caused" the accident in the sense that if he had not been in the intersection Mary would not have hit him. More remotely, if the officer at Ellis Island had refused admission to Joe's great-grandmother, the accident would not have happened. Legal causation seeks to identify a cause that is deemed sufficient for the assignment of civil or criminal responsibility. The legal response to the financial crisis with which I am concerned, however, is not a matter of casuistry but of regulation. Regulation is a kind of social technology in which we seek not to assign blame or responsibility but to intervene in a system so as to avoid unwanted consequences. As lawyer-regulators (as opposed to lawyer-litigators), we are social scientists interested in understanding the causal glue of economic systems wholly

most will agree it was the right thing to do, but that is based on long regular practice of driving on the right. See Dennis M. Patterson, *Fashionable Nonsense*, 81 TEX. L. REV. 841, 890-92 (2003); Dennis Patterson, *On the Conceptual and the Empirical: A Critique of John Mikhail's Cognitivism*, 73 BROOK. L. REV. 1053, 1058-60 (2008).

⁵⁵ See David Gray Carlson, *Hart avec Kant: On the Inseparability of Law and Morality*, (Cardozo Sch. of Law Jacob Burns Inst. For Advanced Legal Stud., Working Paper No. 222, 2008), available at <http://ssrn.com/abstract=1104225>.

apart from the assignment of blame. If morally unobjectionable acts, singly or in combination, create harm, we want to regulate them.

This type of regulating requires that we think about causation as scientists and philosophers, not as traditional blame-assigning lawyers. Hence, I will first consider social scientific causation and then compare briefly the most sophisticated attempts to reconcile legal causation with it.

a. *Reasons and Causes in the Philosophy of Social Science*

It is clear that Hume was the winner of the debate over causation, at least insofar as the interjection of metaphysics into science was concerned. The dominant philosophy of both natural and social science in the early years of the 20th century was logical positivism, which held that the only bases for scientific truth were self-evident truths (i.e., logical deduction and analytic truths) and observation. Scientific causal statements are "deductive-nomological": "[t]o explain a particular event, one deduces its occurrence from a set of one or more laws of nature together with a description of the 'initial' conditions that the laws require for the occurrence of the event to be explained."⁵⁶ Moreover, under logical positivism, all scientific theories reduce to more general scientific laws.⁵⁷ The logical positivists viewed any attempt to explain one event in terms of another by way of "causation," for example, as without meaning. From this basis, Carl Hempel developed his "covering laws" thesis, Popper rejected the verification principle in favor of falsification, and so on. Despite the decline of logical positivism's appeal, philosophers of physical science continue to be more concerned with identifying the regularities as causes-and-effects than exploring the metaphysics of cause-and-effect.⁵⁸

The issue of the metaphysics of the causal "glue," even in the physical sciences, is one of continuing conundrum. There is a problem with the simplicity of Humean regularity, which abjures any inquiry into the "glue" in favor of the view that "laws of nature are nothing more than true

⁵⁶ ROSENBERG, *supra* note 8, at 10.

⁵⁷ *Id.* at 11.

⁵⁸ In 1966, Rudolf Carnap wrote:

Physicists [in the nineteenth century like Kirchhoff and Mach] reacted to [German idealism in the tradition of Fichte, Schelling, and Hegel] by saying: "Leave us alone with your why-questions. There is no answer beyond that given by the empirical laws." They objected to the why-questions because they were usually metaphysical questions [W]e are no longer worried by why-questions. We do not have to say, "Don't ask why", because now, when someone asks why, we assume that he means it in a scientific, nonmetaphysical sense.

Rudolf Carnap, *The Value of Laws: Explanation and Prediction*, in PHILOSOPHY OF SCIENCE: THE CENTRAL ISSUES 678 (Martin Curd & J.A. Covers eds., 1st ed. 1998). This is probably something of an overstatement, and I do not mean to summarize the entirety of the debates in the philosophy of the physical sciences over the last fifty years. They revolve around the question whether scientists should accept the *reality* of the unobservable products of scientific theories (scientific realism). For example, the scientific realists, contra the logical positivists, contend that the best theories of unobservable phenomena must mean that those theories are more than just models, and they reflect deep structures of what is real. See Bas C. Van Fraassen, *Arguments Concerning Scientific Realism*, in PHILOSOPHY OF SCIENCE: THE CENTRAL ISSUES, *supra* at 1064–1087. Scientific naturalism holds that the success of science is, empirically and inductively, the best justification for the scientific endeavor, and forswears any further metaphysical reflection about it. W.V. Quine, *Two Dogmas of Empiricism*, in PHILOSOPHY OF SCIENCE: THE CENTRAL ISSUES, 280, *supra* at 296–99.

universal generalizations."⁵⁹ Under mere universal generalizations, we can derive vacuous laws, ones that are true or just because no instances of them have ever been observed. An example would be the true universal generalization that all unicorns have x-ray vision. One response to the pure regularities approach to causation has been to require at least some actual objects that satisfy the condition.⁶⁰ A.J. Ayer argued, however, that the "existential condition" to the regularity theory excluded relationships that ought to be considered causal, and proposed an alternative: the epistemic regularity theory, under which laws might not be instantiated by actual events, but still say something important about the world (one example being Newton's first law of motion). Ayer proposed that laws of nature need not be logically necessary, but they do need to exhibit "epistemic regularity." Hence, "a proposition expresses a law of nature when it states what invariably happens" but it also needs to exclude vacuous laws, admit "hypothetical consequences of instancial laws," and extend to every possible case of corresponding causes and effects.⁶¹ Moreover, what distinguishes a law of nature from a mere factual generalization is that the former supports counterfactuals.⁶² "All dogs are mammals" is a law of nature because if my tortoise Toby turned out to be a dog, it would indeed be a mammal. "All my dogs are chow mixes" is a factual generalization. It is true that Max and Annie are both chow mixes, but if I acquired a dachshund, it would not be a chow mix.

Even Ayer admitted he did not have the final answer, because he had not accounted for functional laws,⁶³ for example, those that define the relationship between variables like temperature and pressure. Nor could he supply a definition for a law of nature, because he supplied only sufficient and not necessary conditions. That is, he admitted there could be other laws of nature, unknown to him or anyone else, which fell outside his proposal.⁶⁴ Critics of the epistemic regularity theory of causation propose instead something termed "necessitarian" or the "universals theory."⁶⁵ Here, the view is that a law of nature represents the relationship of properties to other properties, not things or events. "Statements of laws of nature, on this view, are not universal generalizations about particulars but singular statements about universals."⁶⁶ Put as simply as possible, the generalization that all dogs are mammals is not, under this view, a universal generalization about mammals, but about the properties that constitute "mammal-ness" like being hairy, or having warm blood.

There are no clear-cut winners in this debate. For example, critics of the universals theory propose returning to Humean regularity because the

⁵⁹ *Commentary*, in PHILOSOPHY OF SCIENCE: THE CENTRAL ISSUES, *supra* note 58, at 880.

⁶⁰ *Id.* at 880–81.

⁶¹ A.J. Ayer, *What is a Law of Nature?*, in PHILOSOPHY OF SCIENCE: THE CENTRAL ISSUES, *supra* note 58, at 808, 815–18.

⁶² *Commentary*, *supra* note 59 at 883–84; Ayer, *supra* note 61, at 808, 815–24.

⁶³ Ayer, *supra* note 61, at 818.

⁶⁴ Ayer, *supra* note 61, at 824.

⁶⁵ *Commentary*, *supra* note 59, at 885–87.

⁶⁶ *Id.*

former fails to eliminate the possibility of vacuous laws.⁶⁷ Other theories include "counterfactual" theory: i.e., A is a cause of B if B would not have occurred unless A occurred. Counterfactual causation raises its own problems, including multiple, transitive, pre-emptive, and over determined causes.⁶⁸

The problems of causation in the physical sciences are relatively non-controversial however, as compared to the social sciences. Consider, for example, a particularly controversial kind of regulatory technology: minimum wage laws. If "[e]conomics is traditionally the most formal and abstract of the discourses about human interactions,"⁶⁹ then we ought at least to be able to agree as a descriptive matter about the effect of minimum wage laws before debating their desirability as a matter of policy. It is, however, not so easy, even for a concept arguably at the level of an introductory microeconomics course. Under neo-classical microeconomics, an unregulated market for labor will reach equilibrium at a wage rate and employment level that clears the market. Everybody who wants a job will be employed, but the wage level may be lower than they would like. The impact of imposing a minimum wage floor, as the theory predicts, is that employers who would otherwise hire at lower wages will not, and the result will be increased unemployment. Nevertheless, not only do policy makers and social scientists disagree about the normative trade-offs, they also disagree whether the economic model correctly predicts the effects.⁷⁰

The problem in moving from natural science to physical science is the role of purpose or teleology. Steven Pinker captures the essence of teleology, even in the purely physical sciences, by summarizing many of the unresolved philosophical debates about causation, and asking, "How can we make sense of the intuition of oomph that drives our causal instincts?"⁷¹ It is thought that scientific causality should be devoid of all notions of intentionality even if the system being studied seems to have a

⁶⁷ D.H. Mellor, *Necessities and Universals in Natural Laws*, in PHILOSOPHY OF SCIENCE: THE CENTRAL ISSUES, *supra* note 58, at 846, 858–62.

⁶⁸ STEVEN PINKER, *THE STUFF OF THOUGHT: LANGUAGE AS A WINDOW INTO HUMAN NATURE* 211–15 (reprint ed., Penguin Books 2008) (2007).

⁶⁹ Hans Kellner, in *THE BLACKWELL GUIDE TO THE PHILOSOPHY OF THE SOCIAL SCIENCES*, *supra* note 40, at 248. "[Economics] stands at the edge of the social sciences, pretending to belong elsewhere. The economist, according to Deirdre McCloskey, aspires to the conditions of pure science, a world of models that can be calculated perfectly, where neither argument nor tale-telling obstruct the proofs." *Id.*

⁷⁰ See, e.g., Paul Krugman, *The Living Wage: What It Is and Why We Need It*, WASH. MONTHLY, Sept. 1, 1998, available at http://economistsview.typepad.com/economistsview/2006/06/paul_krugman_th_2.html. Krugman stated:

So what are the effects of increasing minimum wages? Any Econ 101 student can tell you the answer: The higher wage reduces the quantity of labor demanded, and hence leads to unemployment. This theoretical prediction has, however, been hard to confirm with actual data. Indeed, much-cited studies by two well-regarded labor economists, David Card and Alan Krueger, find that where there have been more or less controlled experiments, for example when New Jersey raised minimum wages but Pennsylvania did not, the effects of the increase on employment have been negligible or even positive. Exactly what to make of this result is a source of great dispute. Card and Krueger offered some complex theoretical rationales, but most of their colleagues are unconvinced; the centrist view is probably that minimum wages "do," in fact, reduce employment, but that the effects are small and swamped by other forces.

⁷¹ PINKER, *supra* note 68, at 218.

purpose. In the physical sciences, we would not think of the forces in feedback system like a thermostat or a toilet float to have the intention of seeking equilibrium. “[A]n explanation of the teleological structure of a thermostat can be accounted for and made nonarbitrary by reference to causal mechanisms making up the thermostat and the causal act of setting the thermostat.”⁷² On the other hand, there is a significant philosophical debate over the role of intentionality as a “cause” or “reason” when dealing with the actions of sentient beings in a physical world. Somewhat infamously, Hempel proposed, in the logical positivist tradition, that reasons in history, as distinguished from reductive covering laws analogous to those in the physical sciences, were meaningless.⁷³ Donald Davidson, on the other hand, argued that reasons or rationalizations were “a species of ordinary causal explanation.”⁷⁴

The fundamental question is where social institutions or objects sit with respect to the continuum between physical cause in the natural sciences and willful intention of an individual human being.⁷⁵ The thermostat does not “intend” to equilibrate. Nor, would it seem, does the market for low-cost, unskilled labor. We ought to conclude, then, that it is as absurd to ascribe end-seeking to the labor market because, in that context, “[e]nd-seeking is a property that adds no explanatory content—everything that happens does so because of the arrangement of causal mechanisms such as the feedback mechanisms that do the work of directing the system toward the end state.”⁷⁶ As to economic systems, of which the labor market is a part, as Paul Krugman observed, “the amorality of the market economy is part of its essence, and cannot be legislated away.”⁷⁷

The attribution of purpose or meaning to social institutions, however, sits in another one of those difficult conceptual places between polarities in how we make sense of systems themselves comprised of individual human beings undertaking purposive action. Paul Roth distinguishes the role of explanation from the role of understanding of meaning in the social sciences: “Explainers pose the study of human qua social beings as continuous with the study of humans qua natural objects. Understanders conceive of the human sciences as *sui generis*, a realm of study of non-natural objects constituted by values and interests.”⁷⁸ To what extent does a macro view of the systems themselves influence action of the actors within the system? Or, as Professor Stephen Turner asks: “to what extent are [social institutions] ‘real,’ or, put differently, do they possess any explanatory force beyond the elements of human action and physical

⁷² See Stephen P. Turner, *Cause, the Persistence of Teleology, and the Origins of the Philosophy of Social Science*, in THE BLACKWELL GUIDE TO THE PHILOSOPHY OF THE SOCIAL SCIENCES, *supra* note 40, at 30.

⁷³ OBJECTIVITY, *supra* note 13, at 14–29.

⁷⁴ Donald Davidson, *Actions, Reasons, and Causes*, 60 J. PHIL. 685 (1963).

⁷⁵ ROSENBERG, *supra* note 8, at 60–65.

⁷⁶ Turner, *supra* note 72, at 35.

⁷⁷ Krugman, *supra* note 70.

⁷⁸ Paul A. Roth, *Beyond Understanding: The Career of the Concept of Understanding in the Human Sciences*, in THE BLACKWELL GUIDE TO THE PHILOSOPHY OF THE SOCIAL SCIENCES, *supra* note 40, at 311.

causality that compose them?"⁷⁹ That is to say, the social system appears to be purposive because of the feedback loop between system and individuals due to the human intention feeding back into it, and not because of anything inherent in the system itself.

In precisely this way, the economist Brian Arthur criticizes the implicit teleology of traditional modern economics which models by way of general equilibrium theory.⁸⁰ Standard economics assumes diminishing returns, but Arthur argues there are instances in which the assumption of "increasing returns" does a better job of explaining what individual agents are doing.⁸¹ What Arthur is doing is a reconciliation of the apparent end seeking within the amoral market and the real end seeking of market participants. This reconciliation may or may not be necessary in the market for low-paid workers, but Arthur contends that bubbles and crashes are better explained by assuming that "investors cannot assume or deduce expectations, but must discover them."⁸² In Arthur's model, "agents continually create and use 'market hypotheses'—individual, subjective, expectational models—of future prices and dividends within an artificial stock market on the computer . . ."⁸³ The key to replicating bubbles and crashes within the model is having the participating agents update their hypotheses about the market quickly. "[I]f the rate of updating of hypotheses is increased, the

⁷⁹ Turner, *supra* note 72, at 34.

⁸⁰ W. Brian Arthur, Talk Delivered at the Conference Einstein Meets Magritte at the Free University of Brussels: The End of Certainty in Economics (1994), reprinted in *THE BIOLOGY OF BUSINESS: DECODING THE NATURAL LAWS OF ENTERPRISE* at 31 (J.H. Clippinger ed., 1999) [hereinafter *End of Certainty*]; W. Brian Arthur, *Complexity and the Economy*, 284 *SCI.* 107 (1999) [hereinafter *Complexity and the Economy*]. Frank Pasquale pointed me to an interesting recent essay in the intellectual history of science. Joel Isaac, *Tangled Loops: Theory, History, and the Human Sciences in Modern America*, 6 *MOD. INTELL. HIST.* 397 (2009). Similarly to Arthur, Isaac is trying to assess, for purposes of historiographic method, how to assess the interplay between social scientist theorizers and the objects of their study, without being co-opted by the underlying theories themselves. What we can observe at times is that "theoretical practices are entangled in special ways with the world they seek to limit: as practices that are designed to produce knowledge about practices, theories in the human sciences may be taken up by the very objects they seek to understand." *Id.* at 416. (Isaac's example is the interplay between options theorists and the development of the trading markets in derivatives.) On one hand, some sociologists suggest that this "looping" between theory and social practice largely forecloses the possibility of objective study about practices; on the other hand, others continue to argue there is a scientific demarcation beyond which theory about social practices has an objectivity that goes beyond cultural or linguistic standpoint. Says Isaac:

We must never assume that the looping of theory into social performances is preordained, but neither should we separate as sharply as Bourdieu the realm of theoretical labour from that of worldly practice and embodied skill. Our task is rather to trace the tangled, shifting, and uncertain connections between the practices contained within a theoretical subculture and social practice of other kinds. It is up to historians of the human sciences to examine in what ways, if any, knowledge has looped into social practices, and how the transformation of those social practices in the face of such knowledge has, in turn, fed back into the inquiries of the human sciences.

Id. at 418–19.

It strikes me that this is a historian's methodological concession to the philosophical point about the infinite regresses we encounter at the core of discussion of concepts like "looping." The practice Isaac writes about is theorizing about theory; Isaac's own essay is a theory about theorizing about theory (ultimately prescribing three heuristics to deal with the regress), and I have offered my own meta-view (another layer of theory?) on top of Isaac's work. To some extent, this supports the "endless looping" theorists, but my intuition (and, it appears, Isaac's) is that there is some middle ground that requires at least the concept of foundational knowledge, even if we cannot nail down what the foundational knowledge is, and even if heuristics are the only methodological tool available.

⁸¹ *Complexity and the Economy*, *supra* note 80 at 108.

⁸² *Id.* at 109.

⁸³ *Id.* at 109.

market undergoes a phase transition into a complex regime and displays several of the anomalies observed in real markets. It develops a rich psychology of divergent beliefs that don't converge over time."⁸⁴

Arthur contends that it is error to view the economy as a physical object, "a gigantic machine," rather than a construct of its agents.⁸⁵ Economics, the most formal and abstract of the social sciences, wants to develop orderly predictive theory, but to do so it needs to operate on well-defined problems in which "[t]here should be no blurring of agent and problem."⁸⁶ Yet traditional economics requires "heroic assumptions" in order to take the agents' purposiveness out of the analysis: "Otherwise the well-defined characterization unravels, agent and problem become blurred, and pockets of uncertainty start to bulge."⁸⁷ The problem is the self-referential loop created by the activity of the markets, the participants' awareness of that activity, which in turn influences their actions, which in turn affects the markets, and so on.⁸⁸ The point here is that individual human action may well have singular purpose in which there is, at least in theory, a singular causal relationship (why did the mortgage broker commit to that particular subprime mortgage?) that includes influence from the very markets whose activities those actors affect.

Max Weber posited a "compatibilist" position that sought to reconcile causation as a matter of scientific regularities with the intuitive sense that individual human beings act for less reducible reasons.⁸⁹ He "raised the question of whether, even if one could have 'a sort of chemistry if not mechanics of the psychic foundations of social life,' its results would have significance 'for our knowledge of the historically given culture or any phase thereof, such as capitalism, in its development and cultural significance?'"⁹⁰ This position is "attributive causation," in which the appropriate answer is not the mechanistic one. For example, the answer to the question "Why did you buy a small fishing boat for your son?" does not

⁸⁴ *Id.*

⁸⁵ End of Certainty, *supra* note 80 at 32.

⁸⁶ *Id.* at 34.

⁸⁷ *Id.*

⁸⁸ *Id.* at 37.

People are creating a world that forms from their predictions, but if they try to form these expectations in a perfectly logical deductive way, they get into a self-referential loop. There is a logical hole in standard economic thinking. Our forecasts cocreate the world our forecasts are attempting to predict. And if I do not know how others might determine their forecasts, mine are indeterminate. There are some cases in economics where it is pretty obvious that everyone can figure out what to do, where something like the above given scheme does work. But otherwise the problem is fundamental. When our ideas and preferences cocreate the world they are trying to forecast, self-reference renders the problem indeterminate. The idea that we can separate the subjects of the economy (the agents who form it) from the object (the economy itself) is flawed. Pockets of indeterminism are present everywhere in the economy. And the high-modern form of economic determinism fails. *Id.*

In his recent assessment of the bursting of the credit bubble, Posner makes similar observations about the impact of the macro economy on individual decision-making (say, for example, hoarding cash) and the feedback loops and oscillations that occur as a result. Richard A. Posner, *A Failure of Capitalism (VI): Fear, Uncertainty, and the Economy* (May 20, 1979), http://correspondents.theatlantic.com/richard_posner/2009/05/a_failure_of_capitalism_vi_fear_uncertainty_and_the_economy--richard_a_posner.php; Richard A. Posner, *A Failure of Capitalism (VII): Are We at a Turning Point?* (May 18, 2009), http://correspondents.theatlantic.com/richard_posner/2009/05/ready_a_failure_of_capitalism.php.

⁸⁹ Turner, *supra* note 72, at 33.

⁹⁰ *Id.*

reduce to molecular biology or further. Rather, the answer attributes meaning to the action. In the above example, the answer is “because he wanted one and I spoil him rotten.”⁹¹

Where do economists stand on the science of bubbles? It is still an open question whether we will ever have the tools to sort through the mix of explanatory and attributive causation that makes up a macro-economy. Arthur's view that feedback loops of intentionality impact the ability of mathematical models to predict bubbles and crashes seems intuitively correct. Indeed, in the fierce and partisan debate between interventionists and free-market advocates, the one point of agreement is that prediction of the unknown and uncertain future from the known past is no easy task.⁹²

b. Reconciling Legal Causation with Scientific Causation

The same tension between impartial social scientific causation and individual human understanding of the system in which the actor operates

⁹¹ OBJECTIVITY, *supra* note 13.

⁹² On the interventionist side, see Paul Krugman, *How Did Economists Get It So Wrong?*, N.Y. TIMES MAG. Sept. 6, 2009, at 36, 37.

As I see it, the economics profession went astray because economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth. . . . [W]hat's almost certain is that economists will have to learn to live with messiness. That is, they will have to acknowledge the importance of irrational and often unpredictable behavior, face up to the often idiosyncratic imperfections of markets, and accept that an elegant economic "theory of everything" is a long way off. In practical terms, this will translate into more cautious policy advice – and a reduced willingness to dismantle economic safeguards in the faith that markets will solve all problems.

Id.

Krugman's article engendered from John Cochrane at the University of Chicago Booth School of Business, largely around the question whether, and the extent to which, the government should be involved in the allocation of resources. See John Cochrane, *How Did Paul Krugman Get it so Wrong?*, http://faculty.chicagobooth.edu/john.cochrane/research/Papers/krugman_response.htm. Putting aside the anger and ad hominem on both sides, this seems to me to be the valid point from Cochrane:

Crying “bubble” is empty unless you have an operational procedure for identifying bubbles, distinguishing them from rationally low risk premiums, and not crying wolf too many years in a row. Krugman rightly praises Robert Shiller for his warnings over many years that house prices might fall. But advice that we should listen to Shiller, because he got the last one right, is no more useful than previous advice from many quarters to listen to Greenspan because he got several ones right. Following the last mystic oracle until he gets one wrong, then casting him to the wolves, is not a good long-term strategy for identifying bubbles. Krugman likes Shiller because he advocates behavioral ideas, but that's no help either. People who call themselves behavioral have just as wide a divergence of opinion as those who don't. Are markets irrationally exuberant or irrationally depressed *today*? It's hard to tell.

Id.

This difficulty is no surprise. It's the central prediction of free-market economics, as crystallized by Hayek, that no academic, bureaucrat or regulator will ever be able to fully explain market price movements. Nobody knows what “fundamental” value is. If anyone could tell what the price of tomatoes should be, let alone the price of Microsoft stock, communism and central planning would have worked.

More deeply, the economist's job is not to “explain” market fluctuations after the fact, to give a pleasant story on the evening news about why markets went up or down. Markets up? “A wave of positive sentiment.” Markets went down? “Irrational pessimism.” (“The risk premium must have increased” is just as empty.) Our ancestors could do that. Really, is that an improvement on “Zeus had a fight with Apollo?” Good, serious behavioral economists know this, and they are circumspect in their explanatory claims.

But this argument takes us away from the main point. The case for free markets never was that markets are perfect. The case for free markets is that government control of markets, especially asset markets, has always been much worse.

appears in the positivist conception of the law. It seems to be no coincidence that the concepts of legal positivism were developing at about the same time as the articulation of the philosophy of the physical and social sciences. Hans Kelsen developed his "Pure Theory of Law" to identify positive law, but it turned on neo-Kantian metaphysics expressed in the fundamental *Grundnorm*, an a priori concept, accessible to us merely by reason and preceding our experience of the world, by which physical events took on legal consequence.⁹³ Hart's positivism put aside the metaphysics, but substituted the Rule of Recognition and the "internal point of view." This substitution is the key conceptual move: the melding of the objective and observable (i.e., positive) with the subjective and internal, the paradox of which is simply accepted or ignored. We observe people stopping at red lights and going on green lights, but that only tells us there is a norm. What makes it law, objectively and positively, is the subjective view of the individual from the internal point of view—the placement of the traffic light traces back to a Rule of Recognition by which the subjective actor recognizes the light as having the force of law.⁹⁴

So, economics is a *science* in the logical positivist tradition. It ought not to try to speculate why things are happening in a metaphysical sense, but simply to explain or predict regularities.⁹⁵ If marginal costs exceed marginal revenues, generally the firm will shut down production. If interest rates go down, generally demand for houses will go up. If demand for labor goes up, so will wages. Consistent with Arthur's view of the traditional economic model, this assumes away the self-referential impact of market participants perceiving that markets are moving in a particular direction and modifying their own actions accordingly. That very self-reference that the objective economic model eliminates is the likely source of bubbles and crashes.

The explanation of *law*, on the other hand, in the positivist tradition at least, explicitly demands that we look at the internal point of view; otherwise we may be studying norms and not law. This explanation constitutes an implicit and unresolved paradox at the heart of legal positivism. The incremental result of combining the two "scientific" approaches—the external point of view of economics combined with the internal point of view of Hartian positive law—is a mish-mash in which the theory demands individual actors incorporate the external point of view in their internal motivations.⁹⁶ Ironically, that result is closer to Arthur's thesis

⁹³ HANS KELSEN, INTRODUCTION TO THE PROBLEMS OF LEGAL THEORY: A TRANSLATION OF THE FIRST EDITION OF THE REINE RECHTSLEHRE OR PURE THEORY OF LAW 24–25 (Bonnie Litschewski Paulson & Stanley L. Paulson trans., 2002).

⁹⁴ H.L.A. HART, THE CONCEPT OF LAW 56–57 (1961).

⁹⁵ That seems to be what John Cochrane was arguing in his response to Paul Krugman: that the science of economics consists of observation and theory based not in narrative, but in deductive (read: mathematical) models. See Cochrane, *supra* note 92.

⁹⁶ The combination of law and economics has produced a Kuhnian "scientific" orthodoxy or paradigm among scholars in that hybrid discipline in which it appears to be assumed that the butcher, brewer, or baker of Adam Smith's invisible hand actually has societal welfare maximization inside his or her head when making decisions. Corporate boards do not generally make decisions based on pareto-optimality, i.e., making everybody better off; they make "Kaldor-Hicks" decisions, which means that they are looking to maximize the corporation's share of any consumer surplus without regard to its overall impact on society. That is what we all do every time we haggle with somebody over the price of the

of what is really happening than the neo-classical models of law and economics.

The struggle to reconcile causation within the legal system with the causation of scientific explanation reflects this internal-external tension as well. It is evident in the two most prominent systematic treatments of the issue: *Causation in the Law* by Hart and Honoré ("H&H") in 1959⁹⁷ and Michael Moore's *Causation and Responsibility*⁹⁸ almost forty years later. The H&H work on causation, as with Hart's positive law theory generally, aspires to science and "reduction," and abjures any discussion of metaphysics. Moore's work is in part a criticism of H&H, rejecting the wholesale failure to come to terms with the issues of metaphysics in causation.⁹⁹ What close analysis of both works demonstrates is that we ought not to be surprised at knee-jerk reactions to financial complexity as a problem, and a concomitant struggle to develop or justify legal intervention. First, legal causation is primarily concerned about past singular causes (i.e., did X cause Y?). It is far less concerned about general causes (i.e., do X's cause Y's?).¹⁰⁰ Second, assigning primary causes for the purpose of after-the-fact blame in traditional legal casuistry turns out to be no less irreducible and mysterious than accounting for the causation of misfortune and injustice generally. Third, "regulation as technology" requires a social scientific approach to causation with the result that the science of financial modeling failed to anticipate and control the financial meltdown because complete control is beyond the capability of the science of human institutions for the reasons that Arthur articulates—the inseparability of individual actors and the systems in which they act. Since regulation is also a human institution, we can expect its ability to anticipate and control to be limited as well.

goods or services. This transformation (or Kuhnian paradigm) completes itself in models like the justification of contract formalism proffered by Alan Schwartz and Robert Scott (contracting parties really do want to maximize the joint surplus, not their individual share of it), or Ronald Gilson's justification of lawyering, in which he theorizes the only reason lawyers are present is because they have to increase the value of the total deal, not just each party's Kaldor-Hicks share. See Alan Schwartz & Robert Scott, *Contract Theory and the Limits of Contract Law*, 113 YALE L. J. 541, 552–53 (2003); Ronald J. Gilson, *Value Creation by Business Lawyers: Legal Skills and Asset Pricing*, 94 YALE L.J. 239, 243–44 (1984).

⁹⁷ HART & HONORÉ, *supra* note 49.

⁹⁸ MICHAEL S. MOORE, *CAUSATION AND RESPONSIBILITY* (2008).

⁹⁹ To get to the punch line quickly, the problem for me is that, on one hand, Professor Moore's conclusions about intervening cause seem sensible. I agree with his conclusions that the doctrine serves a proxy function of approximation and is not a "bright line". I also agree that the bright lines cannot be sustained as a matter of philosophical causation. I have no qualms over his opting for "substantial causation" as the test for apportioning tort liability.

On the other hand, the discussion of the metaphysics of intervening cause seems to me to be putting up straw men. Hart and Honoré were not metaphysicians. Professor Moore attacks the weakest metaphysics to make his case, not the strongest. Maybe there is no need to attack the metaphysics at all. Moreover, in view of the significant work in metaphor and analogy as a key component of cognitive science, it is strange he is so dismissive of the possibility that paradigm and metaphor are what "justify" our common sense line drawing.

In any event, my concern is with causation and its metaphysics, and I cannot fail to address one of the most important treatments of the subject in years.

¹⁰⁰ *Id.* at 470–74.

i. The metaphysics of legal causation

The first issue is the treatment of legal causation in the casuistic tradition. This treatment involves assigning blame or responsibility when looking backward at the causes of an untoward event, whether a tort or a crime. H&H were inheritors of both the Humean rejection of metaphysics, as well as the linguistic turn that found "the meaning of words like 'cause' . . . in the paradigmatic exemplars of such words shared by some linguistic community."¹⁰¹ Indeed, H&H begin their analysis by distinguishing the broader philosophical issues of causation, including (a) the Kantian issues of causation as a matter of a priori knowledge and whether actions of rational agents following the dictates of moral duty are "uncaused" in a naturalistic sense,¹⁰² and (b) Hume's rejection of metaphysical causation in favor of causation simply as the generalization from uniform sequence.¹⁰³ Causation for lawyers is a different kind of inquiry, one that largely accepts the search for physical explanation as raising few perplexities.¹⁰⁴ It is instead one of attribution or the meaning of events in terms of responsibility. Sociologists, historians, and H&H seem to agree the issue is less a question of mechanical or scientific cause than the common sense causal notions of the "historian, the lawyer, and the plain man."¹⁰⁵

The hard question for lawyers is the retrospective question of attributing singular causal significance to the defendant's action.¹⁰⁶ H&H argued that there is more to legal causation than mere policy; the task is distinguishing those merely "but for" conditions (like the presence of oxygen for the starting of a fire) from cognizable legal causes.¹⁰⁷ The gist of their argument was that legal cause differs fundamentally from mere condition when abnormal events or voluntary human actions "bring about disturbances or deviations from the normal course of things."¹⁰⁸

¹⁰¹ *Id.* at 257–58.

¹⁰² HART & HONORÉ, *supra* note 49, at 13.

¹⁰³ *Id.* at 14.

¹⁰⁴ *Id.* at 8.

¹⁰⁵ *Id.* at 11. H&H, as a rhetorical device, repeatedly lump these three categories together. It is consistent with Max Weber's notion of legal causation:

Trained as a lawyer, Weber pointed out that legal reasoning about responsibility was causal, and argued that this kind of reasoning, properly understood, was relevant to and sufficient for the kinds of factual historical questions that arise within cultural points of view. The proper understanding of the causal character of these questions was this: determinations of causality or responsibility did not require scientific laws, but required a judgment that, in a class of similar cases, subtracting a given condition would have lowered the probability of the outcome.

Turner, *supra* note 72, at 33. See also OBJECTIVITY, *supra* note 13, at 65 ("The historian's narrational mode of causal reasoning, which does not differ from that of everyday common sense in any deep structural way, is very different from that of a scientist working in a laboratory, conducting experiments.")

¹⁰⁶ *Id.* at 22–23.

¹⁰⁷ *Id.* at 30–31.

¹⁰⁸ *Id.* at 37–38. So, for example, if a gardener forgets to water the plants and they die, the failure to water is the cause, not the sequence of physical events by which, botanically speaking, a dry plant dies. "The initial disturbance of the normal condition of the thing affected is the cause: these [later events] are merely details of the way it develops. To cite these later phases of the process as the cause would be pointless in any explanatory inquiry; for we only know of them as the usual or necessary accompaniments of the abnormal occurrence or human intervention, which has already been recognized as 'making the difference' between the normal course of events and what has in fact occurred, and so explaining the latter." *Id.*

One of Moore's criticisms of H&H centers on what Moore views as the mistaken metaphysics implicit in using this view of causation to justify the legal doctrine of "intervening cause."¹⁰⁹ According to Moore, H&H contended that the legal doctrine of intervening causation is justified if it matches the conditions of moral blameworthiness.¹¹⁰ The conditions of moral blameworthiness include causation, in the sense of a cause not constructed out of rules of law or morality, "natural" causation; that is, that causing the intended harm is more blameworthy than merely intending it.¹¹¹ The "natural" causation referred to here is the ordinary man's concept to be found in unreflective usages of ordinary language.¹¹² H&H used the ordinary language approach to justify why the law should regard voluntary human actions and abnormal natural events as breaking off the causal responsibility of earlier actors. The analogy for physical causation is a chain:

The persistent notion [reflected in ordinary language describing acts that appear to supersede or intervene] that some kinds of event required in addition to the initiating action for the production of harm 'break the chain of causation' is intelligible, if we remember that though such events actually complete the *explanation* of the harm (and so *make* rather than *break* the causal explanation) they do, unlike mere normal conditions, break the *analogy* with cases of simple actions.¹¹³

Moore's problem is with the last premise. According to H&H, the ordinary person uses language¹¹⁴ suggesting that causes are either voluntary human actions or abnormal natural events that are necessary elements completing a set of conditions necessary for an effect, so long as no other event intervenes between the first event and the later effect.¹¹⁵ Moore asks why should the law adopt this view. The inquiry does not end just because H&H think cause is the "ordinary notion." Moore contends that we need at least to look at what it means actually to cause harm, not just the conventions ordinary people use when they talk about it.¹¹⁶ The essence of the ordinary language program is "truth by convention" which rejects metaphysical inquiry into the causation itself: "things or relations like causation had no nature save that given by their paradigmatic exemplification and analogical extensions thereof; meaning (as paradigms plus analogies) totally fixed nature, rather than vice versa."¹¹⁷

¹⁰⁹ MOORE, *supra* note 98, at 254–79.

¹¹⁰ *Id.* at 255.

¹¹¹ *Id.*

¹¹² *Id.* at 256 ("[I]f legal liability tracks moral responsibility, if moral responsibility tracks causal responsibility, and if causal responsibility is fully determined by ordinary thinking about it, then Hart and Honoré had all the justification they needed to rely on the plain man's view of causation.")

¹¹³ *Id.* at 69.

¹¹⁴ Such ordinary person would describe intervening factors as "'new actions' (*novus actus*) or 'new causes', 'superseding', 'extraneous', 'intervening forces': and for the description of the initiating action when 'the chain of causation' is broken as 'no longer operative, 'having worn out', *functus officio*.'" *Id.* at 69.

¹¹⁵ MOORE, *supra* note 98, at 256–57.

¹¹⁶ *Id.* at 259.

¹¹⁷ *Id.*

Moore's primary criticism is that "it allows the nature of the thing, causation, to be fixed by the conventions of present usage (in this case, the paradigms and analogies). It thus purports to cut off scientific theorizing about such nature on the grounds that anything ordinary thought does not already recognize as causation cannot be causation."¹¹⁸ Ironically, Moore invokes metaphysics to argue that there has to be something more, scientifically speaking, to causation than mere language. The ordinary language conception of causation cuts off the possibility of further scientific insight about the nature of such things because if all there is to such things is what is ordinarily known, as reflected in ordinary usage, then scientific hypotheses about kinetic energy, subatomic structure, rapid eye movements, molecular structure, and brain functioning are about something other than heat, protons, dreams, or water.¹¹⁹

Moore's view is that the H&H conception of intervening cause is the metaphysics of the Stone Age—an acceptance of brute inexplicability at the macro level, in which something in the chain of events throws off our ability to trace an effect to the real cause. As objectionable to Moore as no metaphysics of causation is the primitive (and equally brute) metaphysics of theism: whatever science cannot explain, God, the Uncaused Cause, does.¹²⁰ This is not an unexpected problem; one of the continuing issues in the philosophy of social science (and less so than in the physical sciences) is the search for foundational or "First" principles. There is enough yet to be discovered in the physical sciences to avoid the metaphysical questions at the far end of cosmology as the problems of human interaction and human systems almost always require that the observer take stock of what he or she assumes to be axiomatic. If, for example, rational choice theory "let us make objective yet interpretive sense of social life," it would be "the point at which the spade is turned; explanatory bedrock has been hit."¹²¹ H&H avoid foundational questions entirely, and in their own way (as Moore correctly observes) simply foreclose the path to possible "explanatory bedrock."

Hence, to find a more satisfying foundational answer, Moore reconstructs his own metaphysics of causation. Moore's simplest example of the application of intervening causation is a preemptive event, one that arises subsequent to the defendant's action and preempts the ability of the defendant's action to have caused the harm.¹²² For example, two different actors start forest fires that are heading toward a house. Fire 1 gets there and burns the house down. Fire 2 gets there later. Was Fire 1 an intervening cause that relieved the initiator of Fire 2 of any responsibility? Moore contrasts this problem with problems in "concurrent causation." For example, three bullets, fired by three different actors, hit the victim, and the victim loses blood from each of the bullet holes.¹²³

¹¹⁸ *Id.*

¹¹⁹ *Id.* at 256–57.

¹²⁰ *Id.* at 260.

¹²¹ Turner & Roth, *supra* note 40, at 10–11.

¹²² MOORE, *supra* note 98, at 261.

¹²³ *Id.* at 261–63.

In the hypothetical, Fire 1 is often said to be “sufficient” (as well as necessary) but that is not really helpful. By saying Fire 1 was sufficient, we are just saying that Fire 2 was not necessary. Moore contends there are two causal processes at work. We understand the nature of those causal processes enough to know that one process was completed (Fire 1) and the second was not (Fire 2). This hypothetical may be contrast with the case of the three bullets. According to Moore, we are satisfied to say each one “caused” the death, regardless of the necessity and sufficiency of each wound, because we understand how each bullet caused blood loss, which caused death.¹²⁴ If, however, only one bullet drew blood, and the cause of death is loss of blood, the bullet drawing blood would preempt the others from doing their causal work.

[This] should be our model for a successful metaphysical underpinning for the law of intervening causation generally. In the preemption cases we bring to bear our detailed knowledge of the physical world in justifying the causal conclusion reached by the law. There is no very general metaphysical truth being relied upon in such cases—save perhaps the truths that nothing can cause an event or state to occur that has already occurred, and that merely hypothetical events that might have occurred but which did not occur cannot cause anything else to occur. Yet the metaphysical underpinning of the law is nonetheless quite secure in such cases. Our best scientific theories show us that there is no causal relation in such cases, and the moral and legal conclusions tag along behind such metaphysics without problem.¹²⁵

I find Moore's metaphysics to be less a satisfying explanation of the justification of legal doctrine and more evidence of the intractability of the translation of scientific or natural causation to the social institution of law's casuistry. Put otherwise, I see no reason to accept Moore's approach to foundational issues. There is unquestionably a physical difference between the examples of concurrent and pre-emptive causation that Moore describes. His resolution of the extremes of brute conceptions, however, between no metaphysics at all and theism, is a brute as either extreme. Moore's first brute conclusion is that all of the concurrent blood loss events are causative of death, regardless of necessity or sufficiency, because we have simply concluded that all blood loss looks enough alike to dispense with necessity and sufficiency of the conditions making up cause. The second brute conclusion is Moore's fundamental assumption that moral or legal constructs supervene on the physical structure of the world. Blaming the actor who intended to shoot the victim but whose bullet did not draw blood does not trouble me. He is not morally different from the shooter whose bullet hit concurrently. But even if he is morally different, we still must question whether the law should treat him differently.

In sum, Moore sees a binary difference between the concurrent and the preemptive bullet-firing cases, not a question merely of degree of

¹²⁴ *Id.* at 262.

¹²⁵ *Id.* at 262–63.

remoteness. In the preemptive case, the firing of the bullet that does not draw blood is *really* unnecessary and *really* insufficient to cause death as opposed to the variations on concurrent blood loss, in which Moore has simply assumed away the tricky questions of necessity and sufficiency of the cause by the brute assertion that all blood loss causing events are enough alike to treat them as cause.

These analyses then represent the current state of affairs in the metaphysics of the *legal* approach to causation.

ii. Legal causation and scientific explanation

Having sorted through the metaphysics of legal causation, we now need to reconcile it with causation in the general epistemology of scientific knowledge. Again, Moore's exegesis and criticism of H&H are helpful in assessing the problems with both views. We need to separate Moore's more problematic philosophical analysis from the unobjectionable doctrinal conclusion he draws, which is that trying to find a reductive, "law-of-nature-like" bright line for exculpatory causation is futile. All causation metaphysics can do for law, says Moore, is tell us whether the intervening cause seems significant or not as a mixed assessment of physical proximity and moral culpability.¹²⁶

This assertion follows from the analysis of intervening cause. H&H followed Hume's rejection of metaphysics, what Moore refers to as a "generalist" view of causation. In other words, we say, "A caused B" when we have regularly observed that B follows A. In Moore's view, the H&H generalist account of causation does not account for legal intervening cause. It simply stops, as a matter of brute axiom, at the human action or abnormal event, and declines to ask the next "why" about the source, or the causal conditions of the human action or abnormal event. In other words, some events, whether human or natural, simply cannot be explained.¹²⁷ Moore concedes there are no covering laws to human action, that is, human action cannot be reduced to a scientifically predictable set of physical laws. However, he disagrees with simply assuming, as a brute fact, that human choice is inexplicable.¹²⁸ There has to be something that can be explained! "That we do not know such micro laws of working reflect only our empirical ignorance; it does not reflect any brute inexplicability to human choice."¹²⁹ Moore rejects the idea that "reasons" for action are any less physically or naturally causal than "causes" for action. As for abnormal natural events, if we see a tree falling on a speeding car as "inexplicable" in the sense of "uncaused," it is only because of our limited explanatory

¹²⁶ *Id.* at 278–79.

¹²⁷ *Id.* at 265. I accept Moore's exegesis for purposes of discussion, but I have a hard time with it. I do not think it follows from an adoption of a Humean view of causation that any physical action is inexplicable as a matter of cause and effect. The Humean view simply does not attribute a will to events.

¹²⁸ MOORE, *supra* note 98, at 266.

¹²⁹ *Id.* at 266.

interests, and not because there are no explanations and thus no chain of cause going back to defendant's action.¹³⁰

Accepting Moore's sensible doctrinal conclusion for assigning legal blame does not mean we must accept his epistemology for purposes of law as regulatory technology. The problem is that Moore not only rejects the Humean rejection of metaphysics, but also rejects the mysteries of Kantian metaphysics. Kant viewed human will as a transcendental intervention into the physical world; while it cannot be explained reductively, rational beings are free to choose, and that freedom to follow the dictates of duty versus the pull of material needs or desires is the essence of morality.¹³¹ Moore wholly rejects this view, in an attack on "libertarian" metaphysics. People may believe they are free and therefore capable of breaking the causal chain, but that is no justification for legal doctrine that exculpates, as a bright-line matter, other morally objectionable acts. Says Moore:

If our ambitions are to justify such doctrines, however, we need to leave off doing the sociology of other people's metaphysics and start doing our own. Voluntary human actions have to *be* uncaused—not just *believed to be* uncaused—if they are justifiably to serve the sort of chain-breaking function they do serve in our law.¹³²

So Moore's move is to supply his own metaphysics of "singular causal relations." That is to say, he rejects Hume's empiricist epistemology of causation, as well as the Kantian idea of freedom, for a different kind of causal "glue" which explains the relationship of states and events. His position may be summarized as follows. First, causal relationships have primitive (i.e., brute or irreducible) status.¹³³ Second, the elements of primitive singular causation are:

(a) Causation is a scalar relation. Unlike binary relations, you can be more or less of a cause. Bigger fires are more of a cause than lesser. More blood loss is a bigger cause than less blood loss.¹³⁴

(b) Scalarity of causation is specifically such that the causation relationship diminishes over time.¹³⁵

(c) The amount of causal contribution needed for an actor to be morally responsible for some harm is non-de minimis or substantial.¹³⁶

Hence, to Moore, the attribution of causation in law is a matter of degree, and the appropriate standard should simply be whether the amount of causation is "substantial." "The vague notion of substantial is as good a

¹³⁰ *Id.* at 266–67.

¹³¹ IMMANUEL KANT, *GROUNDWORK FOR THE METAPHYSICS OF MORALS* 47 (Mary Gergor trans., Cambridge Univ. Press 1998) (1785).

¹³² MOORE, *supra* note 98, at 269. This first appears in the discussion of the metaphysics of intervening cause, but reappears in the later general discussion of the metaphysics of causation: "Human agency is no more irreducible to event (process state, fact, etc) causation than is the 'agency' of fires and bullets." *Id.* at 333–34.

¹³³ *Id.* at 275.

¹³⁴ MOORE, *supra* note 98, at 275–76.

¹³⁵ *Id.*

¹³⁶ *Id.*

line as we are going to get. The vagueness of the idea of substantiality is not a defect but a virtue. As Aristotle remarked long ago, we should not demand greater precision than a subject matter can bear."¹³⁷

Professor Moore is, of course, entitled to his opinion, but it seems to me this is precisely the place to heed the warning of both Hume and Kant that "all cognition assumed to be *a priori*, is nothing but a long habit of accepting something as true, and hence of mistaking subjective necessity for objective."¹³⁸ Professor Moore's discussion of libertarian metaphysics dismisses one of the most fundamental debates about the role of human agency—whether we have a will that somehow transcends mere physical cause-and-effect. The position is, at least, clear if also dismissive.

In truth, I find libertarian metaphysics to border on the unintelligible. The closer one looks at this metaphysical position, the worse it looks. If common sense indeed subscribes to such a metaphysics, so much the worse for common sense. It can be no justification of legal doctrine to be based on error this fundamental, no matter how widely shared such error may be in our populace.¹³⁹

If we are to start doing our own metaphysics of causation by way of ventures into pure reason, then we ought to be accordingly humble lest we mistake our subjective view for the objective truth.¹⁴⁰ The putative purpose of Moore's discussion is to undercut libertarian metaphysics as the justification for the legal doctrine of intervening cause, and that logic seems sound as to approach if not to result. In other words, under this argument, we seek to justify legal doctrines like intervening cause based on fitting punishment or remedy to moral dessert as expressed through retributive and corrective justice. If moral dessert depends on causation, then legal doctrine needs to map onto what causation is. If intervening

¹³⁷ *Id.* at 276.

¹³⁸ PROLEGOMENA, *supra* note 20, at 22.

¹³⁹ MOORE, *supra* note 98, at 272.

¹⁴⁰ This is where a modest Kantian (like me) walks a knife-edge. Karl Ameriks noted that Kant, in the spirit of his times, was certain that he had discovered the final answers on the subject of the categories, like causation, but that modern philosophers would prefer a more flexible notion of the *a priori* in which the precise meaning of terms like "causality" can be worked out over time for particular empirical inquiries. AMERIKS, *supra* note 5, at 59. Legal causation, I think, is one of those areas. For example, Professor Moore rejects as false the idea that it makes sense to distinguish legal doctrines of "but for" causation as a matter of science versus "proximate" causation, as simply a matter of normative or policy judgment. MOORE, *supra* note 98, at xii. I am not sure why that distinction is false.

More fundamentally, given the inherent problems with *every* theory of causation that attempts a complete solution, proposed and knocked down in turn by thinkers far more capable than I, I am inclined to think that Kant was correct in suggesting that the unpacking of causation itself is an area of transcendental illusion, i.e., one in which reason cannot bring us to a winning answer, any more than reason can bring us to a winning answer on the correct conception (if any) of a deity. Kant was skeptical of turning reason upon the categories or concepts (like causality or substance) themselves as opposed to objects of experience. For example, he discussed what it meant to make a judgment of substance by calling something "simple in appearance." As to an object of experience, that makes sense. "But if something is cognized as simple only in the concept and not in appearance, then I really have no cognition of the object, but only of my concept, which I make of something in general that is not susceptible of any real intuition. I say only that I think something entirely simple, because I really do not know anything further to say about it than merely that it is something." CRITIQUE OF PURE REASON, *supra* note 52, at 441.

As I have noted, the very intractability of the problem has significance for me.

cause assumes that human voluntary action is uncaused, then it needs to be uncaused to justify the doctrine.

Professor Moore's response is an attack on "uncaused" human voluntary action as a legally cognizable intervening cause. His reasons for rejecting libertarian metaphysics are (a) that they fail to account for acts of God as intervening causes and (b) they fit the doctrine poorly.¹⁴¹ Intervening causes are (1) voluntary bodily movement, (2) motivated by an intention to do the harm done, (3) which intention is "freely" formed, (4) by a generally responsible agent in possession of his faculties.¹⁴² While H&H thought there was a justification for intervening cause when the intervening action was "truly free," Moore disagrees. "Free" choice only needs to involve (1) and (4), a will and a willed action.¹⁴³ Thus, (1) and (4), if you were a libertarian about free will, ought to be enough to create an intervening cause. Points (2) and (3) can be disposed of first, argues Moore.¹⁴⁴ A "negligent" act is as "free" as the "intentional" act. Throwing the cigar on the gasoline is a free act, even if you do not know about the gasoline, and therefore cannot intend to start the intervening fire. Moreover, the bad actor intentionally moved his arm, even if he did not intend to cause the fire. How can the same act be free and not free? Hence, reject (2). Moreover, reject (3) because the fact of coercion ought not to make the act any less free.¹⁴⁵

To dispose of points (1) and (4), Moore needs to reject the concept that any voluntary bodily movement by a generally responsible agent in possession of his faculties could be "free." The response here is simply a brute rejection of the idea of free will as unintelligible and unworthy as a basis of legal doctrine "even if common sense ascribes to such a fundamental error":

Taking this latter functionalist/physicalist view of mental states like willings, there is no reason whatever to think that willings are uncaused. Such functionally specified, physically realized events are both causes and effects of earlier causes, like all other events. They cannot, on such an account, be literal fresh starts breaking causal chains whenever they intervene.¹⁴⁶

As I mentioned, I am as willing as Professor Moore to accept that the H&H view of intervening cause is brute in its own way, but I am less persuaded by his articulation of the metaphysics. Indeed, I disagree with almost everything in it. As to the failure of libertarian metaphysics to account for acts of God, this argument is a red herring. It presumes that the legal doctrine is not multiply explainable. I do not think libertarian metaphysics suggests that acts of God are uncaused. This argument only says that there has to be another explanation for using intervening cause doctrine when the intervening event is an abnormal natural event.

¹⁴¹ MOORE, *supra* note 98, at 270.

¹⁴² *Id.*

¹⁴³ *Id.* at 271.

¹⁴⁴ *Id.* at 271–72.

¹⁴⁵ *Id.* at 270–73.

¹⁴⁶ *Id.* at 273.

More importantly, my intuition, contrary to Professor Moore's, is that we do have free will, but I am willing to acknowledge that one can have either view without committing fundamental error. As to the argument on point (2), Professor Moore generally rejects the distinction between reasons and causes within his particular metaphysics. If, unlike me (or Kant), you do not see will as involving transcendence then you do not see a difference between reasons and causes, and there is no difference. But you have already assumed away the issue. The argument on point (3) is a straw man, created not by Kantian metaphysics of freedom, but by the simple assertion of H&H that (3) fits. In fact, it does not, because Kantian metaphysics of morality do not excuse you from duty because of coercion. Within Kantian moral philosophy, this lack of excuse is the point of the famous passage comparing lust to false witness. If you were told that you would be hanged if you visited a brothel, you could probably control your lustful inclination. If, however, you were told you would be hanged unless you bore false witness against a good man, you could at least consider the possibility of giving up your life so as to do your duty. In short, you are always free to consider your moral obligation.¹⁴⁷ Finally, point (4) is a simple rejection of transcendental philosophy as though there is no debate about it. One either believes that all willing can only exist in natural time and space or not. Neither position is provable.

What is the point? It is that most thinking about cause-and-effect in law, as exemplified by the two comprehensive studies of it, is about justifying the attribution of blame in singular instances, not about considering the impact of legal and regulatory prescriptions on the diseases of the social order, a matter of uncovering the complex web of human intentionality and social explanation. H&H simply put aside metaphysics. Moore's mechanistic metaphysics and the concomitant rejection of the idea of freedom focuses almost entirely on the justification of the causation element of torts and crimes, and cuts off the inquiry into the metaphysics of the legal reaction to complexity just as it starts to get interesting—when we have to consider the inter-relationship of actors in the system and the regulation they impose. His more general discussion of the metaphysics of causation is an attempt to reach a foundational truth somewhere between reductive causal explanation and attributive cause, but rejecting *ab initio* the possibility of "uncaused" human agency as the source of the perplexing irreducibility of the problem.¹⁴⁸ As discussed in Part III, *somebody* has to

¹⁴⁷ CRITIQUE OF PRACTICAL REASON, *supra* note 52, at 27–28.

¹⁴⁸ Even summarizing the various positions on the metaphysics (or not) of causation is an ambitious undertaking, as we have seen, *see supra* notes 56–74, and accompanying text. Professor Moore undertakes, in Chapters 14–20, a theoretical consideration of singular and general causal relationships as they impact legal causation, splitting the inquiry into the consideration of (a) causal relata, i.e., what is it among candidates like facts, events, tropes, objects, or states of affairs that we mean by the "cause" and the "effect", and (b) the relationship itself, the causal "glue" as it were. *See generally* MOORE, *supra* note 98, at 327–512. The key statement of the problem is at 472–73: Moore would agree with Weber and Haskell it is a truism that all singular causal relationships, the kind with which the law is concerned in individual cases, have to reduce in some sense to Humean generalized inductive laws. What Professor Moore seeks is a way of reconciling broad generalist causation with singular causation that avoids the libertarian metaphysics of human free will (as opposed to a compatibilism he endorses earlier in the book). *See id.* at 25–26. "What is wanted is a notion of causal laws that is not dependant on some prior notion of singular causal relations; then the reductionist claim distinctive of generalist theories of causation will not be trivial and will not fail to distinguish generalist from singularist theories." *Id.*

make a judgment about what to do, and libertarian metaphysics might well have some bearing on that question, despite Professor Moore's disdain for the approach.

Moreover, if there is a viable science by which we might eliminate or temper future bubbles, it will come from sorting through the lessons of history in search of causal relationships upon which we will make real world decisions. I share the historian Thomas Haskell's aspiration "to narrow the gap between narrative art and causal inquiry and to liberate causal inquiry itself from two equally acute dangers, the over-ardent embrace of the Hempelians and the scorn of the narrativists."¹⁴⁹ My intuition is that there is some mix of human agency and social force that is the causal explanation, and I am not as willing simply to reject a place for libertarian metaphysics. Again to quote and concur with Haskell:

[M]y conviction—which underlies everything I have written on the subject—[is] that the history of human agency and moral responsibility cannot be understood apart from the shifting conventions through which common sense enables the practices of causal attribution by means of which we humans make sense of our experience.¹⁵⁰

D. THE ABDUCTIVE PROBLEM: WHENCE COMES THE HYPOTHESIS FOR THE CAUSE OF THE FINANCIAL CRISIS?

Even if we assume there is sufficient systematicity in human affairs to warrant the label of "science" in understanding them, there is still substantial mystery in the causal glue, far more than in the physical sciences. The great mystery still is the source of the hypothesis. Said Rudolf Carnap:

It must not be forgotten that, both in the history of science and in the psychological history of a creative scientist, a theory has often first appeared as a kind of visualization, a vision that comes as an inspiration to a scientist long before he has discovered correspondence rules that may help in confirming his theory.¹⁵¹

Quine argued that scientific inquiry could not be as limited as the logical positivists contended: "A dominant further factor, in solid science as in daily life, is *hypothesis*. In a word, hypothesis is guesswork; but it is educated guesswork."¹⁵² The point here is simply that the leap from previous observations to future predictions is embodied in the idea of the hypothesis, and even Quine, while rejecting synthetic a priori knowledge as a helpful distinction, thought there were five "virtues" underlying hypotheses: conservatism, modesty, simplicity, generality, and

¹⁴⁹ OBJECTIVITY, *supra* note 13, at 23.

¹⁵⁰ *Id.* As I note below, I am not sanguine about our ability to achieve complete answers to these questions, in large part because of the irreducibility of the problem.

¹⁵¹ Rudolf Carnap, *The Nature of Theories*, in INTRODUCTORY READINGS IN THE PHILOSOPHY OF SCIENCE 330 (E.D. Klemke, Robert Hollinger, & David Wýss Rudge, eds., 3d ed. 1998). Even the logical positivists accorded some sense of mystery to the source of the hypothesis.

¹⁵² W.V. Quine & J.S. Ullian, *Hypothesis*, in INTRODUCTORY READINGS IN THE PHILOSOPHY OF SCIENCE, *supra* note 151, at 405.

refutability.¹⁵³ Thomas Kuhn made a similar point in connection with theory choice when the evidence confirming hypotheses is capable of supporting more than one: a good scientific theory should be accurate, consistent, and broad in scope, simple, and fruitful of new research findings.¹⁵⁴ As Kuhn and others argued, there is more subjectivity and value judgment within scientific communities and scientists themselves, not so much about the observable data, but about the inferences that need to be made to link the data together as explanation.¹⁵⁵

There is a reason the issues of hypothesis and theory choice are so difficult. We need to apply judgment to synthesize our ordering of the world with the experience we encounter. Judgment defies reduction to rules. Understanding something about the world means we have ordered it. Ordering means that we have implied regularities. Regularities mean that we have inferred a set of rules. “The sun will come up in the east every morning.” “My dog Annie will bark at a dog walking up the street.” There are, however, many possible rules. Judgment, says Kant, is “the faculty of **subsuming** under rules, i.e., of determining whether something stands under a given rule (*casus datae legis*) or not.”¹⁵⁶ Judgment, however, is a strange beast. It precedes rules, either because it involves taking a mass of observed experience and deciding whether there is regularity in that experience, or taking a previously observed regularity and determining whether a new experience falls within it. What is more, there are no rules for judgment. A rule for judgment would mean that there is a rule for determining whether a particular experience fits a rule. But applying that rule would in turn require judgment. If there were a rule for that judgment, it would again require the judgment whether it applied. And so on.¹⁵⁷

Even though there is no rule for the application of a rule does not necessarily mean that philosophers and scientists have given up thinking about the leap from what we know to what we do not. The American philosopher Charles Peirce coined the term “abductive reasoning” to apply to the process by which we derive a hypothesis. The process also goes by the description “inference to the best explanation.”¹⁵⁸ Cognitive scientists

¹⁵³ *Id.* “Hypothesis, where successful, is a two-way street, extending back to explain the past and forward to predict the future. What we try to do in framing hypotheses is to explain some otherwise unexplained happenings by inventing a plausible story, a plausible description or history of portions of the world.” *Id.*

¹⁵⁴ Thomas S. Kuhn, *Objectivity, Value Judgment, and Theory Choice*, in *INTRODUCTORY READINGS IN THE PHILOSOPHY OF SCIENCE*, *supra* note 151, at 436.

¹⁵⁵ *Id.* at 439. See also Helen E. Longino, *Values and Objectivity*, in *PHILOSOPHY OF SCIENCE: THE CENTRAL ISSUES*, *supra* note 58, at 180. “Scientific knowledge is, therefore, social knowledge. It is produced by processes that are intrinsically social, and once a theory, hypothesis, or set of data has been accepted by a community, it becomes a public resource.” *Id.* Stephen W. Ball, *Facts, Values, and Interpretation in Law: Jurisprudence from Perspectives in Ethics and Philosophy of Science*, 38 *AM. J. JURIS.* 15, 26–27 n. 13 (1993).

¹⁵⁶ *CRITIQUE OF PURE REASON*, *supra* note 52, at 268.

¹⁵⁷ *Cf.* LUDWIG WITTGENSTEIN, *PHILOSOPHICAL INVESTIGATIONS* 81 (G.E.M. Anscombe trans., 3rd ed., Macmillan Publishing Co. 1968).

“This was our paradox: no course of action could be determined by a rule, because every course of action can be made out to accord with the rule. The answer was: if everything can be made out to accord with the rule, then it can also be made out to conflict with it. And so there would be neither accord nor conflict here.” *Id.*

¹⁵⁸ Robin Paul Malloy, *Framing the Market: Representations of Meaning and Value in Law, Markets, and Culture*, 51 *BUFF. L. REV.* 1, 103–14 (2003).

have suggested that the source of hypothesis, and, indeed, the source of all new meaning, arises out of a hardwired ability to create metaphors and analogies.¹⁵⁹ If the interplay of fact and value has some role in the development of theories and hypotheses of what *is* as a matter of description in the physical sciences, it will be an even more difficult issue when we try to sort out cause-and-effect in the social realm.¹⁶⁰

Consider the following in the context of seeking out the cause of the financial crisis as though there were a legal claim of which causation was an element: Professor Schwarcz proposes fourteen different influencing factors¹⁶¹ but other hypotheses are more ominous. For example, the thesis of the former chief economist for the International Monetary Fund that the United States government has been "captured" by the financial industry, leading to an over-extension akin to those experienced in developing countries.¹⁶² Popular theories and political rhetoric span the gamut from the evils of executive compensation to the restrictions imposed by the corporate form. Richard Posner managed to have a 350 page book finished by February 2, 2009, and in print by May 2009,¹⁶³ largely attributing the subprime mess to a combination of the Federal Reserve's having pushed interest rates too low, and the dismantling of regulatory controls that reduced the incentives of bankers "to lend into a bubble."¹⁶⁴ Even the thesis that it was a subprime mess is subject to challenge. One recent study suggests that the real problem was not the issuance of loans to borrowers with low FICO score (i.e., subprime borrowers), but the issuance of loans

¹⁵⁹ See Mark Johnson, *Some Constraints on Embodied Analogical Understanding*, in ANALOGICAL REASONING: PERSPECTIVES OF ARTIFICIAL INTELLIGENCE, COGNITIVE SCIENCE, AND PHILOSOPHY (David H. Helman, ed., 1988); Mark Turner, *Categories and Analogies*, in ANALOGICAL REASONING: PERSPECTIVES OF ARTIFICIAL INTELLIGENCE, COGNITIVE SCIENCE, AND PHILOSOPHY, *supra*; JOHN SEARLE, *EXPRESSION AND MEANING* (Cambridge Univ. Press 1979); JOHN SEARLE, *INTENTIONALITY* (Cambridge Univ. Press 1983); DOUGLAS HOFSTADTER & THE FLUID ANALOGIES RESEARCH GROUP, *FLUID CONCEPTS AND CREATIVE ANALOGIES: COMPUTER MODELS OF THE FUNDAMENTAL MECHANISMS OF THOUGHT* (1995); Joseph Agassi, *Analogies Hard and Soft*, in ANALOGICAL REASONING: PERSPECTIVES OF ARTIFICIAL INTELLIGENCE, COGNITIVE SCIENCE, AND PHILOSOPHY, *supra*; Max Black, *Models and Archetypes*, in *MODELS AND METAPHORS: STUDIES IN LANGUAGE AND PHILOSOPHY* (Cornell Univ. Press 1962).

¹⁶⁰ This can be frustrating. During a faculty workshop on somebody's paper, one of my colleagues proposed that corporate managers and directors were "turnips." It is hard to have a dispassionate discussion of regulatory alternatives in corporate governance when we begin with the issue thus framed. I noticed a less trivial, but not untypical, reaction that mixes motive and hypothesis in the social sciences recently. The journalist Charles C. Mann wrote a book proposing that pre-Columbian culture in the Americas was far more advanced than popularly characterized, that there may have been as many as five waves of settlement before Columbus, and that "today's Indians are seen as relative latecomers." Mann notes that Indian activists dislike the line of reasoning because of the possible value-laden inference that if the Native Americans of the early 1600s were themselves interlopers, it is easier to defend European colonization and subjugation of the Americas. My point is that there either were several waves of immigration or there were not; it is the merging of normative inference and physical description that confounds the discussion. CHARLES C. MANN, *1491: NEW REVELATIONS OF THE AMERICAS BEFORE COLUMBUS* 17 (Knopf 2005).

¹⁶¹ Schwarcz, *supra* note 1.

¹⁶² Simon Johnson, *The Quiet Coup*, *THE ATLANTIC*, May 2009, available at <http://www.theatlantic.com/doc/200905/imf-advice>.

¹⁶³ *A FAILURE OF CAPITALISM*, *supra* note 31.

¹⁶⁴ Richard A. Posner, *A Failure of Capitalism (IV): More on Bubbles* (May 19, 2009), http://correspondents.theatlantic.com/richard_posner/2009/05/a_failure_of_capitalism_iv_more_on_bubbles--richard_a_posner.php [hereinafter *A Failure of Capitalism (IV)*].

to borrowers, prime or subprime, who ended up with negative equity in their homes.¹⁶⁵

I take the concern over "complexity" to be a shorthand way of saying that it is hard to sort out why we experience financial bubbles and crashes, and that the interdependence of large institutions whose workings are not transparent has exacerbated the boom-and-bust phenomenon. It is one thing to undertake after-the-fact causation analysis for purposes of attributing blame. It is quite another to see the crisis arising in real time and understanding to some level of scientific certainty the causes-and-effects of facts, events, or states of affairs. If we return to the medical analogy, we need to know if there is a macroeconomic set of symptoms akin to that tickle in the back of the throat that tells you have a cold coming on, and deciding those symptoms are sufficient to tell *somebody* whether and when to start and stop the regulatory medicine. For example, notwithstanding the analytical acuity of Judge Posner's dissection of the problem, it is an after-the-fact assessment of "the blame for the depression."¹⁶⁶ It is, however, a hedged blame, because it does not fault the Federal Reserve for following the conventional wisdom (hence, "dismiss[ing] the few who warned as Cassandras and sourpusses") and thus missing the bubble.¹⁶⁷ When housing values are rising, it might be a bubble, or it may reflect underlying sound fundamentals in the economy. As Judge Posner notes, it is not irrational to take either view when one is in the game, as opposed to doing the post-mortem.¹⁶⁸

In sum, the issues of causation in human affairs, apart from the tendency of legal analysis to focus on blame rather than causation make the science of financial bubbles difficult. Somebody must look at the data and make a testable inference to the best explanation. The next question is whom the "somebody" is.

III. COMMON SENSE AND PROFESSIONAL JUDGMENT

To paraphrase Kant, judgment without information is empty and information without judgment is blind.¹⁶⁹ Even in financial systems as complex as the market for collateralized debt obligations and derivative instruments such as credit default swaps whose value turn on the primary obligations, there is necessarily a point at which the objective data the system presents interfaces with individual minds that have to process the data. The real question is the number of proxies and heuristics that intervene between the decision-maker and the data. The important issue is who makes the judgment and the nature of the judgment. Indeed, it strikes

¹⁶⁵ Stan Liebowitz, *New Evidence on the Foreclosure Crisis: Zero money down, not subprime loans, led to the mortgage meltdown*, WALL ST. J., July 3, 2009, at A13.

¹⁶⁶ Richard A. Posner, *A Failure of Capitalism (I)* (May 18, 2009), http://correspondents.theatlantic.com/richard_posner/2009/05/ready_a_failure_of_capitalism.php.

¹⁶⁷ Richard A. Posner, *A Failure of Capitalism (III): Blame the Fed, the Government in General and the Economists*, (May 19, 2009), http://correspondents.theatlantic.com/richard_posner/2009/05/a_failure_of_capitalism_iii--blame_the_fed_the_government_in_general_and_the_economists--richard_a_p.php.

¹⁶⁸ *A Failure of Capitalism (IV)*, *supra* note 164.

¹⁶⁹ CRITIQUE OF PURE REASON, *supra* note 52, at 193–94.

me that the risk in complexity is not so much the myriad systemic data as what I will call "derivative judgment." A derivative judgment is one in which the ultimate consumer of information makes his or her own judgment to rely on the judgment of an intermediary. When we think about it, it becomes clear that we build our business and personal lives upon the regular exercise of derivative judgments.¹⁷⁰ In *The Paradox of Choice*,¹⁷¹ Barry Schwartz provides a vivid example. The nature of the professional relationship between physicians and patients has shifted so that patients now often bear the burden of choosing their care, despite research indicating that patients who do get cancer overwhelmingly prefer the doctor to make the decision.¹⁷² The patient's judgment in that case is derivative because the judgment regarding the actual course of action to pursue is really on the doctor, upon whose professional judgment the patient will rely.

Consider two concrete examples of derivative judgment in the corporate and finance arena, disclosure with respect to asset-backed securities and the certification of financial results under Sarbanes-Oxley. From the enactment of the two primary securities acts in the New Deal,¹⁷³ the primary focus of securities regulation about the securities themselves has been disclosure. The format of the disclosure in the regulatory system depends upon, in large part, the likelihood of derivative judgment. At one end of the spectrum, a broad distribution of a new company's securities to the general public will require the full panoply of disclosure, and rigorous control of the process by which that disclosure in the form of a prospectus gets into the hands of the purchaser. At the other end of the spectrum there is a relatively laissez-faire approach to narrowly focused offerings of well-known seasoned issues to sophisticated purchasers. Indeed, the definition of a sophisticated purchaser under the 1933 Act regulations explicitly includes one who makes a derivative judgment to rely on a sophisticated representative.¹⁷⁴

Derivative instruments, whether insurance contracts or currency futures, are not in themselves good or bad, and, when used well, are part of a sound strategy of giving up some of the upside to insure against undue loss on the downside, assuming that the insurer or the derivative counterparty is able to pay on the contract. The reason the derivative industry is

¹⁷⁰ I recognize the possibility of confusion in the term "derivative judgment" when one of the concrete issues at hand is judgment about "derivative securities" or "derivative instruments." The sense of the adjective is the same in both cases, however: being at least a step removed from the principal matter, but being derived from it. The issue of derivative judgment in law and life is far broader than the specific instance of a derivative security. Much of economics and law deals with the accountability of the actual judgment maker to the derivative judgment maker, whether as a matter of fiduciary obligations or the business judgment rule in law, or agency costs in economics.

¹⁷¹ BARRY SCHWARTZ, *THE PARADOX OF CHOICE: WHY LESS IS MORE* (Harper 2005).

¹⁷² *Id.* at 29–33.

¹⁷³ Securities Act of 1933, 15 U.S.C. § 77 (hereinafter 1933 Act); Securities Exchange Act of 1934, 15 U.S.C. § 78 (hereinafter 1934 Act).

¹⁷⁴ Rule 506 of Regulation D, governing certain transactions exempted from registration requirements under § 5 of the 1933 Act, requires as a condition that "[e]ach purchaser who is not an accredited investor either alone or with his purchaser representative(s) has such knowledge and experience in financial and business matters that he is capable of evaluating the merits and risks of the prospective investment" 17 C.F.R. § 230.506.

simple in concept is that it goes back to algorithms law students learn in their first year contract law class.¹⁷⁵ The simple hypothetical demonstrating the measure of damages for the contract for the future delivery of bushels of wheat is essentially an algorithm for risk allocation. Assume Sam Seller contracts with Barbara Buyer to sell her 100 bushels of wheat at a dollar per bushel ninety days hence. The spot price over that period rises to \$1.20 per bushel. The formula embodied in the law of contract expectation damages tells us that Barbara Buyer wins a right worth twenty cents. Conversely, if the price falls to eighty cents a bushel, Sam Seller wins because of his right to force Barbara Buyer to take the wheat at twenty cents above the market price.

That example is a forward contract. In the hypothetical, if the parties do not really intend to deliver, the contract itself (not the underlying wheat) is a futures contract, and on the delivery date worth about twenty cents less transaction costs.¹⁷⁶ In other words, the holder of the right should be able that day to sell the contract to somebody for, say, up to nineteen cents a bushel, because the buyer of the contract is still better off by a penny. The irony here, of course, is that futures contracts have real value in being conservative, which is why they are "hedged" as in hedging your bet. Assume a US-based company, which reports its earnings in dollars, sells a widget in Europe with the price denominated in Euros on March 1, and the terms are that the buyer is to pay €1,000 in ninety days. At the moment, the exchange rate is 1.5 US dollars to the Euro. If the company were interested in making money on currency fluctuation as well as widgets, it could take its chances. If the Euro rises in value to 1.75 to the dollar, it can make some money when it repatriates that cash. It also, however, runs the risk of having the Euro fall. As to currency however, the company is far more interested in being safe than in making money. If it buys a ninety-day futures contract on Euros at rate of 1.5 to the dollar, it has insurance against currency devaluation. Assume that on the ninetieth day, the Euro falls in relation to the dollar, and the company would only bring home \$1,200 rather than the \$1,500 that it expected when it made the sale. It receives the buyer's €1,000, fulfills its futures contract obligation by buying the \$1,500, and some counterparty has lost a bet. It has lost the opportunity to profit if the Euro went up in value, but it is hedged against the downside.¹⁷⁷

There is no inherent evil in this business. There are currency traders who gamble on the changes of relative values of currencies, and that is their business. Nevertheless, ordinary businesses regularly use them for their very conservative and cautious purposes.¹⁷⁸ While those gamblers may make or lose money on dumb luck, there is nothing dumb or lucky (or a

¹⁷⁵ RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 125–26 (6th ed. 2003).

¹⁷⁶ *Id.* at 126.

¹⁷⁷ Assume that the Euro increases in value relative to the dollar, say, to two to one. If there had been no hedge, the company would be able to convert the €1,000 into \$2,000, making \$500 on currency in addition to the \$1,500 it expected in product revenue. But with the hedge in place, it needs to fulfill its obligation to buy \$1,500 for €1,000, rewarding a counterparty that guessed right. Effectively, the company gives up the \$500 of currency gain. There is a strategy as well to hedge by purchasing an option, but that complication is not necessary for my point here.

¹⁷⁸ René M. Stulz, *In Defense of Derivatives and How to Regulate Them*, *WALL ST. J.*, Apr. 7, 2009, at A15.

violation of the accounting rules) about a currency hedging strategy, as long as the counter-party to the contract is around and has the dollars to deliver.¹⁷⁹ Moreover, there are multiple levels of derivative judgment about using derivative instruments. Shareholders make the derivative judgment to rely on the board of directors to make appropriate decisions. The board makes a derivative judgment in relying on the CEO in hiring the treasurer who makes the actual judgment about the appropriate level of conservative hedging so as to protect the value of the company's balance sheet, and hence, the value of the company to the shareholder.

Another example of an attempt to control derivative judgment is the financial certification provision enacted as part of the Sarbanes-Oxley Act of 2002.¹⁸⁰ Under Sections 302 and 906, as to each quarterly, annual, and special financial report the issuer files, the CEO and CFO must certify they have reviewed it, that, based on the officer's knowledge, the report is not misleading and fairly presents the financial condition of the company, and that the officers are responsible for, and have designed and maintained, internal controls that let them make the required certification.¹⁸¹ Consider the multiple levels of derivative judgment that are occurring. Nobody realistically expects that the CEO and CFO of a multi-billion dollar corporation have actual knowledge upon which to base the certifications. The essence of the legislation is to assure shareholders, in the exercise of *their* derivative judgment, that the officers have responsibly exercised their derivative judgment in terms of process if not in the actual result.¹⁸²

Reliance on professional judgment is a relatively recent development, of a piece with the rise of professional disciplines generally in the late nineteenth century. The historian Haskell's account is helpful.¹⁸³ He sets modern professional social science, as a subset of modern professionalism generally, in context by studying the rise and fall of the American Social Science Association (the "ASSA"), the forerunner of modern disciplinary associations like the American Historical Association and the American Economic Association. His thesis is that each of us has a sense (perhaps naive) that we are free and volitional agents, largely able to determine for ourselves the course of our lives. We have, in Haskell's words, "causal potency."¹⁸⁴ Moreover, until the late 1700s and early 1800s, little about the organization of society undercut the soundness of that belief. By and large,

¹⁷⁹ See FINANCIAL ACCOUNTING STANDARDS BOARD, SUMMARY OF STATEMENT 133, ACCOUNTING FOR DERIVATIVE INSTRUMENTS AND HEDGING ACTIVITIES, <http://www.fasb.org/st/summary/stsum133.shtml>; Schwarcz, *supra* note 1, at 219–22. Indeed, generally accepted accounting principles require there be a linkage between sales and future contracts or otherwise the issuer must disclose the extent to which it is speculating in the currency markets.

¹⁸⁰ Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, 116 STAT. 745 (2002).

¹⁸¹ *Id.*

¹⁸² The corporation of which I was the general counsel at the time of the enactment of these provisions instituted a program of sub-certifications, a practice I believe was widespread.

¹⁸³ See SOCIAL SCIENCE, *supra* note 13. Not surprisingly, Haskell's approach to history has an epistemological bent. His approach to history, at odds with some historians, is to approach historical data with a theoretical framework, mindful of the philosophical (and thus historiographic) issues of explanation and interpretation of events, particularly historical issues of cause-and-effect. "Because my principal curiosities as a historian concern problems of explanation, interpretation, and the conceptualization of change, my professional colleagues have often remarked on what they regard as the unusually abstract, philosophical cast of my writing." OBJECTIVITY, *supra* note 13, at 9.

¹⁸⁴ SOCIAL SCIENCE, *supra* note 13, at 40.

individuals lived in dispersed and independent communities, and the cause of things—in the sense of reasoned explanation that made sense of the world, and to the extent educated people thought about these things—was proximate, either in oneself, in one's local community, or in a personal God that determined otherwise inexplicable events.

Beginning in the 1800s, as the Industrial Revolution and urbanization took effect, educated people (not just academics) came to believe that such explanation required understanding the impact on individuals and local communities of remote causes, in short, cause and effect in an increasingly interdependent world. With increasing interdependence came increasing specialization, specifically, the rise of professions, itself a reaction to the perception of "complexity." Note the following is a discussion of the nineteenth century, *not* the present crisis of "complexity":

What is it about modern society that causes men to rely increasingly on professional advice? Under what circumstances do men come to believe that their own judgment, based on common sense and the customary knowledge of the community, is not adequate? It is true, but not very helpful, to answer that modern society is complex and that professionals thrive on complexity. "Complexity" is uniquely uninformative word, little more than a mirror-image of confusion. What we have meant by complexity in this context, I think is social interdependence.¹⁸⁵

Haskell's characterization of the impact of social interdependence is particularly apropos. "Growing interdependence" is "that tendency of social integration and consolidation whereby action in one part of society is transmitted in the form of direct or indirect consequences to other parts of society with accelerating rapidity, widening scope, and increasing intensity."¹⁸⁶ Moreover, while interdependence is one of those objective "macro" aspects of social systems, and "exists apart from anyone's perception of it," nevertheless, it can rise to the level of individual attention: "It can, however, be intensified by a growth of mutual awareness that prompts men to respond more deliberately and sensitively to their dependencies."¹⁸⁷

The transitional professional model was the ASSA, a group largely of New England social inquirers, general social philosophers as it were, who themselves were overwhelmed by the next generation of truly professional social scientists. What Haskell argues is that there is a connection between the rise of societal interdependence and the contemporaneous ceding to professionals (by educated people generally) of the task of causal attribution between events in the world.¹⁸⁸ Haskell says social science is a

¹⁸⁵ *Id.* at 28.

¹⁸⁶ *Id.* at 28–29.

¹⁸⁷ *Id.* at 29.

¹⁸⁸ There is a kind of Rule of Recognition problem going on here. In a specialized, professional world, how does one recognize expertise, i.e. make the appropriate derivative judgment? Haskell's historical account says professional organizations arose in order to achieve a community of expertise. For lay people, lawyers are a prime example of such a professional guild, but modern philosophers and historians and economists and sociologists have their self-certifying guilds as well. Those particular

search for the independent variables of explanatory cause somewhere between the "causal potency" of the individual and First Causes like God:

To engage in inquiry is to search for genuine causation, to shear away merely secondary influences and necessary conditions so as to isolate those factors which, within a given frame of reference, can be regarded as self-acting, causal entities—"independent variables." As causes recede and as growing interdependence introduces more and more contingency into each chain of causation, the realm of inquiry must expand and the conditions of satisfying explanation must change. Common sense fails and the claim of expertise gains plausibility. Explanation itself becomes a matter of special significance, because the explainer promises to put his audience back in touch with the most vital elements of a receding and increasingly elusive reality.¹⁸⁹

Interdependence, like complexity, is relative. Haskell relates that Herbert Spencer learned as a child to question every cause and "as an adult took to his bed and wore earmuffs to prevent overstimulation of his senses."¹⁹⁰ Our own epistemic crisis of complexity bears a remarkable resemblance, only now it goes under rubrics like "systemic risk."¹⁹¹ Interdependence is such that the following are all related: foreclosure of a home in Flint, the collapse of the financial system in Iceland, the government take-over (for all intents and purposes) of AIG, several large banks, and General Motors, and the concern of the Chinese government for its investment in securities issued by the United States government. What makes it all the worse is the revelation that the whole mess could be triggered by a judgment of just a few professionals to whom we seem to have ceded (consciously or not) the responsibility of professional judgment and, in hindsight, they appear to have exercised it badly.¹⁹²

protocols surfaced, for example, in the form of peer review for publishing and tenure review for advancement. *Id.* at 39–40.

¹⁸⁹ *Id.* at 44.

¹⁹⁰ *Id.* at 45.

¹⁹¹ For the views of someone far more competent than I to expound upon the systemic issues, see Steven L. Schwarcz, *Systemic Risk*, 97 GEO. L. J. 193 (2008). Professor Schwarcz defines systemic risk as "the risk that (i) an economic shock such as market or institutional failure triggers (through a panic or otherwise) either (X) the failure of a chain of markets or institutions or (Y) a chain of significant losses to financial institutions, (ii) resulting in increases in the cost of capital or decreases in its availability, often evidenced by substantial financial-market price volatility." *Id.* at 204. Note that he is equally skeptical of disclosure for the control of systemic risk because the nature of systemic risk is that market participants, operating in their own interests do not perceive it; moreover, "investors and counterparties already demand, and usually receive, disclosure to the extent it helps them assess the merits of their investments, qua investments." *Id.* at 218. Not surprisingly, then, he does not see much of a role for securities regulation on the systemic side of things. *Id.* at 212.

¹⁹² The poster child being AIG's Financial Products division, headed by Joseph Cassano, which unit issued the arguably underpriced credit default swaps that insured holders of collateralized debt obligations against payment default by the obligor. Bill Saporito, *How AIG Became Too Big to Fail*, TIME, Mar. 19, 2009. This raises the question, beyond the scope of this article, about the relationship of negligence and misjudgment. It is an issue with no small traction in the corporate governance area, where the presumptions of the business judgment rule (as well as § 102(b)(7) of the Delaware General Corporation Law) insulate management from liability for mere management misjudgment. See, e.g., *In re Citigroup, Inc. Shareholder Derivative Litigation*, 964 A.2d 106 (Del. Ch. 2009), in which Chancellor Chandler dismissed a claim that Citigroup management was liable for having misread the "red flags" indicating that the subprime credit crisis was brewing. My intuition, not surprisingly, is that derivative judgment (as I have defined it) deserves much legal leeway, but this is precisely the area in which the

IV. COMPLEXITY AND JUDGMENT

A. LAW'S RESPONSE TO THE EPISTEMOLOGICAL CRISIS OF COMPLEXITY

This discussion is not to suggest that there is no effective legal regulation possible to ameliorate future economic cycles or financial bubbles. My claim is more modest: we had a faith in the technological advances of social science and professional judgment (particularly our ability to predict and control financial markets, or rely on those who could) akin to the Enlightenment faith in physical science, and that faith has been upset. We are now perhaps, as William James, described, "twice-born" on the issue of both economics and law as panacea.¹⁹³ Indeed, it is more than an academic phenomenon when the insights of Tversky and Kahneman on human judgment under conditions of uncertainty become part of the popular literature, as exemplified by Nassim Nicholas Taleb's deconstruction of "success" financial markets in *The Black Swan*¹⁹⁴ and *Fooled by Randomness*,¹⁹⁵ and science writer Leonard Mlodinow's popular study of randomness in *The Drunkard's Walk*.¹⁹⁶ We find it relatively easy after-the-fact to attribute success or failure to specific causes, but (a) it is far harder to say the decisions were wrong at the time they were made, and (b) our after-the-fact intuitions about what caused what do not bear much relationship to the actual probabilities of the events occurring. We are in a period, as Haskell described, in which there is "a growth of mutual awareness that prompts [people] to respond more deliberately and sensitively to their dependencies."¹⁹⁷

Is it possible, by way of regulation, to address our particular crisis of complexity so that we are unlikely to experience this particular catastrophe again? Maybe, but I do not see that as the fundamental issue and I am skeptical whether we can ever regulate our way out of an objectionably volatile boom-and-bust cycle. The real problem here is not the particular confluence of events, but the "experience of senselessness, lack of control, and mortality that catastrophe plows up" ¹⁹⁸ Yet it is a mark of the

question of causation as a descriptive matter gets intertwined with policy (or blame) as a normative matter. *Compare* Posting of J. Robert Brown to The Race to the Bottom, (Mar. 12, 2009, 9:00) <http://www.theracetothetbottom.org/shareholder-rights/delaware-courts-and-exonerating-the-board-from-supervising-r-4.html>, with In Defense of Chandler's Citigroup Decision, (Mar. 17, 2009, 16:04 PST), <http://www.professorbainbridge.com/professorbainbridge.com/2009/03/in-defense-of-chandlers-citigroup-decision.html>.

¹⁹³ To James, a "once-born" soul has never encountered worldly circumstances that upset her simplistic view of the world as "a sort of rectilinear or one-storied affair, whose accounts are kept in one denomination, whose parts have just the values which naturally they appear to have, and of which a simple algebraic sum of pluses and minuses will give the total worth." Twice-born souls, in contrast, have encountered "storm, stress, and inconsistency" requiring some reconciliation or regeneration (whether or not religious) to remedy "inner incompleteness" and reduce "inner discord." WILLIAM JAMES, *THE VARIETIES OF RELIGIOUS EXPERIENCE: A STUDY IN HUMAN NATURE* 166, 175-76 (Longmans, Green and Co. 1928) (1902).

¹⁹⁴ *THE BLACK SWAN*, *supra* note 33.

¹⁹⁵ *FOOLED BY RANDOMNESS*, *supra* note 33.

¹⁹⁶ See LEONARD MLODINOW, *THE DRUNKARD'S WALK: HOW RANDOMNESS RULES OUR LIVES* (Pantheon Books 2008).

¹⁹⁷ *SOCIAL SCIENCE*, *supra* note 13, at 29.

¹⁹⁸ Meyer, *supra* note 24, at 21.

scientific faith of our age that we turn to law as the remedy. As Meyer recasts philosophically what Haskell noted historically:

We deny that the event is a challenge to our normative structures, and we reframe it as injustice, not catastrophe. This is our law's specialty. Law is constantly colonizing catastrophe, reframing it as injustice, expanding the bounds and jurisdiction of law, and consequently expanding the zone of human control and responsibility.¹⁹⁹

To suggest banning financial instruments because they are complex is likely no more valid than it would have been to suggest that the appropriate response to the Lisbon earthquake was to simplify things by demanding that all buildings be no more than one story high, or that the appropriate response to the rapid industrial changes of the late 1800s was to go to bed with earmuffs. The problem, as I see it, is that we have assumed, baselessly, that law, like social science, could expand the zone of human control and responsibility to the point that no amount of complexity is beyond our ability to tame it. But we cannot, and that is the crisis.

Law fails as the ultimate panacea because, like all reductive models and all systems of rules, it hits a limit. Contemplation of law's limits, like all contemplation of the infinite, is an uncomfortable business. Like Hart, we can put our figurative fingers in our figurative ears when it comes to contemplating our ultimate ability to understand everything, notwithstanding the conceptual and empirical evidence of irreducible paradox. Law as science wants to identify cause-and-effect. Whether it is identifying the proximate cause for purpose of tort liability, or linking up future disputes to present contract provisions for the purpose of avoiding the disputes, what we do as lawyers is link up events in the world by way of a set of rules, axioms, conditions, statutes, principles, etc., and thereby attribute or apportion responsibility.

Two of the Continental critiques of law (Luhmann's and Derrida's) as reductive science have some traction here for understanding the limits of the law either in providing justice (a moral "ought") or avoid future financial calamities (a theoretical "ought"). Luhmann's sociological critique said, in so many words, the legal system depends on an illusion, at least within legal system, that there is something called justice, even though anybody looking at it from the outside can see it is just a lot of people using those rules, axioms, conditions, statutes, and principles to further their self-interested ends.²⁰⁰ The system would break down if the illusion of justice were exploded. Gunther Teubner describes this as law's "epistemic trap."²⁰¹ Law as a social institution develops its own models or constructs of reality. Not only is the law autonomous in separating itself (ideally) from moral and political concerns, its "cognitive operations . . . construct idiosyncratic images of reality and move them away from the world constructions of

¹⁹⁹ *Id.*

²⁰⁰ Gunther Teubner, *How the Law Thinks*, 23 *LAW & SOC'Y REV.* 727, 736–38 (1989).

²⁰¹ *Id.* at 742.

everyday life and from those of scientific discourse.”²⁰² Think of it this way: to a mergers and acquisitions lawyer, the agreement is the deal, but the deal may be wholly something else to the CEO, like a handshake.²⁰³ Or, in Teubner’s example, think about *res judicata*. Even if one could show after-the-fact that a legal judgment was based on a finding wholly erroneous as a matter of science (or we could add, common sense), it will not be reversed, regardless of its legal, economic, or social consequences.²⁰⁴

The epistemic trap is that the legal system wants its own internal consistency, at the same time that other societal interests force inconsistencies upon it.²⁰⁵ Perhaps the most fundamental example of this is the paradox of justice. How can the legal system produce a just result when it is clear to anyone looking at it that the participants use it solely for instrumental purposes?²⁰⁶ It is more important to the lawyers than to others that, however the concept might be conceived, the legal system itself must have a self-concept of reductive consistency. Derrida’s unsettling philosophical critique was that law and justice are not equivalent. Law is a human institution and therefore finite. Justice is an unreachable ideal. Hence law will never map on justice “in part because language is always too general, rules too rigid, but also because one must act, in the end, without knowing everything.”²⁰⁷

What stands at the limit of law, or any other system designed to cure a social problem? It is the leap of faith that constitutes the exercise of judgment, the last matter to which we will turn.

B. THE IRREDUCIBILITY AND INEVITABILITY OF JUDGMENT

It is a fair question whether what appears to be the irreducibility of judgment is merely inordinate complexity. That is itself a problematic question, because one either has a kind of faith that some things are ultimately reducible or not. Some academics worry about and indeed fight over what appear to be irresolvable issues, suggesting if they are irresolvable they are irreducible. One of these academic debates, for example, is whether a naturalistic (i.e., reducible) explanation of the empirical reality of human consciousness is even possible.²⁰⁸ For my purposes, it is not necessary to resolve this epistemic quandary. Seemingly

²⁰² *Id.* Note that Teubner is contrasting what I call scientific jurisprudence from what he must think of as real science.

²⁰³ See Jeffrey M. Lipshaw, *Models and Games: The Difference Between Explanation and Understanding for Lawyers and Ethicists*, 56 CLEV. ST. L. REV. 613 (2008).

²⁰⁴ Teubner, *supra* note 200, at 744.

²⁰⁵ Perez, *supra* note 40.

²⁰⁶ For a detailed treatment of this issue, see BRIAN Z. TAMANAHA, *LAW AS A MEANS TO AN END* (Cambridge Univ. Press 2007).

²⁰⁷ Meyer, *supra* note 24, at 23. See also CAPUTO, *supra* note 40.

²⁰⁸ For an overview of this issue see Robert Van Gulick, *The Explanatory Question: How can Consciousness Exist?*, in THE STANFORD ENCYCLOPEDIA OF PHILOSOPHY (Edward N. Zalta ed., 2004), available at <http://plato.stanford.edu/entries/consciousness/>. On the non-reductive side of the discussion, see COLIN MCGINN, *THE PROBLEM OF CONSCIOUSNESS* (Basil Blackwell, Inc. 1991); Colin McGinn, *Consciousness and Space*, in CONSCIOUS EXPERIENCE (Thomas Metzinger ed., 1995); Thomas Nagel, *What Is It Like to Be a Bat?* 83 PHIL. REV. 435 (1974). On the reductive side, see DANIEL C. DENNETT, *CONSCIOUSNESS EXPLAINED* (Back Bay Books 1991).

unsolvable complexity is close enough to irreducibility so as not to have it make a difference.²⁰⁹

Not surprisingly, then, it is judgment—both scientific and practical—that remains the great mystery of thought from Kant to Kahnemann and Tversky²¹⁰ to Malcolm Gladwell.²¹¹ What we are doing is observing the past, and trying to make predictions about the future. Kant said that judgment could not be taught; it was the “mother-wit” capable only of being practiced.²¹² Moreover, he observed, the practice of judgment is uniquely personal:

[f]or, although such a school can provide a limited understanding with plenty of rules borrowed from the insight of others and as it were graft these onto it, nevertheless the faculty for making use of them correctly must belong to the student himself, and in the absence of such a natural gift no rule that one might prescribe to him for this aim is safe from misuse. A physician therefore, a judge, or a statesman, can have many fine pathological, juridical, or political rules in his head, of which he can even be a thorough teacher, and yet can easily stumble in their application²¹³

As a way of getting at this in a contemporary fashion, I offer a critique of Adrian Vermeule's thesis for making prospective judgments under uncertainty.²¹⁴ Unlike me, Vermeule focuses on the big issues of statutory construction and constitutional interpretation, but the fundamental issue is the same: how can conceptual commitments, otherwise referred to as rules or principles, be applied to actual circumstances. Vermeule correctly frames the dilemma. On one hand, “[t]here is no decision-procedure for implementing any high-level interpretive commitment that is best a priori, or that can be deduced from conceptual commitments.”²¹⁵ In other words, judgment is irreducible: as Kant and Wittgenstein have already demonstrated, there is no rule for the application of a rule. On the other hand, judgment is inevitable: judges cannot escape the fact that by their jobs, they are obliged to make decisions even when the facts are uncertain, and they do not know everything.²¹⁶

²⁰⁹ There is an analogy to this in game theory. Chess and tic-tac-toe are both two-person zero-sum games of perfect information. The Prisoners' Dilemma is a two-person variable sum game of imperfect information. What this means is that every possible result in a chess or a tic-tac-toe game can be predicted from the state of the board at any given time. Tic-tac-toe is boring because it is simple; chess is interesting because even though the answers are calculable in theory (10⁴³ moves in a forty-move game), the complexity approaches irreducibility in practice. See Ulrich Schwalbe & Paul Walker, *Zermelo and the Early History of Game Theory*, (1999), available at <http://www.math.harvard.edu/~elkies/FS23j.03/zermelo.pdf>. For a discussion of complexity theory as a way to begin understanding the seemingly irreducible justice component of contract law, see Peter A. Alces, *On Discovering Doctrine, “Justice” in Contract Agreement*, 83 WASH. U. L. Q. 471 (2005).

²¹⁰ JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES (Daniel Kahnemann, Paul Slovic, & Amos Tversky, eds., 1982).

²¹¹ See MALCOLM GLADWELL, *BLINK: THE POWER OF THINKING WITHOUT THINKING* (Little, Brown and Company 2005).

²¹² CRITIQUE OF PURE REASON, *supra* note 52, at 268–69.

²¹³ *Id.* at 268–69.

²¹⁴ See ADRIAN VERMEULE, *JUDGING UNDER UNCERTAINTY* (Harvard Univ. Press 2006).

²¹⁵ *Id.* at 2.

²¹⁶ *Id.* at 3.

For Vermeule, the answer lies in a compromise between unbounded (and unprincipled) intuition and equally mindless application of bright-line rules. Another way of looking at this situation is an acknowledgment of the futility of finding deontological justice (in the sense articulated by Derrida as the objectively correct decision) in the workings of law as a technology, on one hand, or predicting the best result from a consequential standpoint, on the other. Perhaps the most satisfying aspect of this proposal is Vermeule's acknowledgment that this presents a philosophical (i.e., "trans-scientific") and not a scientific question, and one not wholly resolvable by empiricism.²¹⁷ "Overall, what makes the trans-science problem daunting for interpretive choice is that the large-scale character of the institutional variables bars decision-makers from proceeding on the sort of confident intuitive hunches that often prove useful for quotidian decisions on a smaller scale."²¹⁸

Vermeule overstates the difficulty of "big" issues and understates the problem of so-called quotidian issues. This misstatement is precisely the prediction and causation issue we have been discussing, and, as Barry Schwartz has observed, every choice, even if it is no more than selecting a pair of jeans, is difficult.²¹⁹ Equally so is the decision to be made by a regulator charged with prevention of the next financial crisis. Logical positivism in science (a form of the radical empiricism Vermeule rejects) does not posit cause-and-effect. All science does is take observations, note regularities, and use deductive logic to explain the regularities. Confident intuitive hunches about cause and effect are precisely what science tries to test. Confident intuitive hunches are abductive—they are the source of the hypothesis—but they are waiting to be tested, and if they are not falsified and stand the test of time, they become "theories" or "laws."

I am not persuaded by Vermeule's left-handed *distinction* between the so-called bounded rationality of judicial decision-making and purportedly more complete scientific decision-making, even as it might apply to a more empirically "complete" judicial process. The gist of his argument is the standard trope of bounded rationality as a mere modification to rational actor economics—given more time and more evidence, akin to scientific researchers, judges might make better decisions.²²⁰ Judging, however, is not merely a matter of bounded rationality. It is a wholly different undertaking than scientific prediction. Vermeule's pragmatic proposal to "get beyond the stalemate of empirical intuitions that chronically afflicts academic work" is to fall back on a repertoire of techniques for decision-making by

²¹⁷ *Id.* at 162. The questions are trans-scientific, i.e. ones those that "can be asked of science and yet cannot be answered by science. . . . [T]hough they are, epistemologically speaking, questions of fact and can be stated in the language of science, they are unanswerable by science. . . . All told, the trans-science problem considerably dilutes the promise of empiricism for the normative theory of statutory interpretation."

²¹⁸ *Id.* at 163.

²¹⁹ SCHWARTZ, *supra* note 171, at 1–2.

²²⁰ VERMEULE, *supra* note 214, at 163–64:

"[J]udges are often faced with empirical and predictive questions that would (if answered) determine the choice of interpretive doctrines. . . . The analogy would be to the process by which scientific controversies are resolved. The norms that govern the process of scientific research suggest that judgment should be suspended until the needed experiments have been performed and data collected." *Id.*

boundedly rational agents acting under profound uncertainty. These techniques include allocation of burdens of proof, cost-benefit analysis supplemented by the principle of insufficient reason, the maximum criterion for choice under uncertainty, satisficing, arbitrary picking as opposed to choosing, as well as the use of fast and frugal heuristics.²²¹

There is a fundamental insight here because pragmatic solutions often reflect the lack of any reductive answer to the problem posed. The stalemate of empirical intuitions is the problem that there is no rule for the interpretation of a rule. We recognize the infinite regress in trying to find rules to interpret a rule that requires no more, for example, than decisions in a way that is just. But what is the rule for finding rules for deciding in a way that is just? The infinite regress continues all the way down. Nevertheless, Professor Vermeule jumps in where (philosopher) angels fear to tread and asserts, yes, there are intermediate rules, or second-order techniques, that work somewhere in the middle ground between pure intuition and pure consequentialism.

Professor Vermeule's attempt to defend the reducibility of his pragmatic thesis as a matter of the science of law and economics is the weakest part of the argument.²²² First, why should boundedly-informed or rational judges be any better at choosing second-order methods for reasoning under uncertainty than they are at first-order reasoning? Vermeule observes there is an air of paradox about this question. Indeed there is. It is the irreducibility that Kant identified about judgment. But Vermeule simply dismisses the idea that there is a paradox: "[t]he view I am suggesting simply holds that even boundedly rational judges can understand what it is they do not understand, can know the limits of their own knowledge, and can reason in light of those limits. Such second-order decision-making is common, perhaps inevitable, in law and elsewhere." This assertion is pure question begging, and reflective of the sources of the epistemological crisis. As we began this discussion, we don't know what we don't know. Moreover, saying that one can know the limits of one's own knowledge simply sets aside the issue of subjectivity and objectivity, and is weak (or, at least, unreflective) epistemology. I feel certain that I cannot know objectively the limits of my own knowledge. Otherwise, I could step outside of myself and know a thing in itself as though I were God.²²³ Or to put it a different way, Professor Vermeule has refuted a paradox with a paradox.²²⁴ These are heuristics, plain and simple. They may feel more satisfying than pure intuition, but there is just no way one will ever prove that these heuristics are *better* than pure intuition.

The second objection is there is no rule for the application of a rule. Professor Vermeule argues:

²²¹ *Id.* at 168.

²²² *See id.* at 181–82.

²²³ I suspect that would be impossible even with an appointment to the Harvard Law School faculty.

²²⁴ This is, of course, the problem with starting from the presupposition idea of rationality as "bedrock knowledge" and simply trimming off a bit to explain use by way of bounded rationality. *See* Turner & Roth, *supra* note 40.

standard techniques of interpretive choice can appear on both sides of operational-level questions, and there is no general, higher-order procedure for choosing which approach should prevail. This objection is indisputable, but not very significant. It restates what is just the chronic condition of reasoning under severe ignorance or uncertainty. Where formal rationality runs out, a range of choice-procedures and choices are typically reasonable.²²⁵

Why are they reasonable? If there is no rule for the interpretation of a rule, what governs rule following? It may well not be indeterminate, but the source of the reasonable is a matter of conventional meaning.²²⁶

Interpretive choice has an inescapable indeterminacy, observes Professor Vermeule. But it is all we have, because nobody has offered another midpoint choice between pure intuition and pure consequence.

Concretely, the choices are that judges use some repertoire of weakly reasonable techniques, on the one hand, or nothing at all, on the other. It is quite possible, of course, that the techniques of interpretive choice discussed here are the wrong ones or at least not a complete list, and that considering a different set would yield more determinate and perhaps less formalist prescriptions. The issue cannot be settled abstractly; we must examine the consequences of various reasonable choice-procedures.²²⁷

Again, this is the resolution of a paradox with circularity. The original problem with that we could not assess the consequences of first-order questions; why should we be able to do any better at the second-order issues? Maybe we cannot resolve the issue concretely or abstractly, or by a reductive solution to the problem of apparent irreducibility. It is simply the paradox we live with.²²⁸

There are two constructive points we may take from Professor Vermeule's discussion. First, if we think of law not merely as judicial decision-making, but as a kind of technological tinkering with social systems, the analogy between law and science is more helpful. Real-world applied science is technology, and its practitioners are engineers. There may well be a valid analogy between financial regulators and, say, aerospace engineers, who cannot build full-scale prototypes of projects, and therefore use estimates and extrapolations. Indeed, engineering is the practical application of positive science. We are relying on long histories of

²²⁵ VERMEULE, *supra* note 214, at 181.

²²⁶ See Dennis M. Patterson, *Law's Pragmatism: Law as Practice & Narrative*, 76 VA. L. REV. 937 (1990).

²²⁷ VERMEULE, *supra* note 214, at 182.

²²⁸ Note, moreover, that Vermeule's project is to help guide judges in particular decisions, namely, interpretation of constitutional and statutory provisions, the kind of non-quotidian issue I prefer to avoid. It is beyond the scope of this article, but the flaw is that Vermeule attempts an assessment, overall, of interpretation without resorting to meaning. Like Schwartz & Scott on contract interpretation ("there *must be* a mutual intention of the parties that is best realized by contract formalism") or Gilson on whether lawyers add value ("they *must* add value to the transaction overall otherwise why would people use them?"), Vermeule starts with the assumption there is a scientific regularity that is in theory capable of being ascertained (how to read statutes in the best way), and never questions that assumption, but simply works back from perfect rationality and perfect information. For a different view, see Michael Moore, *Interpreting Interpretation*, in *LAW AND INTERPRETATION: ESSAYS IN LEGAL PHILOSOPHY* (Andrei Marmor ed., 1997).

observation, reduced to physical laws that have proven to highly reliable in predicting, for example, the soundness of bridge struts, or building superstructures. Nevertheless, it is a long stretch from structural engineering to economics, and reasonable minds may differ on what economic science may ultimately be capable of achieving. For example, in the present crisis, Judge Posner takes the economics profession to task either for overestimating or misrepresenting its ability to predict and prevent depressions.²²⁹ It is not clear to me whether Judge Posner thinks the predictive science is achievable, although I suspect he does. I tend to think not.

Second, Professor Vermeule is correct in stating that the real world of decision-making, as opposed to a hypothetical empirical judicial research lab, makes judgment inevitable, even if it is irreducible. At some point we make a judgment, even if it is to rely on someone else's judgment. Judge Posner's after-the-fact assessment, I think, gives too much credit to the ability of regulators (who, like us, are merely human) to overcome the irreducibility of forward-looking judgment. If there is no rule for the application of a rule (i.e. do the data tell us we are in a bubble or not?), why should the situation be more reducible for the Federal Reserve or government officials than they are for the otherwise rational bankers and lenders? Those derivative judgments are a multi-layered leap of faith, and accordingly unnerving. We make them all the time, consciously or unconsciously. When they come to the fore to us individually they present a personal crisis. When they come to the fore as a matter of public awareness, they present an epistemological crisis.

V. CONCLUSION

My goal was to unpeel the discussion of complexity in the context of the financial crisis, to figure out whether the aim of the discussion was to eliminate or limit the effects of financial boom-and-bust, to consider whether forward-looking regulation has the ability to be the medicine to cure whatever disease we think needs ameliorating, and to assess our crisis of confidence in the experts who might diagnose the problem and treat the disease. I conclude by indulging in a little speculation. When the world got very complex and interdependence as a result of the first Industrial Revolution, professionals arose to intermediate, and we largely trusted them. Indeed, a century of scientific advancement in both the natural and social sciences, including law, seemed to bear out that trust. The impact of the second Industrial Revolution, namely the Information Revolution, had an ironic two-pronged effect. On one hand, it seemed to promise an unlimited role for algorithms (i.e. computer code) in eliminating human suffering (take, for example, TCAS and ground proximity warning systems that have almost eliminated airplanes crashing into each other or the ground by way of "controlled flight" into terrain) and contributing to human flourishing (as I write this, Twitter is a force in what appears to be a significant upheaval in the internal politics of Iran). One aspect of the latter

²²⁹ See *An Economist Tries to Defend*, *supra* note 7.

was financial algorithm. On the other hand, the Information Age not only shrinks the world, and reduces our dependence on professionals (e.g., WebMD), but also imposes on us, in Barry Schwartz's coinage, the paradox of choice.

Even if we could put aside the normative and political issues, I am skeptical that regulation can eliminate objectionable levels of boom-and-bust, as opposed to hitting upon decent patches of regulatory technology, not only because it is difficult to pinpoint cause-and-effect, but also because there is no Promised Land at the end of the algorithmic journey. There is no rule for the application of a rule so somebody somewhere will always have to take that leap from what we know to what we do not that is judgment. No wonder, then, that the first panic of the Information Age is an epistemological crisis.

