Prudential Regulation and The Knowledge Problem: Towards a New Paradigm of Systemic Risk Regulation

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In this article I examine the regulatory structure created by Title I of the Dodd-Frank Act and ask whether the prudential regulatory authority given to the Financial Stability Oversight Council is an effective tool for accomplishing the mission of identifying and containing risk in the financial system. Prudential regulation, the principal tool at the disposal of the FSOC, was developed in the 19th century to counteract moral hazard in the banking system. Over time, prudential supervision has become policymakers’ regulation of choice, to the point where it is now employed in the oversight and regulation of non-bank financial firms. However, due to the limits of human knowledge—what I refer to as “the knowledge problem”—I argue that it is unlikely that prudential-style regulation, dependent as it is on the planning of a central regulator, can achieve the reduction in systemic risk envisioned by Title I of Dodd-Frank. I draw on advances from complex systems theory to show how complexity and the knowledge problem present significant obstacles for any framework of systemic risk regulation built around a system of prudential supervision. Finally, I outline some alternatives to prudential regulation for regulating non-bank financial firms and reducing systemic risk in a way

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that minimizes regulators’ reliance on their necessarily incomplete knowledge.

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THERE are many ways to regulate financial markets. In the United States, traditionally banks have been subject to prudential regulation and oversight and securities and investment firms have been regulated through registration, disclosure, and enforcement. The Dodd-Frank Wall Street Reform and Consumer Protection Act (“Dodd-Frank”) altered this paradigm. Among its many reforms, perhaps the most prominent was the creation of the Financial Stability Oversight Council (“FSOC”). The FSOC is a ten-member body composed of the heads of the major federal financial regulatory agencies (plus two additional appointees), whose purpose is to “identify risks to the financial stability of the United States . . . ; to promote market discipline . . . ; and to respond to emerging threats to the stability of the United States financial system.” The FSOC is the first U.S. regulatory body with the authority to set standards of conduct, collect information, and promulgate new rules for both banks and other large non-bank financial companies. Its mission is to reduce systemic risk in the financial system through a regime of prudential regulation and enhanced oversight of systemically important financial firms.

This move towards universal prudential regulation grew out of the perceived need to centralize systemic risk oversight in a single body. Previously, there was no one regulator with either the mandate or the authority to watch out for the entire financial system. Each industry had its own regulator and its own regulatory structure. At the federal level, banks were regulated by the Comptroller of the Currency and bank holding

2 Id. at § 5322.
companies were overseen by the Federal Reserve. Prior to Dodd-Frank, there was also an Office of Thrift Supervision. Broker-dealers and most investment managers were required to register with the Securities Exchange Commission (“SEC”), while insurance companies were, for the most part, overseen by state insurance regulators. Banking regulators were, and still are, principally concerned with banks’ ability to repay depositors and other creditors. Their main tools are capital adequacy requirements and supervision. It is not uncommon for bank regulators to have full-time dedicated supervisors on-site at member banks, keeping tabs and monitoring the constant flow of debits and credits. Broker-dealers and investment advisers interact differently with their customers, which has led broker-dealer and investment adviser regulators (primarily the SEC) to use a different approach. Because the relationship between banks and their customers is primarily one of debtor-creditor, banking regulators examine individual banks with an eye toward the solvency and credit risk that each bank poses to its depositors and to the system as a whole. This system is efficient in the sense that bank regulators can protect many millions of customers by focusing on the safety and soundness of a few thousand individual banks. Securities regulators have no such luxury, as securities firms—both broker-dealers and investment advisers—operate under an agency model. Instead of credit risk, the main risk to the customer of a securities firm is *caveat emptor*. Customers and shareholders inevitably know less about the security or service they’re offered than the agent. Tragic cases such as the frauds perpetrated by Charles Ponzi and Bernie Madoff suggest that there is no end to which unscrupulous hucksters are willing to go to take advantage of this informational asymmetry. Securities regulators try to mitigate the problem by requiring issuers and broker-dealers to make full and complete disclosures regarding the securities they sell and the services they offer. If a broker-dealer wants to sell a security to a client, it must inform the client of the risk, usually in the form of a prospectus, and make a suitability determination.

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render some other piece of information misleading. These rules of conduct govern each and every transaction between the securities firm and its customers. Securities regulators understand that they can’t possibly review every securities transaction in the marketplace, so they instead promulgate rules and impose penalties when the rules are violated. The relationship between insurance companies and its customers is a combination of agent (selling a product) and credit (being able to pay on the contract when due); and the regulation of insurance companies reflects a combination of prudential and conduct of business principles.\footnote{See e.g., Susan Randall, Insurance Regulation in the United States: Regulatory Federalism and the National Association of Insurance Commissioners, Florida State University Law Review, 26 Fla. St. U. L. Rev. 625, 634 (1999) (characterizing the dual goals of insurance regulation as “to ensure the solvency of insurers and to protect policyholders”).}

Dodd-Frank added a new systemic regulator to the existing ensemble without otherwise significantly altering the regulatory structure. Since the days of Walter Bagehot’s \textit{Lombard Street}, the use of the instruments of government to prevent or reduce financial crises—what we now call “prudential regulation”—has meant appointing a central banker to regulate and oversee banks.\footnote{\textsc{Walter Bagehot}, \textit{Lombard Street: A Description of the Money Market} (3d ed. 1873) (describing the Bank of England’s duty to protect its bank reserve).} Banks have a special place in the financial system. They are at the center of the network of payments. If one bank goes down, it can bring down not just other banks, but also non-banking firms that rely on the banking network to facilitate payments or meet payroll. Financial crises are often defined by prominent bank failures. In this classic view, the way to stop the spillover effects of one failed bank from contaminating the banking system, and hence the entire financial system, is for a strong central banker to step in at a time of crisis and act as lender of last resort.\footnote{\textit{Id} at 199 (“The only safe plan for the Bank is the brave plan, to lend in a panic on every kind of current security, or every sort on which money is ordinarily and usually lent.”).} Banks that have good collateral but find themselves in a liquidity squeeze are seen as victims of circumstance, and so the benefactors of the lender of last resort. Under normal conditions, healthy banks would continue lending and providing lubrication to the system; so during a crisis the central bank steps in and lends against good collateral. Less fortunate are those banks that lack the assets to provide sufficient collateral for the loans. To those banks, there is cold comfort and usually a speedy demise.

Into this framework of prudential regulation, originally designed to offset central banks’ credit exposure to subject banks, now steps the FSOC. Bank-style prudential regulation, sometimes alternatively called “enhanced
supervision,” can be an effective tool against the types of systemic risk created by non-bank financial firms. However, financial markets are immensely complex systems, and it is a tall order to expect a group of regulators, even (some might say especially) one with the power of the FSOC, to do a better job than the industry’s primary regulators. But that is exactly what Title I of Dodd-Frank requires the FSOC to do.

In what follows, I argue that the task of containing systemic risk given to the FSOC is not just difficult, but impossible, as the expansion of bank regulatory methods, principally, its focus on supervision and intervention, to other types of firms fails to account for the problems a systemic regulator will face in identifying imprudent courses of action. Due to the limits of human knowledge—what I refer to as “the knowledge problem”—it is unlikely that prudential-style regulation will achieve anything resembling the goals of Title I of Dodd-Frank. To provide some background, Section I summarizes the salient features of prudential regulation. Section II provides a brief history of systemic risk from the 19th century to the present. Section III, using the lens of complex systems theory, argues that the knowledge problem dooms any attempt to use discretionary regulatory intervention to promote financial stability or prevent market disruption. Finally, some alternatives to the prudential framework for regulating non-bank financial firms and reducing systemic risk are outlined.

I. PRUDENTIAL REGULATION

You supervise now and figure it out later? 

Like pornography, prudential regulation is in the eye of the beholder. The term has been defined many times, but no single definition captures its full meaning. It is sometimes used to demarcate any policy that aims to promote financial stability or avoid systemic risk. It has also been used

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10 Justice Potter Stewart could have just as well have been talking about prudential regulation when he said, in his concurrence in *Jacobellis v. Ohio*, “I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description, and perhaps I could never succeed in intelligibly doing so. But I know it when I see it...” *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964) (Stewart, J., concurring).

11 See *Int'l Monetary Fund, Central Banking Lessons from the Crisis* 13 (2010), available at http://www.imf.org (search for “Central Banking Lessons from the Crisis”) (stating that prudential policies “seek to ensure financial stability by mitigating the build-up of systemic risk.”); see also MARKUS BRUNNERMEIER ET AL., THE FUNDAMENTAL
synonymously with “bank regulation” to mean any measure employed in the regulation of depository banks. It can also describe the practice of regulation through the exercise of discretionary judgment by a prudential regulator. For its part, the FSOC has defined prudential regulation as whatever the Board of Governors says it is. Although different commentators define it differently, they all seem to know it when they see it.

The practice has its origins in the banking panics of the 19th century. One of the earliest accounts, Walter Bagehot’s *Lombard Street*, published in 1873, remains relevant today. Informed by recent panics in the City of London, Bagehot described the unique role that banks play in the financial system as both primary liquidity providers (lenders) and savings depositories (borrowers), and the problems that arise when failing banks pass on their troubles (illiquidity, depressed assets) to other firms. To prevent bank failures from metastasizing into full-blown panics, Bagehot recommended that the government, in his case the Bank of England, step in as the lender of last resort and provide liquidity to the banking system in a time of need. In exchange for high quality collateral, such as government securities or performing loan assets, the central bank would provide an emergency loan to tide over the imperiled institutions until the liquidity crisis abates. The government’s goal in stepping in as lender of last resort is to reduce systemic volatility during a period of panic with, ideally, little or no cost to the public, since the loans to the banks would be adequately collateralized. On the other hand, insolvent banks, those whose obligations exceed their assets, on Bagehot’s view, should be allowed to fail.

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14 Authority to Require Supervision and Regulation of Certain Nonbank Financial Companies, 12 C.F.R. § 1310.2 (2013) (Prudential supervision is “enhanced supervision and regulatory standards established by the Board of Governors.”).

15 Supra note 7.

16 Id. at 172 (describing the absence of “fresh money” during the panic of 1866).

17 Id. at 198 (When making advances to stave off a panic, “[n]o advances indeed need be made by which the Bank will ultimately lose.”).
regulators supervising and overseeing member banks came to be known as prudential regulation.\textsuperscript{18}

Prudential regulation has come a long way since \textit{Lombard Street}. The modern regulator has at his disposal a vast array of “prudential” tools, such as capital adequacy requirements, investment limits, activity limits, capital buffers, expected-loss provisioning, liquidity standards, direct on-site risk management supervision, and restrictions on the use of collateral.\textsuperscript{19} Since Dodd-Frank, more recent efforts have also included compensation limits, quantitative risk modeling, and stress testing.\textsuperscript{20} The pretense of market failure has been used to justify all manner of regulatory expansion, much of which has fallen under the broad label of prudential regulation, but the primary rationale for prudential regulatory intervention was originally and continues to be the internalization by banks of the credit risk they export to the government as a result of the central bank’s role as lender of last resort. Prudential regulation represents the attempt by regulators to minimize the central bank’s risk of loss by focusing on “the soundness of the [subject] bank’s management practices with regard to controlling risk.”\textsuperscript{21} If bankers are kids at the store with pockets full of their parents’ money, prudential regulators are supposed to be the nanny who watches carefully to make sure they do not buy too many sweets. Preemptive regulatory intervention—stepping in \textit{before} the act—is a further way regulators try to offset the unwanted effects that the government’s lender of last resort function can have on the incentives of bank managers. If bankers know the government will step in and rescue them in a time of crisis, in effect socializing the losses from a bad investment with no offsetting reduction of private gains, they have an incentive to take additional risk beyond what would be rational in the absence of government intervention. Instead, examiners monitor bank activities and try to take the punch bowl away before the party gets out of hand. By reducing the number of bank failures, prudential regulation has the beneficial effect of reducing the overall cost of the taxpayer backstopped insurance system.


\textsuperscript{19} \textit{I}nt’l Monetary Fund, \textit{supra} note 11, at 14–15.

\textsuperscript{20} \textit{See infra} note 62.

Outside of the banking sector, prudential regulation is much less common. One of the reasons for this division is undoubtedly cost. There are many more investment advisers and broker-dealers than there are depository banks. Covering all those market participants with the same level of attention as bank regulators give their member banks would require a tremendous reallocation of resources. But another reason is a fundamental difference in approach between bank regulation and securities regulation. In a normal borrowing and lending environment, banks are properly incentivized to do due diligence on their borrowers to minimize their borrower-specific credit risk. In securities transactions and advisory arrangements, the risks are reversed—the buyers/customers are exposed to the greatest risk (brokers and advisers usually get their fees upfront), but are at a severe informational disadvantage, and rarely have the purchasing power to demand extra disclosures. Informational asymmetries can range from the relatively mild, such as a potentially misleading statement in a disclosure document, to the extreme of Ponzi-style frauds. To protect customers from these risks, securities regulation governs what information agents must disclose, to whom, and the manner and even the format of the disclosure itself. Regulation of the securities markets tends to be based not on ex ante intervention and supervision like prudential regulation, but on broad rulemaking and ex post enforcement. The idea is to require the agents to follow certain best practices and prohibit them from acting in a grossly unfair manner. Examples of good behavior required by SEC rules and/or regulations include the adoption of compliance policies and procedures and the disclosure of potential conflicts of interest; examples of bad behavior include fraud and money laundering. These rules are policed by a

22 BLUEPRINT, supra note 18, at 31-72 (describing the current regulatory framework).
23 According to an SEC Study on Enhancing Investment Adviser Examinations conducted pursuant to Dodd-Frank, in 2010 the ratio of SEC examiners to registered investment advisers was approximately 26:1. The ratios of subject entities per examiner for the OCC and FDIC were each approximately 1:1. DIV. OF INV. MGMT., U.S. SEC. & EXCH. COMM’N, STUDY ON ENHANCING INVESTMENT ADVISER EXAMINATIONS 13 n.26 (2011), available at http://www.sec.gov/news/studies/2011/914studyfinal.pdf.
25 BLUEPRINT, supra note 18, at 53-54.
27 Delivery of Brochures and Brochure Supplements, 17 C.F.R. § 275.204-3 (2013) (requiring all registered investment advisers to provide clients with a copy of their Form ADV disclosure statement).
combination of civil and criminal enforcement mechanisms. The difference between prudential regulation and conduct of business regulation has been likened to the difference between a doctor whose task is to diagnose the illness and treat the patient, and a cop who is responsible for enforcing the law.\(^\text{30}\)

This distinction between prudential regulation and conduct of business regulation is somewhat artificial and never as clear in practice as it is in theory. All prudential regulators promulgate rules and all securities regulators have some degree of supervisory authority. For example, the SEC, the nation’s primary conduct of business regulator of the securities markets, imposes a net capital requirement on registered broker-dealers.\(^\text{31}\) What distinguishes prudential regulation and conduct of business regulation is not so much their application as it is their purpose. The \textit{ex ante} measures taken by bank regulators over individual institutions are designed to preserve the safety and soundness of the wider system—benefits to individual bank customers are generally ancillary—whereas securities regulators focus on broad rulemaking and \textit{ex post} enforcement to protect consumers and prevent fraud.\(^\text{32}\) However carried out, the regulator’s objective—whether mitigating moral hazard or protecting consumers—shapes the structure of the overarching regulatory regime.

\section*{II. Systemic Risk Regulation Before and After Dodd-Frank}

\textit{Many of the justifications for regulation may now be found under the heading of maintaining or promoting financial stability.}\(^\text{33}\)

The financial crisis of 2007–2009 placed the idea of systemic risk in the national spotlight. Before the crisis, authority for regulating systemically

\begin{itemize}
  \item 29 Records of Non-Resident Brokers and Dealers, 17 C.F.R. § 240.17a-7 (2013) (requiring broker-dealers to comply with anti-money laundering rules).
  \item 30 DAVIES & GREEN, supra note 13, at 192.
  \item 31 Net Capital Requirements for Brokers or Dealers, 17 C.F.R § 240.15c3-1 (2013). The CFTC, which is also primarily a conduct of business regulator, has proposed similar capital requirements for swap dealers and major swap participants. See Capital Requirements of Swap Dealers and Major Swap Participants, 76 Fed. Reg. 27,802 (May 12, 2011) (to be codified at 17 C.F.R. §§1.10, 1.12, 1.16, 1.17, 23.100–107, 140.91).
  \item 32 The point is not that bank regulators care less about customer protection than securities regulators. Rather, when customer protection is the regulators’ aim, they do not use prudential regulation. The kinds of supervision and intervention required for prudential regulation do not lend themselves to application over the many interactions between banks and their customers.
  \item 33 See DAVIES & GREEN, supra note 13, at 17-20.
\end{itemize}
important U.S. financial institutions was spread across a Balkanized landscape of state and federal industry regulators, with no single agency responsible for overseeing the system as a whole. To the extent there was conventional wisdom on the state of American financial regulation at the time, it was in favor of deregulation, not expanding government oversight. All that changed with the failure of Bear Stearns and the subsequent bailouts of American International Group ("AIG") and Citibank, and the non-bailout of Lehman Brothers in 2008. For the first time in several generations, the government was seen as a central part of the solution, not of the problem. Through the creation and empowerment of the FSOC, the Dodd-Frank Act ushered in a new paradigm of systemic risk regulation in the U.S. But to understand where we ended up, we must first trace through how we got there.

From the founding of the nation through the early decades of the 20th century, economic policy in the U.S. was dominated by laissez-faireism to an extent that is difficult to comprehend today. In an era when every pronouncement of a Federal Reserve Governor is parsed and analyzed on the front page of the business journals, one can be forgiven for forgetting that the U.S. operated without a central bank for 77 years between the lapsing of the charter of the Second Bank of the United States in 1836 until the establishment of the Federal Reserve System in 1913. During that period, the financial system was decentralized and state banks were prohibited from opening interstate branches. So when a particularly severe financial panic struck in 1907 destabilizing many banks, Washington had no immediate ability to respond. Congress’s eventual solution was the Federal Reserve Act of 1913, which reestablished a central bank of the United States and created the modern Federal Reserve System. But even with the new central bank, statutory authority for the regulation of private banks remained scant.

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34 See e.g., Helen Garten, Regulatory Growing Pains: A Perspective on Bank Regulation in a Deregulatory Age, 57 FORDHAM L. REV. 501 (1989).
37 The difficult task of unwinding the insolvent banks was left to the private sector, in this case, the preeminent J.P. Morgan, who orchestrated the effort that successfully saved the nation’s banking system.
38 12 U.S.C. ch. 3.
39 State banks had the ability to opt in to Federal Reserve supervision by becoming members of the Federal Reserve System. State banks that chose not to opt in were left to the oversight of their state’s local banking regulator.
Following the Great Crash of 1929, the U.S. experienced a period of unprecedented economic turmoil. In 1933 alone, 4,000 commercial banks and 1,700 savings and loans failed. President Franklin D. Roosevelt came into office promising action, and Congress responded with the Banking Act of 1933, which represented a watershed moment in banking regulation. It established the nation’s first system of deposit insurance, under the supervision of the Federal Deposit Insurance Corporation (“FDIC”), and, importantly, the first national effort at systemic risk regulation—the prohibition of the mixing of commercial banking and securities activities commonly referred to as “Glass-Steagall.”

For the seventy-seven years between the passage of the Banking Act of 1933 and the adoption of the Dodd-Frank Act, bank regulation represented the main national effort at systemic risk regulation in the U.S. The creation of the FDIC and the attendant changes to the Federal Reserve Act expanded federal supervisory authority to “impose direct regulatory controls on the assets and investments of banks, removing from bank management the discretion to allocate resources among business opportunities.” This regulatory framework was based on the comprehensive supervision of member banks. Financial innovation outside the realm of standard banking activity was viewed with suspicion and presumed to be dishonest. Many believed that rule-based regulation was futile because, in the words of one commentator, as soon as a rule was written down it would “be chipped away, circumvented, in search of profit.” So bank supervision was thorough, frequent and methodical. Regulators developed systems and procedures for identifying and monitoring risks and requiring banks’ regular communication with supervisory staff, who were encouraged to develop bespoke supervisory plans tailored to each firm’s individual business and risks. This was the era of the unofficial “3-6-3 Rule,” when financial regulation was synonymous with on-site inspections and loan loss allowances. These measures served as

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42 See BLUEPRINT, supra note 18, at 31-72.
43 Supra note 34, at 510.
44 Id. at 513.
45 Dooley, supra note 9.
47 The 3-6-3 Rule refers to the practice of bankers paying 3% interest on depositors’ accounts, lending the depositors money at 6% interest, and then playing a 3:00 pm round
the model for the “enhanced supervision and regulatory standards” later propounded in Dodd-Frank.48

Glass-Steagall represented something else entirely. It was an effort to protect the banking industry from what was viewed as the inherently risky business of the securities markets.49 After the experience of the Great Crash of 1929, Congress determined that selling securities was too volatile an activity for staid depositary banks. So it required the separation of commercial banking from securities activities.50 As a result, J.P. Morgan’s banking empire was broken up into the separate firms of J.P. Morgan & Company (later Morgan Guaranty Trust and now JPMorgan Chase), Morgan Stanley and Morgan Grenfell.51 Unlike the problems posed by banks’ credit externalities, which called for supervision and regulatory intervention, systemic risk was addressed through a bright-line prohibition of certain comingled activities.52

Over time, cracks formed in this regulatory edifice. As markets grew more complex, so too did banks themselves. Through the 1960s, 1970s and 1980s, Glass-Steagall’s restrictions were gradually eroded and many commercial banks in the U.S. felt that the restrictions put them at a competitive disadvantage to large non-U.S. banks that weren’t subject to the same limitations.53 As a result, in 1999, following a successful industry lobbying campaign, Glass-Steagall was repealed by the Financial Services Modernization Act, known as Gramm-Leach-Bliley (“GLB”),54 thus symbolizing the end of one era of financial regulation and the beginning of another.

There is plenty of room to debate GLB’s role (or non-role) in the ensuing financial crisis, and no doubt plenty of people will. The facts are that Glass-Steagall was repealed in 1999 and by late 2007 the U.S. was in the early stages of the worst financial crisis since the Great Depression.55 By 2009, the crisis had ushered in a new mindset in Washington. President Barack Obama

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49 John R. Walter, Firewalls, 82 ECON. QUARTERLY, no. 4, 1996, at 15, 16.
53 Walter, supra note 49, at 25.
55 See Bethany McLean & Joe Nocera, All the Devils Are Here: The Hidden History of the Financial Crisis (2010).
blamed inadequate regulation for the nation’s financial problems and vowed to take action.\textsuperscript{56} He pushed Congress for new legislation that would increase government oversight of, and involvement in, the financial system, and prevent future business leaders and regulators from making the same mistakes again. The result was the Dodd-Frank Act on July 21, 2010. More than a year in the making, the Dodd-Frank Act ran to 848 pages in the Federal Register, contained 16 separate titles and, by one estimate, required 398 different agency rulemakings and 87 studies.\textsuperscript{57} If a lack of regulatory authority had been a problem before, Dodd-Frank made sure that it was no longer. Legislators left no doubt about the intended scope of the new bill—it was meant to reform the entire financial system. Its explicit purpose was to promote the financial stability of the United States by improving accountability and transparency in the financial system; to end too big to fail institutions; to protect the American taxpayer by ending bailouts; to protect consumers from abusive financial services practices; and for other purposes.\textsuperscript{58} Where previous efforts had been limited to regulating individual firms, markets or industries, this was the first legislative measure conceived, designed and implemented to protect the entire American financial system. To accomplish all of this, the Dodd-Frank Act created the FSOC, the nation’s first systemic risk regulator, and gave it broad new powers to monitor and shape the financial system, and a new Office of Financial Research to collect and manage market data.\textsuperscript{59}

Title I of Dodd-Frank extended the bank regulatory model of enhanced supervision and prudential standards to cover non-bank systemically important financial institutions (“SIFIs”), as designated by the FSOC for supervision by the Federal Reserve, and large foreign financial companies with combined assets of U.S. operations of $50 billion or more.\textsuperscript{60} The task of developing and implementing the new prudential standards was given to the Board of Governors of the Federal Reserve.\textsuperscript{61} In its published summary of its

\textsuperscript{59} Id.
\textsuperscript{60} For practical reasons, the following discussion will focus primarily on Title I of Dodd-Frank. Other sections of Dodd-Frank take other approaches besides micro-prudential supervision to address other perceived regulatory gaps. I do not believe it unfair to Congress to emphasize the importance of Title I within the larger Act, nor do I believe that the use of other regulatory methods in other sections of the Act undermines the main point that Dodd-Frank ushered in a new paradigm of financial regulation.
\textsuperscript{61} 12 U.S.C. § 5322.
supervisory framework for large financial institutions, the Federal Reserve, now the preeminent financial regulator in the U.S., has interpreted this mandate as requiring it to enhance the resiliency of firms to lower the probability of their failure and reduce the impact on the financial system and the broader economy in the event of a firm’s failure or material weakness.62 The framework calls for stronger regulatory and supervisory assessments, with a close focus on the core areas of capital and liquidity planning, corporate governance, recovery/resolution planning, and management of core businesses and operations.63 The Federal Reserve will use a broad range of supervisory measures to pursue these goals, including coordinated examinations, stress tests, and detailed and individualized supervisory plans.64

In some sense these developments are not new—large financial institutions in the insurance and securities industries have been subject to prudential standards for decades.65 But in another sense, these measures represent a paradigm shift in the regulation of financial firms in the U.S. Before Dodd-Frank, when Congress, the SEC or the Federal Reserve wanted to address risks across industries, they tended to use prudential standards, such as capital requirements and leverage limits, or wholesale Glass-Steagall-like prohibitions.66 When lawmakers or regulators wanted to mitigate risk arising from individual firms, they tended to use a mixture of supervisory methods, such as examinations and oversight, to try to reign in risky behavior.67 Dodd-Frank took this approach a giant step further by attempting to use enhanced supervision of individual firms to reduce systemic risk in the financial system, that is, risk across the entire U.S. economy. While the original purpose of prudential regulation was to prevent problems at one bank from spilling over to another, the intent behind Title I of Dodd-Frank was (and is) to use prudential regulation to prevent problems at one financial firm from spreading across the financial system. Whereas the network of interconnections between merchant banks in 19th-century London was surely intricate, the 21st-century global economy is orders of magnitude more

63 Id.
64 Id.
65 See Blueprint, supra note 18, at 31-72.
66 Awareness of systemic risk as a regulatory problem is a relatively new, dating back only to the collapse of the large hedge fund Long-Term Capital Management in 1998. See President’s Working Grp. on Fin. Mkt., Hedge Funds, Leverage, and The Lessons of Long Term Capital Management 31–32 (1999). Before Glass-Steagall, the primary method of systemic risk reduction was the prohibition on interstate banking.
67 See Blueprint, supra note 18.
complex. Therefore, understanding the many connections and myriad ways in which risk can spread between large financial firms is no small feat. It is to this problem we turn in the next section.

III. THE KNOWLEDGE PROBLEM

\textit{Every year if not every day we have to wager our salvation upon some prophecy based upon imperfect knowledge.}^{68}

All regulation involves planning. The amount of planning is proportionate to the regulator’s participation. Generally, it requires less planning to implement bright line rules than prudential regulation involving enhanced supervision, but even relatively benign rules can have adverse consequences. To borrow a famous example, New York City initiated a program of rent control in the 1940s to make apartments in the city more affordable for low- and middle-income tenants. Most economists now agree that, in practice, rent control rules have had the opposite effect—by imposing a ceiling on the rents of certain units, the policy has discouraged investment and decreased the overall supply of available units.\textsuperscript{69} The city planners failed to fully understand the underlying dynamics of the market for rental units in New York City, leading to higher—not lower—prices for many renters. The more ambitious the plans and the more complex the market, the more astute the regulator’s understanding of the system must be to devise and implement effective regulatory controls. In the case of prudential systemic risk regulation, that means understanding the system’s interactions and interconnections well enough to not only identify those key individuals and key actions that spread risk in the financial system, but also to impose constraints that actually reduce risk. This kind of understanding requires a deep knowledge of the causal influences and interdependencies of the financial system and all its constituent parts. In what follows, I draw on complex systems theory to show why such an understanding of the global financial system is not possible.

For the past eighty years, regulators led by the SEC, have used rules-based regulation and enforcement to regulate the securities markets and many other non-bank financial activities.\textsuperscript{70} This framework of \textit{ex ante} rulemaking

\begin{itemize}
  \item \textsuperscript{68} Abrams v. United States, 250 U.S. 616, 630 (1919) (Holmes, J., dissenting).
  \item \textsuperscript{70} See Blueprint, supra note 18, at 31-72.
\end{itemize}
followed by *ex post* enforcement is not always successful—there are the notorious examples of fraudsters and con-artists who have continued in their crimes for far too long—but the causal mechanism of the regulation—in most cases, the credible threat of punishment as deterrence—is easy to identify and understand. Prudential regulation is different. It seeks to modify behavior through the supervision of specific firms, rather than the promulgation of broadly applicable rules. To reduce the systemic risk caused by a single firm, a prudential regulator must diagnose the symptoms of the risk, identify its source, and prescribe and implement an appropriate measure before the problem spreads to other market participants. Attaining this level of knowledge about even a single firm is no small task. Strategy consultants earn hefty fees helping CEOs acquire similar knowledge about their firms’ strengths and weaknesses to develop more effective business plans.\(^{71}\) This type of in-depth firm-specific information is the Holy Grail of that multi-billion dollar industry. Bank regulators do much the same thing when employing enhanced supervision to address firm-specific risks in subject firms. But using prudential regulation to address *systemic* risks requires regulators to take this process a step further and extrapolate firm-specific measures to effects across the *entire financial system*, with its thousands of firms and millions of participants, in something approaching real time. This task is orders of magnitude more difficult.

There is no evidence that government regulators possess this kind of knowledge. If they did, they would have a better track record making forecasts. In fact, officials and professional economists have demonstrated their forecasting ability is no better than chance. That was the conclusion of a team of economists at the Federal Reserve Bank of Boston in a 2010 report.\(^{72}\) The Boston Fed economists examined the available academic literature, which included publications by other government economists, to see if there was a consensus among experts about whether there was a bubble in the real estate

\(^{71}\) See Bruce Henderson, *Strategic and Natural Competition*, BCG.PERSPECTIVES, www.bcgperspectives.com/content/Classics/strategy_strategic_and_natural_competition (last visited Feb. 15, 2014) (strategic competition requires “[t]he ability to understand competitive interaction as a complete dynamic system which includes the interaction of competitors, customers, money, people and resources,” and “[t]he ability to use this understanding to predict the consequences of a given intervention in that system and how that intervention will result in new patterns of stable dynamic equilibrium.”).

market in the period leading up to the financial crisis. They found that not only was there no consensus, but economists were no better than chance at identifying the economic bubble. For every “expert” who asserted that real estate prices were too high, there was another who said real estate prices were fair and yet another who believed they were cheap. Published views ran the gamut, even when controlling for the expert’s degree of confidence. Based on these observations, the Boston Fed economists concluded, “[W]e may need to acknowledge that we do not currently have the ability to prevent a bubble from forming or the ability to identify a bubble in real time.”

This conclusion is borne out by the statements of the Boston Fed economists’ boss, Chairman Ben Bernanke. As late as February 2008, only weeks before Bear Stearns collapsed, Chairman Bernanke said publicly that he didn’t anticipate “any serious problems” among any of the large international banks. In July 2008, he went on record to say that the mortgage giants Federal National Mortgage Association (Fannie Mae) and Federal Home Loan Mortgage Corporation (Freddie Mac) were “in no danger of failing.”

And this was from the man who, as chairman of the nation’s primary bank regulator, not only had access to the greatest trove of data and most expansive informational resources of any regulator in the world, but also had statutory responsibility to make detailed inquiries into any bank suspected of being a systemic risk. Other regulators suffered similar predictive failures.

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73 Id. at 2.
74 Id. at 24.
75 Id. at 1-2.
76 Id. at 24.
80 The Federal Reserve Board staff includes more than 200 Ph.D. economists conducting innovative research on a broad range of topics in economics and finance. The Economists, BD. OF GOVERNORS OF THE FED. RESERVE SYS.,
In 2007, during the run-up to the crisis, Treasury Secretary Henry Paulson, Jr., a former CEO of Goldman Sachs, declared the economy the strongest he had seen in his lifetime. Then, in the period between the near-bankruptcy of Bear Stearns and real bankruptcy of Lehman Brothers, he told an audience that, “The worst is likely to be behind us” and that the country was “closer to the end of the market turmoil than the beginning.”

In retrospect, the impending crash appears obvious, but that is only with the benefit of hindsight. At the time, the vast and intricate interconnections between the financial participants and the explosion of innovative new financial products were unknown, and the downstream cascade effects from the failures of the subprime mortgage industry, Bear Stearns, Lehman Brothers, AIG, et al too uncertain to predict. Considering the enormous complexity of financial markets, it is no surprise that regulators were unable to identify and properly account for the risks that were building in the system. Reasonable minds could—and did—disagree.

As markets become more complex, the task of identifying and influencing trends in the broader market by closely supervising individual firms is becoming increasingly more difficult. The size and breadth of individual firms has multiplied geometrically from the days of single branch banking in the 1930s to today’s marketplace of transnational financial behemoths and the number and scope of interconnections has increased apace. No longer are individual banking centers like New York and the City of London effective islands of commerce set apart by oceans. We have entered an information age in which data moves at the speed of light, phone calls beam across satellites, and transaction speed is measured in milliseconds. Two hundred years ago, Adam Smith named the unseen market force


conveying information across society the “invisible hand.” Perhaps a more apt metaphor for today, though one lacking the same literary flair, would be of the market as a crowd of hands, each promoting the common good in seeking its own gain. Although the market acts as a singular force seemingly in pursuit of some all-knowing but inscrutable purpose, it is actually comprised of many individual agents acting independently but, miraculously, interacting together across a common network. Today, we have a name for a system of autonomous agents that acts independently within an interconnected network—a complex system.

The multidisciplinary field of complex systems theory has shed light on a diverse range of topics, from cellular systems to automobile traffic, from the common law to the scientific method. Like those systems, financial markets are complex systems with emergent properties, meaning that from just a single specimen—a few speculators trading stocks under a buttonwood tree or a handful of merchants swapping goods in a bazaar—vast networks of interconnected activity can develop. Complex systems share a number of basic properties. They begin with heterogeneous agents acting autonomously in pursuit of their individual self-interest. Think of a bee in a hive, a single motorist in a traffic jam, or a lone trader selling stock through an exchange—from afar each action looks almost random, but up close it is rational from the agent’s point of view. Second, the agents must be interconnected.

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85 2 ADAM SMITH, THE WEALTH OF NATIONS 28 (James E. Thorold Rogers ed., London, Oxford Univ. Press, 2d ed. 1880) (1776) (“By pursuing his own interest [the individual] frequently promotes that of the society more effectually than when he really intends to promote it.”).
88 Id. at 176; TOM VANDERBILT, TRAFFIC: WHY WE DRIVE THE WAY WE DO (AND WHAT IT SAYS ABOUT US) 35 (2008).
89 JIM MANZI, UNCONTROLLED: THE SURPRISING PAYOFF OF TRIAL-AND-ERROR FOR BUSINESS, POLITICS, AND SOCIETY 51-52 (2012) (quoting Oliver Wendell Holmes, Jr.: “[T]he life of the law has not been logic: it has been experience.”).
91 Adam Smith was the first economist to point out the emergent properties of financial markets, although the terminology would have been foreign to him. Friedrich A. Hayek and Karl Popper also did pioneering work in the field. For a more recent treatment, see generally THE OBSERVATORY OF ECONOMIC COMPLEXITY, http://atlas.media.mit.edu (last visited Feb. 24, 2014).
Without interconnection, there is no system, just a disparate collection of actors. The interaction of agents to create a structure is what scientists refer to as emergence. Finally, through a series of feedback loops, the whole is greater than the sum of the parts. Individual agents adapt to a changed environment, which in turn changes the environment further, which in turn leads other agents to adapt to the new environment, ad infinitum. Together, from the adaptation of individual agents, the system exhibits characteristics of collective learning. This learned “knowledge” doesn’t exist anywhere in the material world, but is dispersed and shared among the network of individual agents—Adam Smith’s invisible hand. Through the interaction of traders trading, motorists switching lanes, or worker bees gathering pollen, a complex system emerges.

Historical data supports the proposition that financial markets behave like complex systems. Under standard models, market prices should move smoothly and relatively evenly in a bell curve-like pattern. If markets and prices followed a normal distribution, then roughly 68% of all price fluctuations would be within one standard deviation of the mean (also known as a “sigma”), 95% would be within two standard deviations, 98% would be within three standard deviations, and more extreme events would be rarer still. In the 1960s, however, the mathematician Benoit Mandelbrot discovered that movements in the price of cotton were far more volatile, and far less predictable, than was previously assumed or could fit on a bell curve. Mandelbrot’s observations suggested that cotton prices did not behave in accordance with the standard models. Since the 1960s, as markets have grown more complex, additional observations have validated Mandelbrot’s findings in other markets. Using the mathematics of the standard models, the stock market crash of 1987 would represent a twenty sigma event—5 with 90 zeroes after it—signifying an event so unlikely that it would happen once every several billion lifetimes of the universe. If nothing else, this episode showed the futility of trying to predict extremely improbable events like stock

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93 MAUBOUSSIN, supra note 92, at 76.
94 By “standard model,” I mean models that rely on a normal distribution, sometimes called a “Gaussian distribution” after the German mathematician Carl Friedrich Gauss.
96 Id. at 6 (the same pattern has been detected in wheat prices, railroad and Blue Chip stocks, and dollar-yen exchange rates).
market crashes, or what Nassim Nicholas Taleb has since famously dubbed “black swans,” using models that rely on normal distributions.98

Regulators bent on using prudential supervision to prevent systemic risk must somehow account for these inherently unpredictable events. After all, if the financial “stability” promoted by regulatory action is achieved by suppressing short-term volatility at the expense of the system’s long-term health, then the cure is surely worse than the disease.99 Nothing threatens the stability of the financial system more than sharp, intense crises of the kind experienced in 1929, 1987 and 2008, and yet these are exactly the sorts of events prudential regulators are least equipped to prevent. To know the future, one must understand the forces that will shape the future. Those forces include things like scientific and technological innovations, which, if they could be known a priori would have been invented already.100 The problem for the prudential regulator is that to avert the next crisis, she must understand the causes of the next crisis, but understanding the causes of a future crisis is the same as predicting it. Imagine trying to prevent the 2007 to 2009 crash without knowing the role played by credit default swaps and collateralized debt obligations (“CDOs”). We can say now, with the benefit of hindsight, that these new inventions were precipitating causes of some of the larger failures. However, in 2005 and 2006 they were not even on the radar of the regulators, who were still dealing with the fallout of the accounting frauds at Enron and WorldCom.101 Addressing the causes of the preceding crisis in 2001 did little to prevent the next one because history did not repeat itself.102

When faced with a seemingly insoluble knowledge problem, there is a natural human response to look for more data. As Chairman Barney Frank, the sponsor of Dodd-Frank put it, “When technology can track billions of transactions in real time, a failure to pierce the opaqueness of the system is

98 Id. 99 Cf. NASSIM NICHOLAS TALEB, ANTIFRAGILE: THINGS THAT GAIN FROM DISORDER 98 (2012) (leveling the same charge against Chairman Bernanke’s “Great Moderation”). 100 See generally KARL R. POPPER, THE POVERTY OF HISTORICISM (1957) (laying out many of the problems with forecasting). 101 The Sarbanes-Oxley Act of 2002 was Congress’s response to the accounting scandals. The SEC was still issuing final rulemaking and reports as late as June 2005. See Spotlight on Sarbanes-Oxley Rulemaking and Reports, U.S. SEC. & EXCH. COMM’N, http://www.sec.gov/spotlight/sarbanes-oxley.htm (last visited Feb. 24, 2014). 102 Like phenomena will always have superficial similarities simply by virtue of being like phenomena, but that is a long way from having similar causes. For instance, the Russian debt crisis of the late 1990s that led to the demise of the hedge fund Long Term Capital Management, the 2000 bursting of the dot-com bubble, and the 2007-2009 financial crisis all shared common traits, but each was sui generis.
Chairman Frank viewed the opacity of the financial system as fundamentally an information problem, not a knowledge problem. Information problems are caused by information scarcity, and can be solved with more information, because the opacity is directly connected to one’s ability—or will—to collect the relevant information. According to this view, more—or better—information can bring previously unknown facts to light. Dodd-Frank addressed the problem of regulators’ information scarcity by, among other measures, creating the Office of Financial Research to generate reliable financial data about things like large hedge funds, credit default swaps and CDOs, which were previously largely opaque to regulators. If Chairman Frank were right, then the FSOC and its constituents would now have the necessary tools to “pierce the opaqueness of the system” and prevent another financial crisis.

But historical data can never provide a complete picture of a complex emergent system. By the time the information is collected, communicated, and then analyzed, it is obsolete before it can be used. In his 1945 essay “The Use of Knowledge in Society,” future Nobel laureate Friedrich A. Hayek observed that if all of the relevant information about the economy could be possessed by a single mind commanding complete knowledge, then identifying the solutions to society’s problems would be as simple as applying the rules of logic. The trouble is that knowledge is never given to one person, or even one group of people, but is dispersed, incomplete, and frequently contradictory. Conditions change so rapidly that data purporting to describe the state of the system at a point in time are stale almost the moment they are collected. These changes occur through constant, usually small, iterations that interact in dynamic feedback loops among millions of heterogeneous, interconnected agents and actors, and cannot be reduced to a

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106 Supra note 103.

set of "facts" or a series of equations.\textsuperscript{108} All of the constant, imperceptible feedback loops that make the global markets so complex also make them opaque and unpredictable at the micro level.\textsuperscript{109} The study of individual firms is no more a help in understanding the systemic risk in a complex system than the study of water molecules is in understanding ocean waves. As another Nobel laureate, Philip Anderson, put it, "more is different."\textsuperscript{110}

More is also more difficult. Understanding system dynamics is orders of magnitude more difficult than understanding the actions of individual participants. Models of complex system behavior are prone to problems of omitted variable bias, interaction effects, and intercorrelation.\textsuperscript{111} Omitted variable bias is a statistical term that describes problems of inadequate information.\textsuperscript{112} Because the universe is so vast, and the number of possible facts about it at any instant infinite, any catalogue of the relevant variables of a system at any point in time is inevitably incomplete, selective, and oversimplified. Isolating the key drivers or salient features in a causal chain against a background of infinite possible data can be nearly impossible; yet, a model that fails to account for all the salient factors, or perhaps misses some variables and overcompensates by over-representing others, will have trouble matching up with reality. Interaction effects occur in systems with multiple independent variables. Sometimes the effects of the variables will offset; sometimes they will have a multiplicative effect; and there is a whole spectrum of possible interactions in between. Because nothing happens in a vacuum, isolating the relative effect of independent variables can be extraordinarily difficult. Intercorrelation is the problem of analyzing data with multiple dependent variables. As the Scottish philosopher David Hume observed more than 350 years ago, we are never able to discover the

\textsuperscript{108} As in so many things, Oliver Wendell Holmes, Jr. understood the problem more than a century ago when he wrote: "The danger of which I speak is not the admission that the principles governing other phenomena also govern the law, but the notion that a given system, ours, for instance, can be worked out like mathematics from some general axioms of conduct . . . [C]ertainty generally is illusion . . ." Oliver Wendell Holmes, Jr., The Path of the Law, 10 HARV. L. REV. 457, 465 (1897).

\textsuperscript{109} TALEB, supra note 99, at 132 ("[E]vents that are produced by interdependent systems . . . [are] not statistically understandable at the individual level.").

\textsuperscript{110} MAUBOUSSIN, supra note 92, at 76 ("The behavior of large and complex aggregates of elementary particles, it turns out, is not to be understood in terms of the simple extrapolation of the properties of a few particles. Instead, at each level of complexity entirely new properties appear . . .") (quoting P. W. Anderson, More Is Different, 177 SCi. 393, 393 (1972)).

\textsuperscript{111} MANZI, supra note 89, at 136.

\textsuperscript{112} Id. at 135 (citing K. A. Clarke, The Phantom Menace: Omitted Variable Bias in Econometric Research, 22 CONFLICT MGMT. & PEACE SCI. 341 (2005)).
“necessary connexion” between cause and effect, because one can never know with certainty if the successor event in a sequence was the necessary consequence of the predecessor, or whether the events were coincident of a common cause. A further consequence of intercorrelation in complex systems is dynamic change, or “fat tails.” Complex systems tend to experience periods of relative quietude followed by a cascade of severe change. After a fat tail event, such as a stock market crash or economic downturn, we often hear that the experts “didn’t see it coming.” One potential explanation for the experts’ ignorance is that they failed to take into account the dynamic feedback loops characteristic of complex systems.

For an example, we need look no further than the recent financial crisis. There were signs of trouble in the subprime mortgage market in early 2007. At the time, prominent experts thought the problem was contained to a small cabal of subprime mortgage originators and the relatively small number of subprime mortgage bonds held on commercial bank balance sheets. However, eighteen months later, a $300 billion subprime meltdown morphed into a $6 trillion economic tsunami. Some concluded from this sequence—first A, then B—that the subprime mortgage mess “caused” the financial crisis. But, as the skeptics pointed out at the time, the subprime mortgage industry was a relative minnow in the ocean of an extraordinarily diverse and complex global financial system. How could a small phenomenon have such a large effect? Was it, as some have argued, another example of the “Butterfly Effect” in action?

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114 MANDELBROT supra note 95 at 198.
115 RICKARDS, supra note 86, at 211 (“Failure to consider critical state dynamics and scaling metrics explains why regulators ‘did not see it coming’ and why bankers were constantly ‘surprised’ at the magnitude of the problem.”).
117 The Economic Outlook: Hearing Before the Joint Econ. Comm., 110th Cong. (2007) (statement of Ben S. Bernanke, Chairman of the United States Federal Reserve), available at http://www.federalreserve.gov/newsevents/testimony/bernanke20070328a.htm (just as the subprime crisis was reaching a critical tipping point, Bernanke told Congress that problems relating to subprime defaults were “likely to be contained.”).
118 See id.; Lawder, supra note 116.
matter is that we don’t know. Correlation does not equal causation, just as not all storms in the tropics are caused by butterflies. The subprime mortgage fiasco could have caused the financial crisis, or the first ripples of the impending financial crisis could have caused the subprime mortgage fiasco, or both could have been symptoms of a different set of underlying causes. Further analysis and additional data do not lead to a definitive answer because we lack a sufficient understanding of the underlying connections to be able to isolate the causal relationships in a dynamic system such as the U.S. economy.

What Chairman Frank failed to appreciate is that opaqueness in the financial system can come from both informational scarcity and the inability to use necessarily incomplete knowledge, or what I, following Hayek and Israel Kirzner, refer to as “the knowledge problem.” Unlike an information problem, the knowledge problem cannot be solved by collecting more data. The knowledge problem is not new and is not unique to the financial system, although its role in laying waste to attempts to predict or understand financial markets is often underappreciated. Variously known as the epistemological problem, cognitive failure, and information complexity, the knowledge problem is endemic to any human activity that involves planning or prediction. Additional observation and data cannot solve the core problem, which stems from the inherent inability of finite beings to fully understand complex situations on the basis of insufficient knowledge. The prevalence of the problem is why genuine, true knowledge is scarce, expensive, and hard to come by, and why presumed knowledge so often wilts under close scrutiny. Again, it was David Hume who famously noticed the crumbling foundation of “knowledge” of cause and effect derived from past observations. More recently, Malcolm Gladwell, borrowing from the national security literature, colorfully described knowledge problems as a type of mystery, in contrast with information problems, which are puzzles. Writing in the New Yorker in 2007, he said:

123 Balleisen & Eisner, supra note 104.
124 See HUME, supra note 113. Hume is sometimes credited with being the first to make this connection, others attribute the idea to the original skeptic, the ancient Greek philosopher Sextus Empiricus.
Osama bin Laden’s whereabouts are a puzzle. We can’t find him because we don’t have enough information. The problem of what would happen in Iraq after the toppling of Saddam Hussein was, by contrast, a mystery. It wasn’t a question that had a simple, factual answer. Mysteries require judgments and the assessment of uncertainty, and the hard part is not that we have too little information but that we have too much. If things go wrong with a puzzle, identifying the culprit is easy: it’s the person who withheld information. Mysteries, though, are a lot murkier: sometimes the information we’ve been given is inadequate, and sometimes we aren’t very smart about making sense of what we’ve been given, and sometimes the question itself cannot be answered. Puzzles come to satisfying conclusions. Mysteries often don’t.\(^\text{125}\)

When too little (or too much) information makes it impossible to distinguish causes from effects, we’re left with what Gladwell calls the “hard part.”\(^\text{126}\) Puzzles can be solved with additional information; but mysteries resist models and predictive schemas of the sort relied on by regulators when exercising discretionary judgment.

Yet that is exactly what the FSOC and its constituent agencies have been asked to do under Title I of Dodd-Frank. They have been tasked with identifying the causes of systemic risk in the financial system and taking action to respond to such risks.\(^\text{127}\) To do that, they need to understand the current state of the financial markets and the causal mechanisms that drive them forward. Yet, knowledge of the relevant facts and circumstances, if it exists at all, is fractured and dispersed among the market’s many participants.\(^\text{128}\) If markets were simple, then the complexity and waste of the market system would be unnecessary, and a central authority could more efficiently set prices and allocate resources.\(^\text{129}\) But markets are not simple, and


\(^{126}\) *Id.*


\(^{128}\) Hayek, *supra* note 107 (“knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess.”).

\(^{129}\) MANZI, *supra* note 89, at 52 (“If the environment were simple—if determining the course of action were obvious and relatively static across time—then the complexity and waste of
the history of top-down attempts to set prices or regulate economies is not inspiring. If enhanced prudential regulation could reduce systemic risk, then the banking industry, which has been subject to various forms of enhanced prudential supervision and control for more than a hundred years, should have fared much better during the past century’s crises. Its repeated failures suggest that prudential regulation alone is not an effective tool for addressing systemic risk. The mistaken belief that it might reflects the confusion between a knowledge problem and an information problem—or a lack of regulatory will.

The difficulties with predicting market trends from available information are well known to the regulators themselves. Chairman Bernanke expressed doubt about regulators’ ability to effectively use firm-specific information more than a year before the financial crisis. In a discussion of liquidity risk, he said,

To measure liquidity risks accurately, the authorities would need data from all major financial market participants . . . As a practical matter, could the authorities collect such an enormous quantity of highly sensitive information in sufficient detail and with sufficient frequency (daily at least) to be effectively informed about liquidity risk in particular market segments? How would the authorities use the information?

His predecessor, Alan Greenspan, no great champion of financial regulation, had a unique perspective on the systemic regulator’s task as the Chairman of the Federal Reserve System for sixteen years. Even before the financial crisis, Greenspan believed that markets were too complex to be effectively regulated. While Chairman Greenspan’s “shocked disbelief” at the apparent extent of the market’s dislocation in the crisis caused even the famous
champion of deregulation to propose additional regulatory changes,\textsuperscript{133} it did not alter his opinion of the ability of regulators to manage systemic risk:

\begin{quote}
[T]he regulators are being entrusted with forecasting, and presumably preventing, all undesirable repercussions that might happen to a market when its regulatory conditions are importantly altered. No one has such skills . . . The problem is that regulators, and for that matter everyone else, can never get more than a glimpse at the internal workings of the simplest of modern financial systems.\textsuperscript{134}
\end{quote}

Andy Haldane, Executive Director for Financial Stability at the Bank of England put it more bluntly, “Modern finance is complex, perhaps too complex. . . As you do not fight fire with fire, you do not fight complexity with complexity.”\textsuperscript{135}

A simple thought experiment might illustrate the point further. Imagine that on February 2, 2006, the day after he took over as Chairman of the Federal Reserve, an omniscient demon appeared before Chairman Ben Bernanke and the heads of the other major federal regulatory agencies and told them all that within three years the U.S. financial system would experience the worst shock since the Great Depression. However, despite their pleading, the demon refused to give them any more information about the nature or cause of the panic or the underlying systemic risks. To avert the crisis, they had only their cunning and the otherwise available information to rely upon.

In this admittedly fantastical thought-experiment, what should the nascent FSOC members have done? One possible answer is that they should have cracked down on the activities of Bear Stearns and Lehman Brothers, two of the most reckless risk takers and, eventually, spectacular failures of the


\textsuperscript{134} Alan Greenspan, Dodd-Frank Fails to Meet Test of Our Times, F\textsc{in.} T\textsc{imes}, Mar. 29, 2011, http://www.ft.com/cms/s/0/146d2f88-5a28-11e0-86d3-00144feab49a.html#axzz2t1tZEQ00 (describing the financial markets as “unredeemably opaque”).

\textsuperscript{135} Brooke Masters, Haldane Calls for Rethink of Basel III, F\textsc{in.} T\textsc{imes}, Aug. 31, 2012, http://www.ft.com/cms/s/0/8a5e61b2-d34a-11e1-9c6c-00144feabcde0.html.
major financial firms during the period. But it is not at all clear that saving Bear Stearns and Lehman Brothers—or sacrificing Bear Stearns and Lehman Brothers, if that is your preference—would have averted the crisis. After all, the bailout of Bear Stearns did not prevent the runs on Lehman Brothers and Merrill Lynch six months later. If the regulators had incisively identified Bear Stearns, Lehman Brothers and Merrill Lynch as the three most troubled of the large Wall Street houses and forced them to adopt more prudent business practices, the panic might have instead consumed the larger Morgan Stanley and Goldman Sachs, with even more devastating effects. And this is assuming that the regulators correctly identified Bear Stearns, Lehman Brothers and Merrill Lynch in the first instance. Perhaps more likely, they would have used size as a proxy for systemic riskiness and targeted the largest commercial banks, JPMorgan Chase, Citibank and Bank of America, for enhanced supervision; or attempted to clamp down on the so-called “shadow banking system” and its myriad hedge funds and other intermediaries about which there was comparatively little available information. Even with the omniscient demon’s prodding, it probably would have taken awhile before the regulators thought to examine AIG or the money market mutual fund industry as potential sources of systemic risk. They just weren’t on the regulators’ radar screen in 2006, and to the extent they were they were, they were viewed as potential counterbalances that would dampen risk—not spread the contagion.

The point of this exercise is not to rub salt in the wounds of Chairman Bernanke and his brethren or to assign blame among the financial firms; rather, it is to emphasize just how difficult a task it is to identify systemic risk ex ante and the practical impossibility of containing systemic risk through the prudential supervision of individual firms. To the extent the regulators could have done anything to avert the financial crisis, it is hard to see how designating AIG, Prudential Financial, and General Electric Capital Corporation as systemically important would have helped. Even putting

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136 For an engaging account of the rise and fall of Bear Stearns, see William D. Cohan, HOUSE OF CARDS: A TALE OF HUBRIS AND WRETCHED EXCESS ON WALL STREET (2010).


138 See Financial Stability Oversight Council: Nonbank Financial Company Designations, U.S. DEP’T OF THE TREASURY, http://www.treasury.gov/initiatives/fsoc/designations/Pages/default.aspx (At the time of writing, these are the firms that the FSOC has designated as systemically important nonbank firms).
aside the problem of “systemically important” being perceived as a synonym for “too big to fail,” with its implied government guarantee, these firms represent just a drop in the bucket of total global financial activity. But casting the net wider wouldn’t help either, as any attempt to identify and monitor every firm with a fleeting influence in the market would be too gargantuan a task for the government to accomplish with the alacrity required to keep up with the ever-evolving market.

The complexity of the financial markets and the difficulties in accurately assessing systemic risk in the financial system ex ante have been cited as reasons for a framework of prudential regulation and enhanced supervision. However, as Chairman Bernanke, Chairman Greenspan, and Executive Director Haldane acknowledged, complexity and the ex ante knowledge problem are precisely the reasons why such frameworks do not work. Under conditions of true complexity where unpredictability reigns, the knowledge required to fully understand—never mind forecast and effectively influence—a system exceeds that of any single person or group, even a group as august as the one that comprises the FSOC. There are too many variables interacting in too many different ways, and changing too rapidly, for prudential regulators to gain enough insight into the market to understand its future course. Without this knowledge, attempts to change its path using the carrots and sticks of enhanced supervision amount to little more than blind stabs in the dark. Such interventions only exacerbate the problem by introducing more uncertainty and unpredictability into the system, thereby further increasing complexity. Until policymakers recognize the problem for what it is, a knowledge problem—not an information problem—they will not be able to implement an effective solution.

IV. TOWARDS A NEW PARADIGM OF SYSTEMIC RISK REGULATION

The larger the system turns out to be . . . the simpler the rules have to be to put it together.140

However well-intentioned, the notion that getting the smartest people into a room will solve a complex problem like systemic risk is wrong. The

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139 INT’L MONETARY FUND, supra note 11, at 16-17 (citing complexity and measurement difficulties as reasons for of framework of discretionary supervisory judgment).

complexity of the financial system is such that even seemingly easy steps like gathering market data\textsuperscript{141} and identifying systemically important firms are massive undertakings that take years of planning.\textsuperscript{142} At the heart of the problem lays a mystery—how the future will unfold under conditions of uncertainty—that no amount of planning or information can reliably solve. But regulators don’t necessarily need to predict the future to reduce systemic risk. A better approach would be to match the scope of the policy proposal to the level of the perceived risk. If the goal is to reduce systemic risk, that is, risk across the entire system, then the solution must be systemic too. Enhanced supervision can reduce the spillover risks from a single firm, or several firms, but it will not reliably improve the form or functioning of the larger financial system. Just as an engineer does not need to know exactly where a bridge might fail to recommend a repair, a financial regulator does not need to know exactly which risk might metastasize into the next crisis to recommend improvements to the system’s overall health. In each case, predicking the solution on a specific guess about which weak link—whether it be a support beam or large financial firm—will collapse first, and addressing only that one risk, does little to quell the threat to the rest of the structure if the guess is slightly off. A better tack is to clear away the debris, repair the problem, and reinforce the structure against the next one hundred year (or one thousand year) flood. Similarly, a better paradigm of systemic risk regulation would adopt incremental measures that improve the structure and functioning of the market to buttress the system for the next inevitable shock.

A better system of systemic risk regulation would start by seeking to leverage the knowledge that already exists in the market. It may be impossible

\textsuperscript{141} CFTC Commissioner Scott O’Malia has been an outspoken critic of his agency’s efforts to gather and process data. See Scott D. O’Malia, Comm’r, Commodity Futures Trading Comm’n, Keynote Address at the 9th Annual FIA Asia Derivatives Conference: Setting Priorities and Fixing Broken Rules Must be Commission’s First Order of Business in 2014 (Dec. 4, 2013); Scott D. O’Malia, Comm’r, Commodity Futures Trading Comm’n, Keynote Address at the SIFMA Compliance and Legal Society Annual Seminar (Mar. 19, 2013); Andrew Ackerman, \textit{Inaccurate Swaps Data Bedevil Regulator}, \textit{WALL ST. J.}, Dec. 26, 2013, http://online.wsj.com/news/articles/SB10001424052702304753504579282730330975324# (discussing problems with accuracy of swaps transaction data at CFTC).

for the Secretary of the Treasury or the Chairperson of the Federal Reserve to ever possess a complete understanding of the markets at a particular time, but the knowledge is dispersed throughout the system, rather than centralized at the top.143 Improving the functioning of the financial system requires regulators to, in the words of F. A. Hayek, “show how a solution is produced by the interactions of people each of whom possesses only partial knowledge.”144 You cannot do this by placing greater reliance on a group of top-down prudential regulators. In an ideal structure, there wouldn’t be a need for regulators to exercise discretion. The aim would be “to dispense with the need of conscious control, and . . . provide inducements which will make the individuals do the desirable things without anyone having to tell them what to do.”145 In the words of Nassim Taleb, “[I]t should minimize its reliance on the competence of information-gathering organizations and the predictions of ‘experts’ in what are inherently unpredictable domains.”146

The way to improve the functioning of the market through regulator-proof rules is to pursue policies that promote market efficiency, with features like transparency, liquidity, and predictability; and discourage or eliminate the obstacles of market efficiency, like opacity, exogenous shocks, and unpredictability. New Deal-era policymakers recognized almost a century ago that market regulators can’t be everywhere all the time, so market-wide rules of universal application are an effective way to encourage transparency and predictability.147 Such rules—the structural pillars of systemic risk regulation—govern the conduct of the biggest, most systemically important firms, the smallest startups, and every firm in between. They are broadly applicable (i.e., one-to-many), promote transparency, and encourage market participation (i.e., increase liquidity) by upholding the appearance of fairness. Under a prudential regulatory regime, there might be only one way for a

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143 This was F. A. Hayek’s cardinal insight and main argument against socialism. Hayek, supra note 107; F. A. Hayek, THE ROAD TO SERFDOM (1944).
144 Hayek, supra note 107, at 530.
145 Id. at 527.
146 Nassim Nicholas Taleb & Mark Blyth, The Black Swan of Cairo: How Suppressing Volatility Makes the World Less Predictable and More Dangerous, 90 FOREIGN AFF. 35 (2011). Or, put more colorfully, paraphrasing legendary investor Peter Lynch, you want a system of regulation that any idiot can run, because sooner or later one will. (The exact Lynch quote, later quoted even more famously by Warren Buffett, is “Go for a business that any idiot can run—because sooner or later any idiot probably is going to be running it.” Virginia McLean, Track Companies, Not Markets, USA TODAY, Mar. 7, 1989, at 4B.)
147 For simplicity, I am using the word “rules” to mean either rules or standards. The intended distinction is between rules of general application and the exercise of discretionary intervention, not the choice between rules and standards, which is a separate debate.
subject firm to comply with a regulatory order, but under a conduct of business regime there can be as many ways to comply with a rule as there are firms in the marketplace. Effective rules also leverage the mechanisms of the price system—the crowd of hands—to impact the entire market and thereby improve the stability of the system, not just to impact individual firms and their counterparties. Rule-based conduct of business regulation of the sort used in the securities markets is far from perfect, but, to (badly) paraphrase Winston Churchill, it is the worst form of systemic risk regulation, except for all the others.148

Regulators cannot overcome the knowledge problem, but they can pursue strategies that reduce the need for prediction and planning. The actual policy measures are never obvious. If there were any truly low-hanging fruit, they would have been picked by now. One should not expect to find, here or elsewhere, a silver bullet for slaying the beast of systemic risk. The result of any new undertaking will be just as uncertain ex ante as a prudential regulation imposed by the FSOC. But to advance knowledge and minimize the negative effects of any flawed policies, regulators must be systematic in their approach and rigorous in their efforts to measure outcomes. In a word, they must be experimental. A better paradigm of systemic risk regulation would follow a trial-and-error approach to incrementally expand regulators’ empirical knowledge base and identify specific rules that improve the form or function of the system. This means setting specific, observable targets or benchmarks before promulgating new rules or regulations. A hallmark of ineffective legislation is the establishment of goals or standards so loose and ethereal that both proponents and opponents can cite the measure’s outcome as proof of its success or failure. As we have seen, prudential regulation has its origins in 19th century, top-down social engineering, which is difficult to measure and usually irreversible. Structural improvements implemented through broad-based rulemaking can be phased in both gradually and incrementally, and can be assessed using a variety of quantitative measures.149 If a structural change doesn’t produce the desired outcome, or the costs of complying with the rule turn out greater than expected, the rule can be amended or repealed.150 Before

148 The Official Report, House of Commons (5th Series), 11 November 1947, vol. 444, cc. 206–07 (“Indeed, it has been said that democracy is the worst form of government except all those other forms that have been tried from time to time”).

149 See TALEB, supra note 99, at 324 (criticizing urban planning, and similar attempts at top-down ordering, as irreversible and mistake prone).

150 An example of this kind of deliberation and change was the study and eventual elimination of the uptick rule by the SEC in 2007. See Regulation SHO and Rule 10a-1,
they become effective, regulators often publish rules in draft form to give
market participants and interested observers an opportunity to review and
comment. As often as not, the final rules are modified in response to industry
feedback. The process is iterative and transparent, and increases general
knowledge and a sense of fairness that encourages participation, and
promotes a consistency in outcome.\footnote{151} Although not all rules developed in
this way are necessarily well conceived or effective, the public nature of the
process has the benefit of holding the rule-maker accountable for the results.
This is a major advantage over prudential supervision, which, by its nature,
tends to be opaque and highly tailored to the circumstances of the individual
firm.\footnote{152}

Depression-era legislators weren’t the only ones who understood the
benefits of smart market reforms. The seeds of better systemic risk regulation
are already in Dodd-Frank. While Title I, and to a lesser extent, Title VIII are
based on a framework of enhanced prudential regulation, other parts of the
Act use other methods to address systemic risk: Title IV expanded the
application of the Investment Advisers Act of 1940 to most hedge fund and
private equity fund advisers; Title VI dealt with improvements to the
regulated banking industry, including the so-called Volcker Rule; Title VII
reformed the over-the-counter derivatives market; Title IX incorporated
changes to the existing securities market; and Title XIV addressed mortgage
reform and predatory lending.\footnote{153} Each of these major parts transformed the
regulation of one aspect of the financial system or another without the same
degree of reliance on top-down interventionist supervision. They did this by
seeking to bring sunlight to previously dark markets, expanding existing


\footnote{152} Oliver Wendell Holmes, Jr. expressed a similar sentiment with respect to the progress of
the common law when, writing in the Harvard Law Review, he said, “The object of our
study, then, is prediction, the prediction of the incidence of the public force through the
instrumentality of the courts.” Oliver Wendell Holmes, Jr., The Path of Law, in THE
ESSENTIAL HOLMES: SELECTIONS FROM THE LETTERS, SPEECHES, JUDICIAL OPINIONS,
AND OTHER WRITINGS OF OLIVER WENDELL HOLMES, JR. 160, 160 (Richard A. Posner

\footnote{153} By vesting discretionary supervisory powers in an exogenous council that operates outside
of the normal market processes, Dodd-Frank may even have weakened market discipline
and impeded accountability and transparency by transferring responsibility for risk
mitigation from market participants to the FSOC (and that is even putting aside any
concerns about political influence or the purity of the regulators’ motives). For an
eample of decisions made based not on their own merits, but on the influence of
political forces, see McLean & Nocera supra note 55, at 168–86.

conduct of business rules, and governing the formerly ungoverned. That is not to say that these parts of the Act are necessarily wise, or that the rules promulgated thereunder will be successful, rather, only that they fit within a more realistic framework that takes market complexity and uncertainty into account.

An example of this more effective approach to systemic risk regulation is the treatment of derivatives transactions under Title VII of Dodd-Frank. Before the financial crisis, a subsidiary of the massive insurance firm AIG, called AIG Financial Products Corporation ("AIGFP"), sold credit protection on $64 billion of mortgage-backed securities through credit default swaps, which are basically a form of insurance contract. Unlike standard insurance contracts, due to a lack of regulation and the norms of the over-the-counter derivatives market, AIG wasn’t required to set aside capital against these liabilities in the event of loss. At the time, executives of AIG could not fathom a scenario that would result in AIG absorbing losses from those transactions, so no capital was set aside. When the subprime market collapsed in 2007 and the mortgage-backed securities began to default, AIG suffered losses on its mortgage-backed securities contracts of approximately $26 billion, requiring a government bailout that eventually totaled $150 billion. Title VII of Dodd-Frank addressed the systemic threat of another massive derivatives counterparty failure like AIG by authorizing the CFTC and the SEC, as the regulators of the swaps market, to set capital requirements for swap dealers and major swap participants. By requiring large financial entities to set aside capital to offset potential losses in their swaps portfolios, the rules will reduce the risk of another firm ever accumulating such a large position in the derivatives market that it poses a risk to the financial system.

155 Id.
156 Id.
157 The balance of AIG’s shortfall included losses in other derivatives positions besides credit default swaps on subprime mortgage-backed bonds. Id.
Another way to improve the functioning of the market is to improve transparency. While greater transparency alone will not necessarily prevent the buildup of systemic risk—sunlight may be a disinfectant, but it’s rarely a cure\(^{159}\)—it is a precondition necessary for market participants to identify their own risks, prepare for future contingencies, and counterbalance the effects of a possible market disruption. A transparent and reckless firm is a danger to itself, but an opaque and reckless firm is a danger to the entire financial system. The key is to place the onus of the responsibility for risk mitigation on those who have the most at stake—the market participants themselves—and not simply to increase the amount of data that streams into the regulators’ computer servers. An example of the wrong sort of transparency is the joint SEC and CFTC rule adopted ostensibly pursuant to Dodd-Frank that requires SEC- and CFTC-registered advisers with at least $150 million in private fund assets under management to periodically file confidential reports (“Form PF”).\(^{160}\) The SEC and CFTC do not intend to make public either the aggregate data or the firm-specific information reported on Form PF; rather, the information is provided to the FSOC for use in monitoring risks to the U.S. financial system.\(^{161}\) Given the volume of data required to be reported on Form PF, it is an open question whether and to what extent this data will prove useful in informing FSOC policy. But even with this voluminous new data, the FSOC is unlikely to be any closer to an effective understanding of private funds’ role in creating systemic risk because the system is continually changing and evolving in new ways. A more effective approach would be to require a public filing of certain basic risk-related information about each fund. Instead of forty pages of privately reported items, a public form might require one or two pages of key data, such as fund size and quarterly performance, which other market participants could use to assess their own risk exposure to those funds. The funds’ prime brokers already require this type of basic periodic reporting, so a typical prime broker report could serve as the template. The net result would be a simpler form that is easier to complete, is available to the public, and better serves the underlying goal of protecting the financial system from unseen systemic risk.

\(^{159}\) LOUIS D. BRANDEIS, OTHER PEOPLE’S MONEY AND HOW THE BANKERS USE IT 92 (1913) (“Sunlight is said to be the best of disinfectants . . . ”).


\(^{161}\) Id. at 71,728-735.
The ultimate goal of more effective regulation should be not just to repair or address known market failures, but also to buttress the system against future shocks.\textsuperscript{162} Again, this is easier said than done. Preparing for the next one hundred year, or one thousand year, flood invariably requires layers of redundancy and additional expenses which, during times of relative calm, appear unnecessary and excessive. And not all redundancy is beneficial.\textsuperscript{163} Some amount is the cost of a more stable, more resilient system. According to Nassim Taleb, “Layers of redundancy are the central risk management property of [complex] systems.”\textsuperscript{164}

In recent years we have witnessed firsthand the perils of relying on an outmoded system. On May 6, 2010, the Dow Jones Industrial Average experienced the greatest single day fluctuation in its history. In a matter of minutes, the market plunged nearly 1,000 points and then almost as quickly recovered.\textsuperscript{165} The proximate cause of this so-called “Flash Crash” remains a matter of debate, but it didn’t help that during critical minutes the data flow between the three largest U.S. exchanges, NASDAQ, NYSE Arca, and CME, was disrupted.\textsuperscript{166} As stock trading increasingly goes electronic, the U.S. market system is under the auspices of Regulation NMS, a nearly ten-year-old SEC rule that some observers blame for some of the recent market dislocations.\textsuperscript{167} Preventing these sorts of market disruptions requires an investment in the technology and infrastructure, including the governing regulatory structure, to ensure that information flows smoothly between the major trading venues.

The ideas I am promoting here are not as novel as they may first appear. For the better part of a decade, regulators in the U.K. and E.U. have been

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\textsuperscript{162} For an extended account of the various types of market failure, see John Cassidy, How Markets Fail: The Economics of Rational Irrationality (2009).
\textsuperscript{164} Taleb, supra note 99, at 44.
\textsuperscript{166} See U.S. SEC. & EXCH. COMM’N & COMMODITY FUTURES TRADING COMM’N, FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010 2 (Sept. 30, 2010) (attributing the volatility to a single firm’s order to sell a large number of electronic S&P 500 futures); David Easley, M. López de Prado & Maureen O’Hara The Microstructure of the “Flash Crash”: Flow Toxicity, Liquidity Crashes and the Probability of Informed Trading, 37 J. PORTFOLIO MGMT., no. 2, 2011, at 119 (attributing the crash to a phenomenon dubbed “order flow toxicity” or a cascading effect caused by a disruption in the liquidity process).
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experimenting with regulatory strategies focused on economic cost-benefit analysis and impact assessment, which has been dubbed, “better regulation.”¹⁶⁸ These efforts aim to put financial regulation on a more scientific footing by emphasizing evidence-based analysis, consistency in application, and an open dialogue between regulators and market participants.¹⁶⁹ In the United States, the SEC has taken the lead in using studies and empirical research to improve rulemaking.¹⁷⁰ Famously, in 2004, the SEC initiated a yearlong study to assess the impact of the uptick rule on stock prices and volatility, which had been in place since 1938.¹⁷¹ As a result of their findings, the SEC repealed the rule in 2007.¹⁷² Before adopting new rules under Regulation NMS in 2005, the SEC staff conducted ten studies and solicited testimony from dozens of industry experts, practitioners, and academics.¹⁷³ Even the U.S. Department of Treasury, through the new Office of Financial Research created under Dodd-Frank, has taken the first steps toward a more bottom-up approach by conducting a study of the use of agent-based modeling for analyzing threats to financial stability.¹⁷⁴ Successes in other fields suggest that these sorts of thoughtful, evidence-based approaches to regulatory reform can work. For example, in the 1990s,

¹⁶⁹ Id. at 15 (“International cooperation and dialogue is essential”).
¹⁷² For a summary of these efforts, see Spotlight On: Regulation NMS, SEC & Exch. Comm’n, http://www.sec.gov/spotlight/regnms.htm (last modified June 7, 2010).
policymakers learned how to improve welfare reform from the trials and errors of various state and federal programs. The result was, as one commentator put it, “one of the most successful reforms of a domestic federal government program in the United States in the past several decades, and is an imperfect but practical prototype for how an experimental regime can help improve policy.”

A similar success in financial regulatory reform would do more to promote the stability of the American economy than any number of SIFI designations.

Information is the lifeblood of markets. Therefore, regulation that enhances information flow and helps participants adapt to changing circumstances will improve the stability and efficiency of the market. Imperfect knowledge is not a challenge that can be overcome, but an unavoidable fact that must be accepted. All complex systems are susceptible to failure. A better paradigm of systemic risk regulation must take the realities of complex systems—both their benefits and their weaknesses—into account. The most productive function of market regulation is to encourage the dissemination of information and to support the structures that allow for full and fair competition. If the goal of market regulation is to improve the functioning of the market, then the way to do that is by promoting and enhancing the core principles of market efficiency directly, through clear and concise market-based rules, and not indirectly through intervention in the activities of individual firms.

V. CONCLUSION

*It ain't so much the things we don't know that get us into trouble. It's the things we know that just ain't so.*

As we saw in Section I, regulators have a large arsenal of regulatory tools at their disposal to shape market activities and influence market participants. Prudential regulation is best suited as a means to counterbalance the moral hazards that inhere to large firms with implicit (or explicit) government guarantees. When a firm becomes too big to fail, the government has a legitimate interest in seeing that the firm’s managers do not act irresponsibly with the public’s funds. In the absence of a legal means or the political will to breakup such institutions, officials have no choice but to take a hands on

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175 MANZI, supra note 89, at 186.

176 The quote is sometimes credited to Artemus Ward or Mark Twain, although a better guess may be the humorist Josh Billings. See RALPH KEYES, THE QUOTE VERIFIER: WHO SAID WHAT, WHERE, AND WHEN, 3 (2006).
approach to their supervision and regulation. Enhanced supervision can be an effective way to dampen the exuberance of moral hazard, but measures that only directly impact one firm at a time inevitably miss whole swaths of the market. In the early stages of the recent financial crisis, there was much public fretting about Citibank and its Enron-like use of off-balance sheet accounting, but even bigger problems, such as AIG’s mounting credit derivatives losses, went unnoticed and unchecked. A better approach would be to directly address the activities that cause systemic risk. That was the approach reflected in the Securities Act of 1933 and the Securities Exchange Act of 1934, the most ambitious—and effective—securities legislation of the 20th century. These acts work not by focusing on the practices of the largest firms, but by providing a framework for regulating all securities transactions anywhere in the United States. All regulation requires some amount of planning, but microprudential regulation of the sort promoted by Title I of Dodd-Frank requires more than most. It requires regulators to identify the most systemically important firms and the most systemically risky activities at those firms, and to devise ways to limit those activities without causing adverse effects on the rest of the market. To do this, the FSOC members need to understand the present state of the market, project its future course, and implement policy measures with sufficient alacrity to achieve their intended result. As we saw in Section III, the uncertainty inherent in the financial system prevents regulators from possessing knowledge sufficient to reliably predict the system’s future course from present conditions. This poses a significant if not fatal challenge to the FSOC model.

The main justification for using prudential regulation to combat systemic risk is that it is the best alternative to unfettered free markets and their periodic crises. But this view gives prudential regulation too much credit. As others have pointed out, the classic argument for prudential regulation “amounts to a justification for a lender of last resort function, typically held by the central bank, to supply liquidity and conceivably solvency support, and not necessarily for the whole apparatus of prudential supervision carried out by a regulatory authority. . .” Ultimately the question of what approach is

177 Note that even this is not always true. See supra note 152, at 174-81 (discussing Fannie Mae).
180 DAVIES & GREEN, supra note 13, at 17.
best is an empirical one. Complex systems are notoriously inhospitable to standard methods of scientific inquiry, and we will never know what might have happened if the FSOC had been around in time to prevent the collapses of Lehman Brothers, Bear Stearns, or AIG. But fortunately, we don’t need to be omniscient to take steps to improve the structure and functioning of the financial markets before the next crisis. If regulators show the restraint to follow a cautious, fact-based, incremental approach, they can effect positive changes that will reduce systemic risk. If they continue to exercise selective discretion through the implementation of prudential regulation, they run the risk of engendering a false sense of security.

In the meantime, what is to be done with the FSOC, one of the crowning achievements of the Dodd-Frank Act? With its impressive authority and Congressional mandate, it is unlikely to go away anytime soon. Yet, as we have seen, its prudential powers may prove counterproductive. In this regard, perhaps the FSOC is more like a doctor tending to a patient than we first thought, in that its best course might be to heed the old hospital adage, don’t just do something, stand there.