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Reading About the Financial Crisis: A Twenty-One-Book Review

Andrew W. Lo*

The recent financial crisis has generated many distinct perspectives from various quarters. In this article, I review a diverse set of twenty-one books on the crisis, eleven written by academics, and ten written by journalists and one former Treasury Secretary. No single narrative emerges from this broad and often contradictory collection of interpretations, but the sheer variety of conclusions is informative, and underscores the desperate need for the economics profession to establish a single set of facts from which more accurate inferences and narratives can be constructed. (*JEL* E32, E44, E52, G01, G21, G28)

1. Introduction

In Akira Kurosawa's classic 1950 film *Rashomon*, an alleged rape and a murder are described in contradictory ways by four individuals who participated in various aspects of the crime. Despite the relatively clear set of facts presented by the different narrators—a woman's loss of honor and her husband's death—there is nothing clear about the interpretation of those facts. At the end of the film, we're left with several mutually inconsistent narratives, none of which completely satisfies our need for redemption and closure. Although the movie won many awards, including an Academy Award for Best Foreign Language Film in 1952, it was hardly a commercial success in the United States, with total U.S. earnings of $96,568 as of April 2010.[1] This is no surprise; who wants to sit through 88 minutes of vivid story-telling only to be left wondering whodunit and why?

Six decades later, Kurosawa's message of multiple truths couldn't be more relevant as we sift through the wreckage of the worst financial crisis since the Great Depression. Even the Financial Crisis Inquiry Commission—a prestigious bipartisan committee of ten experts with subpoena power who deliberated for eighteen months,

* MIT Sloan School of Management and AlphaSimplex Group, LLC. I thank Zvi Bodie, Jayna Cummings, Janet Currie, Jacob Goldfield, Joe Haubrich, Debbie Lucas, Bob Merton, Kevin Murphy, and Harriet Zuckerman for helpful discussions and comments. Research support from the MIT Laboratory for Financial Engineering is gratefully acknowledged. The views and opinions expressed in this article are those of the author only, and do not necessarily represent the views and opinions of MIT, AlphaSimplex, any of their affiliates or employees, or any of the individuals acknowledged above.

[1] See http://www.the-numbers.com/movies/1950/0RASH.php. For comparison, the first Pokemon movie, released in 1999, has grossed $85,744,662 in the United States so far.

interviewed over 700 witnesses, and held nineteen days of public hearings—presented three different conclusions in its final report. Apparently, it's complicated.

To illustrate just how complicated it can get, consider the following "facts" that have become part of the folk wisdom of the crisis:

1. The devotion to the Efficient Markets Hypothesis led investors astray, causing them to ignore the possibility that securitized debt[2] was mispriced and that the real-estate bubble could burst.
2. Wall Street compensation contracts were too focused on short-term trading profits rather than longer-term incentives. Also, there was excessive risk-taking because these CEOs were betting with other people's money, not their own.
3. Investment banks greatly increased their leverage in the years leading up to the crisis, thanks to a rule change by the U.S. Securities and Exchange Commission (SEC).

While each of these claims seems perfectly plausible, especially in light of the events of 2007–09, the empirical evidence isn't as clear. The first statement is at odds with the fact that, prior to 2007, collateralized debt obligations (CDOs),[3] the mortgage-related bonds at the center of the financial crisis, were offering much higher yields than straight corporate bonds with identical ratings, apparently for good reason.[4] Disciples of efficient markets were less likely to have been misled than those investors who flocked to these instruments because they thought they had identified an undervalued security.

As for the second point, in a recent study of the executive compensation contracts at 95 banks, Fahlenbrach and Stulz (2011) conclude that CEOs' aggregate stock and option holdings were more than eight times the value of their annual compensation, and the amount of their personal wealth at risk prior to the financial crisis makes it improbable that a rational CEO knew in advance of an impending financial crash, or knowingly engaged in excessively risky behavior (excessive from the shareholders' perspective, that is). For example, Bank of America CEO Ken Lewis was holding $190 million worth of company stock and options at the end of 2006, which declined in value to $48 million by the end of 2008,[5] and Bear Stearns CEO Jimmy Cayne sold his ownership interest in his company—estimated at over $1 billion in 2007—for $61 million in 2008.[6] However, in the case of Bear Stearns and Lehman Brothers, Bebchuk, Cohen, and Spamann (2010) have argued that their CEOs cashed out hundreds of millions of dollars of company stock from 2000 to 2008, hence the remaining amount

[2] "Securitized debt" is one of the financial innovations at the heart of the crisis, and refers to the creation of bonds of different seniority (known as "tranches") that are fixed-income claims backed by collateral in the form of large portfolios of loans (mortgages, auto and student loans, credit card receivables, etc.).

[3] A CDO is a type of bond issued by legal entities that are essentially portfolios of other bonds such as mortgages, auto loans, student loans, or credit-card receivables. These underlying assets serve as collateral for the CDOs; in the event of default, the bondholders become owners of the collateral. Because CDOs have different classes of priority, known as "tranches," their risk/reward characteristics can be very different from one tranche to the next, even if the collateral assets are relatively homogeneous.

[4] For example, in an April 2006 publication by the *Financial Times*, reporter Christine Senior (2006) filed a story on the enormous growth of the CDO market in Europe over the previous years, and quoted Nomura's estimate of $175 billion of CDOs issued in 2005. When asked to comment on this remarkable growth, Cian O'Carroll, European head of structured products at Fortis Investments replied, "You buy a AA-rated corporate bond you get paid Libor plus 20 basis points; you buy a AA-rated CDO and you get Libor plus 110 basis points."

[5] These figures include unrestricted and restricted stock, and stock options valued according to the Black-Scholes formula assuming maturity dates equal to 70 percent of the options' terms. I thank Kevin Murphy for sharing these data with me.

[6] See Thomas (2008).

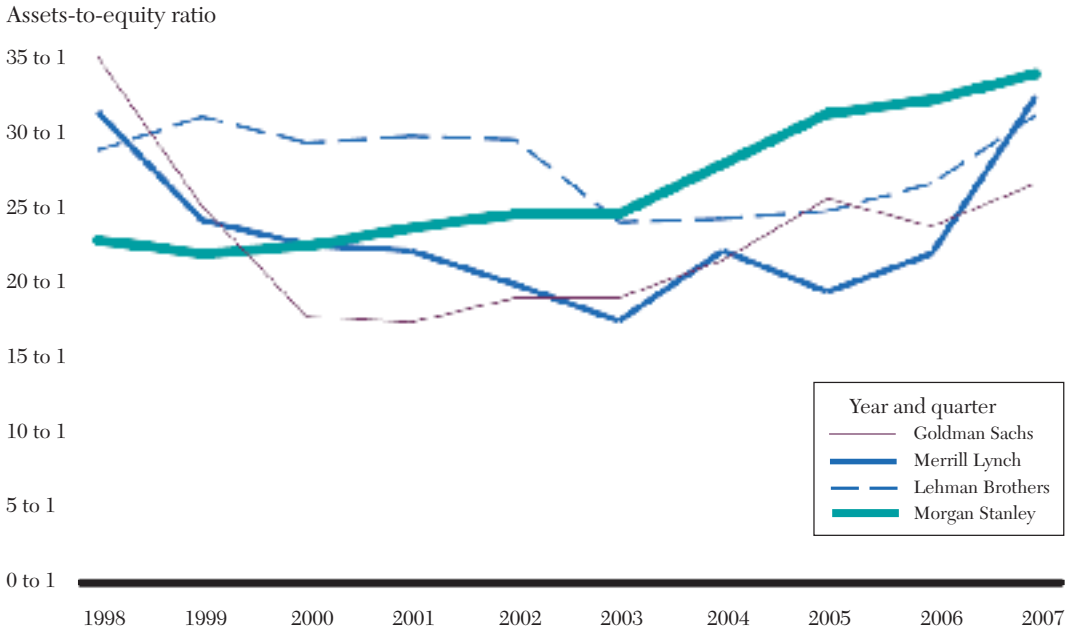

Figure 1. Ratio of Total Assets to Equity for Four Broker-Dealer Holding Companies from 1998 to 2007

Source: U.S. Government Accountability Office Report GAO–09–739 (2009, figure 6).

of equity they owned in their respective companies toward the end may not have been sufficiently large to have had an impact on their behavior. Nevertheless, in an extensive empirical study of major banks and broker-dealers before, during, and after the financial crisis, Murphy (2011) concludes that the Wall Street culture of low base salaries and outsized bonuses of cash, stock, and options actually reduces risk-taking incentives, not unlike a so-called "fulcrum fee" in which portfolio managers have to pay back a portion of their fees if they underperform.

And as for the leverage of investment banks prior to the crisis, figure 1 shows much higher levels of leverage in 1998 than 2006 for Goldman Sachs, Merrill Lynch, and Lehman Brothers. Moreover, it turns out that the SEC rule change had no effect on leverage restrictions (see section 4 for more details).

Like World War II, no single account of this vast and complicated calamity is sufficient to describe it. Even its starting date is unclear. Should we mark its beginning at the crest of the U.S. housing bubble in mid-2006, or with the liquidity crunch in the shadow banking system[7] in late 2007, or with the bankruptcy filing of Lehman Brothers and

[7] The term "shadow banking system" has developed several meanings ranging from the money market industry to the hedge fund industry to all parts of the financial sector that are not banks, which includes money market funds, investment banks, hedge funds, insurance companies, mortgage companies, and government sponsored enterprises. The essence of this term is to differentiate between parts of the financial system that are visible to regulators and under their direct control versus those that are outside of their vision and purview. See Pozsar, et al. (2010) for an excellent overview of the shadow banking system.

the "breaking of the buck"[8] by the Reserve Primary Fund in September 2008? And we have yet to reach a consensus on who the principal protagonists of the crisis were, and what roles they really played in this drama.

Therefore, it may seem like sheer folly to choose a subset of books that economists might want to read to learn more about the crisis. After all, new books are still being published today about the Great Depression, and that was eight decades ago! But if Kurosawa were alive today and inclined to write an op-ed piece on the crisis, he might propose *Rashomon* as a practical guide to making sense of the past several years. Only by collecting a diverse and often mutually contradictory set of narratives can we eventually develop a more complete understanding of the crisis. While facts can be verified or refuted—and we should do so expeditiously and relentlessly—we must also recognize the possibility that more complex truths are often in the eyes of the beholder. This fact of human cognition doesn't necessarily imply that relativism is correct or desirable; not all truths are equally valid. But because the particular narrative that one adopts can color and influence the subsequent course of inquiry and debate, we should strive at the outset to entertain as many interpretations of the same set of objective facts as we can, and hope that a more nuanced and internally consistent understanding of the crisis emerges in the fullness of time.

To that end, I provide brief reviews of twenty-one books about the crisis in this essay, which I divide into two groups: those authored by academics, and those written by journalists and former Treasury Secretary Henry Paulson. The books in the first category are:

- Acharya, Richardson, van Nieuwerburgh, and White, 2011, *Guaranteed to Fail: Fannie Mae, Freddie Mac, and the Debacle of Mortgage Finance*. Princeton University Press.
- Akerlof and Shiller, 2009, *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton University Press.
- French et al., 2010, *The Squam Lake Report: Fixing the Financial System*. Princeton University Press.
- Garnaut and Llewellyn-Smith, 2009, *The Great Crash of 2008*. Melbourne University Publishing.
- Gorton, 2010, *Slapped by the Invisible Hand: The Panic of 2007*. Oxford University Press.
- Johnson and Kwak, 2010, *13 Bankers: The Wall Street Takeover and the Next Financial Meltdown*. Pantheon Books.
- Rajan, 2010, *Fault Lines: How Hidden Fractures Still Threaten the World Economy*. Princeton University Press.
- Reinhart and Rogoff, 2009, *This Time Is Different: Eight Centuries of Financial Folly*. Princeton University Press.
- Roubini and Mihm, 2010, *Crisis Economics: A Crash Course in the Future of Finance*. Penguin Press.
- Shiller, 2008, *The Subprime Solution: How Today's Global Financial Crisis Happened and What to Do About It*. Princeton University Press.
- Stiglitz, 2010, *Freefall: America, Free Markets, and the Sinking of the World Economy*. Norton.

[8] This term refers to the event in which a money market fund can no longer sustain its policy of maintaining a $1.00-per-share net asset value of all of its client accounts because of significant market declines in the assets held by the fund. In other words, clients have lost part of their principal when their money market fund "breaks the buck" and its net asset value falls below $1.00.

and those in the second category are:

- Cohan, 2009, *House of Cards: A Tale of Hubris and Wretched Excess on Wall Street*. Doubleday.
- Farrell, 2010, *Crash of the Titans: Greed, Hubris, the Fall of Merrill Lynch, and the Near-Collapse of Bank of America*. Crown Business.
- Lewis, 2010, *The Big Short: Inside the Doomsday Machine*. Norton.
- Lowenstein, 2010, *The End of Wall Street*. Penguin Press.
- McLean and Nocera, 2010, *All the Devils Are Here: The Hidden History of the Financial Crisis*. Portfolio/Penguin.
- Morgenson and Rosner, 2011, *Reckless Endangerment: How Outsized Ambition, Greed, and Corruption Led to Economic Armageddon*. Times Books/Henry Holt and Company.
- Paulson, 2010, *On the Brink: Inside the Race to Stop the Collapse of the Global Financial System*. Business Plus.
- Sorkin, 2009, *Too Big to Fail: The Inside Story of How Wall Street and Washington Fought to Save the Financial System from Crisis—and Themselves*. Viking.
- Tett, 2009, *Fool's Gold: How the Bold Dream of a Small Tribe at J.P. Morgan Was Corrupted by Wall Street Greed and Unleashed a Catastrophe*. Free Press.
- Zuckerman, 2009, *The Greatest Trade Ever: The Behind-the-Scenes Story of How John Paulson Defied Wall Street and Made Financial History*. Broadway Books.

I didn't arrive at this particular mix of books and the roughly even split between academic and journalistic authors with any particular objective in mind; I simply included all the books that I've found to be particularly illuminating with respect to certain aspects of the crisis. Reviewing the books authored by our colleagues is, of course, natural. The decision to include other books in the mix was motivated by the fact that, as economists, we should be aware not only of our own academic narratives, but also of populist interpretations that may ultimately have greater impact on politicians and public policy. Whereas the academic authors are mainly interested in identifying underlying causes and making policy prescriptions, the journalists are more focused on personalities, events, and the cultural and political milieu in which the crisis unfolded. Together, they paint a much richer picture of the last decade, in which individual actions and economic circumstances interacted in unique ways to create the perfect financial storm.

Few readers will be able to invest the time to read all twenty-one books, which is all the more motivation for surveying such a wide range of accounts. By giving readers of the *Journal of Economic Literature* a panoramic perspective of the narratives that are available, I hope to reduce the barriers to entry to this burgeoning and important literature. In section 2, I review the books by academics; in section 3, I turn to the books by journalists and former Treasury Secretary Paulson; and I conclude in section 4 with a brief discussion of the challenges of separating fact from fantasy with respect to the crisis.

2. *Academic Accounts*

Academic accounts of the crisis seem to exhibit the most heterogeneity, a very positive aspect of our profession that no doubt contributes greatly to our collective intelligence. By generating many different narratives, we're much more likely to come up with new insights and directions for further research than if we all held the same convictions. Of these titles, Robert J. Shiller's *The Subprime Solution: How Today's Global Financial Crisis Happened, and What to Do about It* was the first out of the

gate. Written for the educated layperson, it appears from internal evidence that Shiller's short book was completed by April 2008, and published in August of that year. This book captures the view, which became current at the time, that the crisis was principally about the unraveling of a bubble in housing prices. Shiller ought to know about such things: years ago, he and his collaborator Karl E. Case pioneered a new set of more accurate home-price indexes based on repeat sales rather than appraisal values, now known as the "S&P/Case–Shiller Home Price Indices" and maintained and distributed by Standard & Poor's. Thanks to Case and Shiller, we can now gauge the dynamics of home prices both regionally and nationally.

Much of Shiller's exposition on real estate bubbles will be familiar to readers of the second edition of *Irrational Exuberance*. Rather than scarcity driving up real estate prices—a theory that he demonstrates is incomplete at best—he postulates a general contagion of mistaken beliefs about future economic behavior, citing Bikhchandani, Hirshleifer, and Welch's (1992) theoretical work on informational cascades to support this notion, but also John Maynard Keynes's famous concept of "animal spirits." Overall, Shiller's discussion of underlying causes is rather thin, perhaps due to his writing for a general audience. Shiller would expand more fully on his theory of animal spirits in his 2009 book with George Akerlof (reviewed below), as Shiller mentions in his acknowledgements, so perhaps a little intellectual "crowding out" took place as well.

With the benefit of three short years of hindsight, Shiller's policy prescriptions appear laudable but almost utopian. Past the necessity of some bailouts, Shiller proposes "democratizing finance—extending the application of sound financial principles to a larger and larger segment of society" (115). This follows from his theoretical premise: if bubbles are caused by the contagion of mistaken beliefs about economic outcomes, then the cure must be inoculation against further mistaken beliefs and eradication of currently mistaken ones. Much as the government plays a vital role in public health against the spread of contagious disease, Shiller recommends government subsidies to provide financial advisors for the less wealthy, and greater government monitoring of financial products, analogous to the consumer product regulatory agencies already in existence in the United States. More speculatively, he also suggests using financial engineering to create safer financial products and markets. Finally, since bubbles represent a failure of the correct information to propagate to the public, Shiller calls for greater transparency, improved financial databases, and new forms of economic measurement made more intuitive for the general public.

Shiller's stylized description of the housing bubble largely passes over how its bursting transmitted ill effects to the rest of the economy. In August 2008, however, at the same time that his book was released, a much more detailed account of the mechanics behind the crisis in short-term credit markets was presented at the annual Jackson Hole Conference sponsored by the Federal Reserve Bank of Kansas City. The paper by Gary Gorton, simply titled, "The Panic of 2007," quickly became a hot topic of discussion among economists and policymakers, and—something new under the sun—a samizdat for interested laypeople on the Internet. This paper was republished in March 2010 with additional material and analysis on the shadow banking system as *Slapped by the Invisible Hand: The Panic of 2007*.

Much of Gorton's account is descriptive. Among other things, it's a crash course (no pun intended) in several specialized areas of financial engineering. Gorton begins with the basic building block, the subprime

mortgage,[9] describing each of the layers of a tall layer cake that we call securitized debt: how those subprime mortgages were used to create mortgage-backed securities, how those securities were used to create CDOs, why those obligations were bought by investors, who those investors were, and why their specific identities were important.

What Gorton describes is a machine dedicated to *reducing* transparency. Even today, it's still striking how the available statistics in his account dwindle as one gets to the upper layers of the cake. There are estimates, guesstimates, important numbers with one significant figure or less, and admissions of complete ignorance. Even the term "subprime" represents a reduction of transparency—Gorton details at some length the heterogeneity of the underlying mortgages in this category, a term that wasn't part of the financial industry's patois until recently.

With this description in hand, Gorton walks us through the panic of 2007. It begins with the popping of the housing bubble in 2006: house prices flattened and then began to decline. Refinancing a mortgage became impossible and mortgage delinquency rates rose. Up to this point, this account parallels Shiller's basic bubble story. Here, however, Gorton claims the lack of common knowledge and the opaqueness of the structures of the mortgage-backed securities delayed the unraveling of the bubble. No one knew what was going to happen—or rather, many people thought they knew, but no single view dominated the market. As a device for aggregating information, the market was very slow to come up with an answer in this case.

When the answer came to the market, it came suddenly. Structured investment vehicles and related conduits, which held a sixth of the AAA CDO tranches,[10] simply stopped rolling over their short-term debt. This wasn't due to overexposure in the subprime market: Gorton estimates that only two percent of structured investment vehicle holdings were subprime. Rather, as Gorton states, "investors could not penetrate the portfolios far enough to make the determination. There was asymmetric information" (125). At each step in the chain, one side knew significantly more than the other about the underlying structure of the securities involved. At the top layer of the cake, an investor might know absolutely nothing about the hundreds of thousands of mortgages several layers below the derivative being traded—and in normal situations, this does not matter. In a crisis, however, it clearly does. The rational investor will want to avoid risk; but as Gorton analogizes, the riskier mortgages in mortgage-backed securities had been intermingled like salmonella-tainted frosting among a very small batch of cakes that have been randomly mixed with all the other cakes in the factory and then shipped to bakeries throughout the country.[11] To continue Gorton's analogy, the collapse of the structured investment vehicle market, and the consequent stall in the repurchase

[9] The term "subprime" refers to the credit quality of the mortgage borrower as determined by various consumer credit-rating bureaus such as FICO, Equifax, and Experian. The highest-quality borrowers are referred to as "prime," hence the term "prime rate" refers to the interest rate charged on loans to such low-default-risk individuals. Accordingly, "subprime" borrowers have lower credit scores and are more likely to default than prime borrowers. Historically, this group was defined as borrowers with FICO scores below 640, although this has varied over time and circumstances, making it harder to determine what "subprime" really means.

[10] The term "AAA" refers to the bond rating of the CDO, which is the highest-quality rating offered by the various rating agencies.

[11] Gorton actually uses the analogy of *E. coli*-tainted beef in millions of pounds of perfectly good hamburger. I've exercised poetic license here by changing the reference to tainted frosting to maintain consistency with my layer-cake analogy, but I believe the thrust of his argument is preserved.

(repo) market, represented the market recalling the contaminated cakes.

Here the story becomes more familiar to students of financial crises. Dislocation in the repo market was the first stage of a much broader liquidity crunch.[12] Short-term lending rates between banks rose dramatically, almost overnight, in August 2007, as banks became more uncertain about which of their counterparties might be holding the cakes with tainted frosting and possibily shut down by food inspectors, i.e., which banks might be insolvent because of declines in the market value of their assets. Fears of insolvency will naturally reduce interbank lending, and this so-called "run on repo" (Gorton's term) caused temporary disruptions in the price discovery system of short-term debt markets, an important source of funding for many financial institutions. In retrospect, the events in August 2007 were just a warm-up act for the main event that occurred in September 2008 when Lehman failed, triggering a much more severe run on repo in its aftermath. Gorton believes that the regulatory insistence of mark-to-market pricing,[13] even in a market with little to no liquidity, exacerbated the crisis. Certainly there was a substantial premium between mark-to-market values and those calculated by actuarial methods. These lowered asset prices then had a feedback effect on further financing, since the assets now had much less value as collateral, creating a vicious circle.

Gorton strongly disagrees with the "originate-to-distribute" explanation of the crisis. This term, which became common in the summer of 2008, contrasts the previous behavior of financial institutions, which retained the loans and mortgages they approved, i.e., "originate-to-hold," to the relatively new behavior of creating and packaging loans as products for further sale. The originate-to-distribute explanation places the blame on the misaligned incentives of the underwriters, who believed they had little exposure to risk; on the rating agencies, which didn't properly represent risk to investors; and on a decline in lending standards, which allowed increasingly poor loans to be made. Here Gorton becomes much less convincing, especially in light of later information, and he argues as if proponents of the originate-to-distribute explanation are directly attacking the general process of securitization itself (which may have been the case at the Jackson Hole conference). But there is little in Gorton's account—or for that matter, the recent historical record—to suggest that the originate-to-distribute explanation is *excluded* by the asymmetric information hypothesis. Simply because many lenders went under after the fact doesn't mean that their incentives were necessarily aligned correctly beforehand. However, there is some anecdotal evidence to suggest that a number of the most troubled financial institutions ran into difficulties in 2007–08 precisely because they did *not* distribute all of the securitized debt they created, but kept a significant portion on their own balance

[12] The term "repo" is short for "repurchase agreement," a form of short-term borrowing used by most banks, brokerage firms, money market funds, and other financial institutions. In a typical repo transaction, one party sells a security to another party, and agrees to buy it back at a later date for a slightly higher price. The seller (borrower) receives cash today for the security, which may be viewed as a loan, and the repurchase of the same security from the buyer (lender) at the later date may be viewed as the borrower repaying the lender the principal plus accrued interest.

[13] "Mark-to-market pricing" is the practice of updating the value of a financial asset to reflect the most recent market transaction price. For illiquid assets that don't trade actively, marking such assets to market can be quite challenging, particularly if the only transactions that have occurred are "firesales" in which certain investors are desperate to rid themselves of such assets and sell them at substantial losses. This has the effect of causing all others who hold similar assets to recognize similar losses when they are forced to mark such assets to market, even if they have no intention of selling these assets.

sheets instead.[14] Perhaps with the benefit of more hindsight and data collection, we can get to the bottom of this debate in the near future.

With asymmetric information in the air, one might have expected Akerlof and Shiller's *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*, released in January 2009, to have touched on the topic, especially since Akerlof's classic 1970 paper, "The Market for 'Lemons'," launched this entire literature. Instead, *Animal Spirits*, which Akerlof and Shiller began writing in 2003, attempts to rehabilitate John Maynard Keynes's concept of "animal spirits" into a broad interpretive framework for studying less quantitative economic phenomena, among them confidence, fairness, corruption, the money illusion, and stories, i.e., the power of narrative to shape events. Like Shiller's *The Subprime Crisis*, this is also meant for the advanced general reader, although earlier drafts were used in Shiller's course on behavioral economics at Yale. As a result, the book is variegated, but sometimes unfocused. While the insertion of material pertaining to the economic crisis isn't an afterthought, in some places, it feels like a ninety-degree turn away from the main thrust of their argument.

Akerlof and Shiller clearly hold to the originate-to-distribute theory. Tellingly, they describe the run-up to the financial crisis in their chapter on corruption and bad faith in the markets. Where Gorton sees opaqueness dictated by the structure of the securities in question, Akerlof and Shiller see concealment, deception, and willful blindness. In their view, the worst offenses took place at the first link of the chain, among the subprime lenders who took advantage of borrower ignorance. Later links in the chain had little incentive to investigate, and greater incentives to overlook or spin away flaws in earlier links.

These are serious allegations, and while there is no doubt that certain lenders did take advantage of certain borrowers, some empirical support would have been particularly welcome at this point, especially because the reverse also occurred. During the frothiest period of the housing market, stories abounded of homeowners flipping properties after a year or two, generating leveraged returns that would make a hedge-fund manager jealous. Loose lending standards also benefited first-time homebuyers who couldn't otherwise afford to purchase, and many of these households haven't defaulted and are presumably better off. Moreover, even among the households who *have* defaulted, while many are certainly worse off, there are also those who can afford to pay their mortgage payments but have chosen to "strategically default" because it's simply more profitable to do so. Are we certain that predatory lending was more rampant than predatory borrowing, and that the cumulative benefits to all homeowners are less than the cumulative costs? I'm not advocating either side of this debate—in fact, it's difficult to formulate a sensible prior as to which is more likely—but I believe this is a sufficiently important issue to warrant gathering additional facts to support a particular conclusion.

In the end, Akerlof and Shiller believe, there was "an economic equilibrium that encompassed the whole chain" (37), where no one had any incentive to rock the boat—until housing prices began to drop. As with Shiller's earlier book, their policy recommendations for the financial crisis appear almost naively optimistic with the passage

[14] These were presumably the "troubled assets" that the government's $700 billion Troubled Asset Relief Program (TARP) were meant to relieve. For example, on October 28, 2008, Bank of America, BNY Mellon, Citigroup, Goldman Sachs, JPMorgan Chase, Morgan Stanley, State Street, and Wells Fargo received a total of $115 billion under the TARP program (see GAO 2009).

of time. They suggest two stimulus targets. First, the proper fiscal and monetary stimulus needed to bring the American economy back to full employment. The proper target, they believed, would be easy to administer: "The Federal Reserve, the Congress, and the Council of Economic Advisers are all experienced in making such predictions" (89). Second, they propose a target for the proper amount of credit needed to keep the economy at full employment. In retrospect, this—the more speculative of their proposals—is the one that has been most fully realized. In January 2009, it wasn't yet clear that the political economy of the financial crisis would favor the rebuilding of the credit markets over the pursuit of full employment.

By the fall of 2009, the outlines of the early stages of the financial crisis were clear, although the exact causation (or the blame) remained a point of vigorous contention. With the September publication of *This Time Is Different: Eight Centuries of Financial Folly*, Carmen M. Reinhart and Kenneth Rogoff provided invaluable historical data and context for understanding the crisis. Among all the books reviewed in this article, theirs is the most richly researched and empirically based, with almost 100 pages of data appendices. If all authors of crisis books were required to support their claims with hard data, as Reinhart and Rogoff do most of the time, readers would be considerably better off and our collective intelligence would be far greater.

This vast compendium of financial crises showed that the 2007 subprime meltdown was neither unprecedented nor extraordinary when compared to the historical record. Reinhart and Rogoff briefly document the "this time is different" thinking among investors, academics, and policymakers. They link the rise of the housing bubble in particular and the rise of the financial industry in general to the large increase in capital inflows to the United States. The great size and central position of the American economy—the largest engine of growth in human history—didn't render it immune to basic forms of financial calamity. Nor, more disappointingly, did the expertise of its financial professionals or the strength of its financial institutions. Nor did the forces of globalization or innovation prevent the financial crisis—in fact, they may have provided it with new channels through which to propagate.

To respond to future crises, Reinhart and Rogoff suggest the further development of informational "early warning" systems and more detailed monitoring of national financial data, perhaps through a new international financial institution, similar to the development of standardized national account reporting after World War II. Their data appendices and analytics pave the way for such an initiative. They also warn about the recurrence of "this time is different" syndrome, something that observers since Charles Kindleberger (if not Charles Mackay) have warned against. Moreover, they preemptively dismiss future statements of "this time is different" based on the Lucas critique, Robert E. Lucas's famous macroeconomic dictum against historical prediction because simple linear extrapolations of the past don't take into account the sophistication of rational expectations. Reinhart and Rogoff argue that because the historical record shows that some nations have "graduated" from perennial financial instability to financial maturity, there is reason to hope that improved forms of self-monitoring and institutional advances can keep certain types of financial crises from happening, despite the implication of the Lucas critique that such predictions are futile.

An unusual perspective of the financial crisis appeared in the United States in November 2009 from the Australian economist Ross Garnaut in a book coauthored with journalist David Llewellyn-Smith. Written

originally for an Australian audience, *The Great Crash of 2008* gives a somewhat journalistic account of the events of the crisis through the summer of 2009, but one in which the authors describe the many firms and personalities involved in the crisis by name and by anecdote, with obvious relish. This was a necessity for them because most of the primary actors were unfamiliar to Australians, but the authors' specificity contrasts starkly with the greater abstraction and distance of most American academics in their formal accounts of the crisis (though not necessarily in op-ed pieces and less formal articles).

Australia's position as an English-speaking advanced economy, yet one still peripheral to the core global economies of the North, closely informs Garnaut and Llewellyn-Smith's account. Like Reinhart and Rogoff, they immediately tie the housing bubble to increased capital flows, especially those from China. They largely agree with the originate-to-distribute hypothesis, and they believe that regulatory capture and a culture of greed aided and abetted the development of the crisis. Where *The Great Crash of 2008* is most valuable for an American reader, however, is through its descriptions of parallel innovations in the Australian financial industry and in Australian political economy. Here, the authors postulate a contagion of *ideas* through the English-speaking world—the "Anglosphere"—causing economies such as Australia, the United States, and Great Britain to experience similar consequences, e.g., securitization, the shadow banking system, housing price booms, and a rise in executive remuneration, rather than such developments arising naturally and independently in response to local economic conditions.

If American academics had previously been circumspect in their accounts of the financial crisis, the gloves came off with the publication of Joseph Stiglitz's *Freefall: America, Free Markets, and the Sinking of the World Economy* in January 2010. Expanded in part from two earlier articles in *Vanity Fair* magazine, this book is Stiglitz's jeremiad as well as his explanation of the financial crisis. He begins his story in 2000 with the bursting of the Internet bubble. In his view, the housing bubble and the subprime mortgage crisis cannot truly be separated from the earlier dot.com boom and bust, but rather represent symptoms of a deeper systemic crisis among our policymakers and institutions. Instead of addressing the root problems underlying the earlier bubble, a dismantling of the regulatory apparatus, regulatory capture, and an explosion in untested financial innovations set the stage for the next crisis. Stiglitz fears that the pattern will repeat: that government half-measures—or actively bad policy decisions—in response to the subprime crisis will set up the conditions for an even greater crisis.

In many ways, Stiglitz's polemical tone belies the mainstream nature of his explanation. It is a variation of the originate-to-distribute theory, made rhetorically sharper with the revelations of venality and outright criminality among intermediate links in the subprime chain. The largest misaligned incentives, however, in Stiglitz's view, were found among the "too big to fail" financial institutions, which Stiglitz argues took excessive risk *because* they were too big to fail; that is, they were so large and essential to the functioning of the financial systems of the American (and global) economy that their managers behaved as though they would be bailed out despite making poor decisions.

While such vitriol accurately channels a significant portion of the public's reaction to the crisis, there's not much new in the way of data or economic analysis. It seems eminently plausible that "too big to fail" and implicit government guarantees could affect corporate strategy to some extent, but

quantifying the impact seems less obvious. In particular, to determine the effect that government bailouts might have on corporate risk-taking, it matters a great deal whether the bailouts are intended to rescue bondholders, equityholders, or both. This is where new economic analysis could have added real value. For example, given the empirical evidence in Fahlenbrach and Stulz (2011) and Murphy (2011) that CEOs' incentives seem highly aligned with shareholders, do implicit government guarantees cause shareholders to take on too much risk, in which case we need to focus on reducing the sizes of large financial institutions, as Johnson and Kwak (2010) propose (see below)? Or is this a reflection of deeper concerns regarding corporate governance and whether CEOs should be maximizing *stakeholder* wealth instead of shareholder wealth? Maximizing shareholder wealth is currently the focus of most U.S. CEOs and their executive compensation plans. However, some of the rhetoric in this debate suggests an unspoken desire for more inclusive policies, which would be quite a departure from the corporate governance structures of most Anglo-Saxon and common-law countries such as the United States and United Kingdom.[15] A more detailed fact-based analysis would have been particularly valuable in this instance.

The proper solution according to Stiglitz is a wholesale reformation of the American financial system on a scale not seen since the Great Depression. Much of *Freefall* laments the missed opportunity for such a reformation. Here, however, Stiglitz's account of the political economy behind the stimulus packages and bailouts becomes much too vague. It may fall to the political scientists rather than the economists to give us the complete story of what happened. Readers will likely find Stiglitz's moral fervor either refreshing or tedious, depending on their prior beliefs, but at least he's explicit about his convictions. However, he sometimes loses clarity with respect to his assertions of bad faith among principal players during the crisis. Stiglitz was certainly in a position to hear privileged information about private policy discussions—he credits the Obama administration's economic team with sharing their perspectives with him, despite his often profound disagreement with them. Still, many readers will have their curiosity piqued about the circumstances behind some of these disclosures; unfortunately, they may not get much satisfaction until Stiglitz publishes his memoirs.

Several attempts to place the financial crisis into a larger framework emerged in the spring of 2010. First published among these attempts was Simon Johnson and James Kwak's *Thirteen Bankers: The Wall Street Takeover and the Next Financial Meltdown*, released in March. Johnson and Kwak frame the financial crisis as another swing of the pendulum of the American political economy and its financial institutions. In their view, the concentration of power by financial elites in the American system—whom Johnson and Kwak characterize as "oligarchs"—leads to governmental financial institutions with strong private cross-interests and weak regulatory oversight, producing a financial environment prone to recurrent crises. On the other hand, when the government has played an aggressively hostile role against the concentration of financial power (as during the Andrew Jackson administration), its actions have resulted in a fragmented, weak, and vulnerable financial system. In their opinion, the most successful course has been the middle course, taken by Franklin Delano Roosevelt and his advisors in the early 1930s, which led to a half-century of strong finance without major financial crises.

Johnson and Kwak mark the turning point away from the older, safer, "boring" banking

[15] See Allen and Gale (2002).

regime to today's bigger, "exciting," more crisis-prone regime with the election of Ronald Reagan. Financial innovation and a wave of financial deregulation, made possible in the new political climate, reinforced each other, leading to increased profits and a rapid expansion of the financial sector. Banks also grew under deregulation—here, Johnson and Kwak's account doesn't fully explain their reasoning behind the resulting concentration, although the facts are hardly in dispute. By the 1990s, the American financial sector was able to exert further influence on the political process in a number of ways: lobbying, campaign contributions, and providing official Washington with a cadre of financial professionals who had internalized much of the new, "exciting" ethos of Wall Street.

According to Johnson and Kwak, this renewed regulatory capture by America's new masters of the universe set the stage for the boom and bust cycles of the late 1990s and onward. Moves toward greater financial regulation were actively driven back by the so-called oligarchs—in one of their examples, Brooksley Born, then head of the Commodity Futures Trading Commission, was blocked from issuing a concept paper on new derivatives regulation by the "thirteen bankers" of Johnson and Kwak's title. Financial institutions became "too big to fail," taking additional risk with the implicit (and possibly not-so-implicit) knowledge that should the worst happen, the United States government would likely rescue them from their financial folly. Once again, this glosses over the critical question of whether it is the bondholders or equityholders who get bailed out, and where more careful economic analysis is needed.

Johnson and Kwak diagnose a systemic problem of consolidation and influence, not merely of a small number of large financial institutions, but of an entire financial subculture. Their solution is quite simple: hard capitalization limits on the size of financial institutions. This, they believe, would cause these problems to unwind, piece by piece, initially by decreasing the threat of "too big to fail" banks. As the financial sector becomes less "exciting" under these new rules, the incentives for pursuing risky behavior will diminish. Eventually, this virtuous cycle ends with changes to the institutional culture of the financial sector, returning to its earlier norms.

Nouriel Roubini and Stephen Mihm's *Crisis Economics: A Crash Course in the Future of Finance* was published in May 2010, shortly after Johnson and Kwak's account. Roubini by this point had achieved a certain measure of notoriety outside of academia as the prophetic "Doctor Doom" of the financial media; his early warnings that the housing bubble could lead to systemic financial collapse led Roubini to become one of the few financial economists nicknamed after a comic book super-villain (a nickname in fact popularized by his coauthor in a *New York Times* profile).

Roubini and Mihm give a crisp exposition of the underlying mechanisms of the crisis. In Roubini's view, the financial crisis wasn't a rare, unpredictable "black swan" event, but rather a wholly predictable and understandable "white swan." Comparing it to recent crises in developing economies and historical crises in developed ones, Roubini and Mihm present a short primer on contagion, government intervention, and lender of last resort theory, using them to set up the heart of the book: its policy prescriptions. They propose a two-tier approach of short-term patches and long-term fixes. Most of the short-term proposals have to do with reforms to the financial industry, including increased transparency, changes to compensation structure, and increased regulation and monitoring of the securitization process, the ratings agencies, and capital reserve requirements.

In contrast, *Crisis Economics* prescribes much stronger medicine for the long term. Bubbles should be actively monitored and proactively defused by monetary authorities. Lobbying and the "revolving door" between finance and government should be severely restricted to prevent regulatory capture. To prevent what Roubini and Mihm call "regulatory arbitrage" by banks—what lawyers often refer to as "jurisdiction shopping"—a single, unified national authority should regulate and monitor financial firms, and strong international coordination is needed to prevent banks from engaging in regulatory arbitrage on a global scale. "Too big to fail" institutions should be broken up, whether under antitrust laws, or under new legislation that defines such institutions as a threat to the financial system. Finally, the separation between investment banking and commercial banking, which had existed under the Glass–Steagall Act, should return in an even stronger form. Given their premises, these suggestions make sense, but Roubini and Mihm avoid the difficult political questions of implementation.

May 2010 was also the month in which Raghuram G. Rajan's *Fault Lines: How Hidden Fractures Still Threaten the World Economy* was released. Rajan's arguments on the causes of the financial crisis are multiple and complicated, but they are all variations on the same theme: systematic economic inequalities, within the United States and around the world, have created deep financial "fault lines" that have made crises more likely to happen than in the past. Rajan begins with the United States, where there has been a long-term trend, he argues, of unequal access to higher education creating growing income inequality. To address the political effects of this inequality, leaders from both parties have pursued policies to broaden home ownership, e.g., through government-sponsored enterprises like Fannie Mae and Freddie Mac.[16] Political pressure caused these programs to extend easier credit to less suitable applicants and private firms followed the government's lead, culminating in the housing bubble of 2006 and its aftermath.

Each link in Rajan's causal chain is a compelling idea worthy of further consideration, characteristic of Rajan's method of argument. But does the chain truly hold? As with the well-known property of probabilities, even if each link has a high likelihood of being the "correct" causal relationship, a sufficiently long chain of independent events may still be extremely unlikely to occur. Of course, Rajan realizes the solution to this conundrum, and uses multiple chains of reasoning to create a stronger cable of analysis. He considers other "fault lines" such as the global capital imbalance, the traditionally weak social safety net in the United States, and the separation of business norms in the financial sector from those in the real economy, which Rajan witnessed firsthand.

He proposes a three-pronged attack against the conditions that made the financial crisis possible. First, he suggests a set of strong social policies to lower inequality in the United States, among them increasing educational access, universalizing health care, and decreasing the structural risks to personal labor mobility. Second, he recommends that international multilateral institutions develop relationships with the constituencies of their component nations, rather than functioning merely as a top-down council of ministers.

[16] "Fannie Mae" is the nickname of the Federal National Mortgage Association, a government-sponsored enterprise created by Congress in 1938 to "support liquidity, stability, and affordability in the secondary mortgage market, where existing mortgage-related assets are purchased and sold." "Freddie Mac" refers to the Federal Home Loan Mortgage Corporation, another government-sponsored enterprise created by Congress in 1970 with a charter virtually identical to Fannie Mae's. See http://www.fanniemae.com and http://www.freddiemac.com for further details.

More democratic input and greater transparency should, in Rajan's opinion, improve the quality of the decision-making process among the multilateral institutions on the one hand, and make their policy recommendations more palatable to their member nations on the other. This would allow greater international and domestic coordination regarding the global capital imbalance (and other pressing international issues).

Rajan proposes a complex set of carrots and sticks to defuse the bad incentives that have accumulated in the American financial sector. He believes risk was systematically underpriced in large part because of the financial sector's expectations of government intervention. Removing the implicit promise of intervention and the explicit promise of subsidies would eliminate this distortion. The government should especially remove itself from the secondary mortgage market as soon as possible, and reduce its role in the primary mortgage market. Even the role of deposit insurance, usually thought of as one of the centerpieces of American bank regulation, should be reconsidered according to him.

Meanwhile, financial corporate governance must reduce the amount of risk taken on by traders and companies. Instead of immediate compensation for investment strategies that might have hidden tail risk, Rajan proposes that a significant fraction of the bonuses generated by finance workers and management be held in escrow subject to later performance. This would have the effect of extending the time horizon used to calculate profit. If the traders and managers are acting rationally, this should, in theory, diminish tail risk.[17] At the highest levels, boards should choose prudent financial professionals who take an active role in their firms' operation.

Rajan believes the discipline of the market will not be enough, however. Other governmental regulation must simultaneously become more comprehensive and less sensitive to political over- or underreaction. In contrast to Johnson and Kwak, Rajan believes that fixed limits on bank size or activity are too crude and easily evaded, creating a new set of misaligned incentives for financial institutions. Rajan sees an active role for bank regulators and supervisors. Public transparency and bank supervision would serve as a check to excessive risk-taking by corporate governance. Like Roubini and Mihm, Rajan favors a modern version of the Glass–Steagall Act and other forms of asset segregation: this would diminish risk and eliminate a potential channel for a panic. Rajan admits that this would also increase a bank's borrowing costs, but he believes the tradeoff might be worthwhile. He also favors a prohibition against proprietary trading, not for its increased risks, but because of the potential abuse of asymmetric information by the banks.

In May 2010, a third crisis book was published, authored by fifteen financial economists including Rajan and Shiller: *The Squam Lake Report: Fixing the Financial System*. This bipartisan group originally met in the fall of 2008 at Squam Lake, New Hampshire, to discuss the long-term reform of the world's capital markets. This report cuts across a representative (but not necessarily complete) section of the political and ideological spectrum; as a result, many passages resemble carefully worded public statements released by an ecumenical group on a controversial tragedy. This report doesn't propose any consensus view among academic policymakers, but is more of an extended brainstorming session to find new policy solutions for an unprecedented crisis.

[17] It's worth noting that AIG had a broadly similar plan in place for its top executives during the run-up to the crisis.

Many of the Squam Lake group's proposals will already be familiar to readers of this review. The group proposes that each nation set up a systemic financial regulatory agency run by the central bank. In terms of transparency, these regulators should collect much broader standardized data on financial institutions, and this data should become public after an interval. Capital requirements should increase with the size, risk, and liquidity of assets. Governments shouldn't impose limits on executive compensation, but they should impose rules that financial institutions withhold full compensation for a fixed time period. Simply put, the government should be used to universalize regulation, but institutions should internalize the cost of their own failures.

Other proposals of the Squam Lake group are more novel. To maintain bank solvency, the group proposes that the government promote banks to issue a long-term convertible bond that converts to equity at very specific triggers during a crisis. In this way, instead of ad hoc government recapitalization during a banking crisis, the costs of recapitalization will be put on the bank's investors. To expedite a recovery, the group recommends that financial institutions maintain "living wills" to help regulators restructure them quickly in worst-case scenarios.

For problems specific to the recent crisis, however, the Squam Lake group offers fewer panaceas. The problem of systemic risk in credit default swaps (CDSs) is a difficult one,[18] but the Squam Lake Report can only suggest that the government encourage financial institutions to use a single, strongly regulated clearinghouse.[19] On other questions, such as the problem of runs on large brokers due to their unsegregated asset structure, the group cannot decide on a solution based on existing research. Interestingly, the group attempts to walk through how specific failures during the financial crisis, such as the collapse of Bear Stearns, would have played out had their recommendations been in place. Candidly enough, they see a modest improvement at the firm level, and a reduced cost to the taxpayer, but they make no claims that the financial crisis itself would have been averted.

Finally, in April 2011, Acharya, Richardson, van Nieuwerburgh, and White's *Guaranteed to Fail: Fannie Mae, Freddie Mac, and the Debacle of Mortgage Finance* was published. This is a key contribution to one of the most vexing problems from the epicenter of the crisis: the future of Fannie Mae and Freddie Mac. The authors trace the origin of their problems to Fannie Mae's flawed privatization during the Johnson administration (made largely for accounting reasons). Fannie Mae, and later Freddie Mac, had the ability to participate as a publicly traded company on the one hand, but maintained the privileges granted by its federal charter on the other. Financial markets believed that Fannie Mae and Freddie Mac had implicit guarantees on their holdings from the federal government, apparently with good reason. Following the deregulation of the mortgage industry during the Reagan administration, investors naturally preferred to invest in them rather than in truly private

[18] A "credit default swap" is an agreement between two parties in which one party agrees to pay the other party a prespecified amount of money in the event of a default on a third party's bond. Essentially a type of insurance contract, CDSs were used to provide credit protection for various mortgage-backed securities like collateralized debt obligations (CDOs), which was particularly popular among the most conservative investors in CDOs such as money market funds.

[19] A "clearinghouse" is a legal entity that serves as an intermediary between two counterparties so that if either one defaults on its obligation, the clearinghouse will fulfill that obligation. The presence of a clearinghouse greatly reduces "counterparty risk" and enhances the liquidity of the contracts traded, which is especially relevant for credit default swaps.

mortgage companies. Bipartisan policy goals made the enterprises politically untouchable, even while the evidence of their mismanagement grew. In effect, as the authors of *Guaranteed to Fail* point out, Fannie Mae and Freddie Mac were run as the world's largest hedge funds, and badly at that.

How to unwind this trillion-dollar problem? If much smaller institutions were already "too big to fail," Fannie Mae and Freddie Mac must represent a class unto themselves in terms of sheer size and the dollar-value of their implicit guarantees (estimated to be between $20 to $70 billion in present-value terms according to Lucas and McDonald (2011), depending on the assumptions used). Drawing on the example of the savings and loan crisis in the United States in the late 1980s and early 1990s, the authors propose that the government establish a "resolution trust corporation" to manage the slow liquidation of Fannie Mae and Freddie Mac assets—slow, so as not to destabilize the remaining mortgage-backed securities market. As the housing market improves, eventually the process can be accelerated. A similar procedure can take place with those Fannie Mae and Freddie Mac assets now held by the Federal Reserve.

The other half of this trillion-dollar problem, the authors agree, is to never let a similar situation arise again. The authors believe that the problem is inherent to government-sponsored enterprises with laudable social goals, especially in the housing market, and they point to similar but smaller failures in Germany and Spain. They reject full nationalization due to its enormous liability—Johnson had partially privatized Fannie Mae for much less—and for the likely political capture of its management. In a similar spirit, they are agnostic about full privatization, foreseeing that the largest private mortgage originators would simply induce enough regulatory capture to become government-sponsored enterprises in all but name. The authors attempt to split the difference by proposing a private/public partnership for the mortgage guarantee business only, the lower levels of the mortgage industry becoming fully private (although highly regulated). Finally, the authors believe the root cause of the mortgage finance debacle, and by extension, the entire global financial crisis from 2007—the American "addiction" to homeownership—should be treated posthaste.

3. *Journalistic Accounts*

While often overlooked by academic readers, the journalistic accounts of the financial crisis are complementary in many ways to their academic counterparts. If we return to the analogy of the financial crisis as a major war, then in the same way that the academic writers acted as the strategists, diplomats, and gadflies of the crisis, the financial reporters were the war correspondents. These journalists documented the campaigns, battles, and exceptional acts of courage and cowardice among individuals and battalions. Moreover, they describe elements of the crisis that, as a scientific discipline, economics has difficulty capturing: the role of motives, psychology, personality, and strong emotion. We have seen how Akerlof, Shiller, Stiglitz, Roubini, and others have touched upon the role of greed, fear, and anger in the housing bubble, the financial crisis, and its policy responses. By breaking down the macro-events of the crisis into many different personal stories, these accounts are actually literary attempts to make sense of the crisis from a micro-foundational level. It's difficult to speak of rational behavior in the aggregate when major economic decisions are made by an unrepresentative handful of people. While journalistic accounts of the crisis have the flaws of their genre—they are necessarily subjective, often moralistic, and they may attempt to shape a narrative beyond what

the facts will strictly bear—the accounts of economists and policymakers may have their own form of biases.

William Cohan's *House of Cards: A Tale of Hubris and Wretched Excess on Wall Street* was the first major journalistic account out of the gates, published in March 2009, almost a year to the day after the fall of Bear Stearns, which it recounts in great detail. Cohan, a former finance professional turned investigative reporter, documents the harrowing final days of the firm, and this morbidly fascinating tale reminds us that economics has few answers to liquidity crises, thin markets, and other situations where the price discovery mechanism fails to perform. As the financial analyst A. Gary Shilling (1993, 236) put it, "Markets can remain irrational a lot longer than you and I can remain solvent." In those circumstances, economic actors will necessarily fall back onto procedures which, almost by definition, will produce suboptimal outcomes, e.g., the fate of Bear Stearns. Cohan is also very strong in his portrayal of economic decision-making under stress and decision-making by small groups, two areas which have recently begun to receive more scholarly attention.[20]

Bear Stearns was the first of the major American banking firms to fall during the financial crisis, and it's commonly believed that it was also the weakest in terms of oversight, incorrectly aligned incentives, and organizational culture to handle the crisis. While this might be an example of fallacious post hoc reasoning, Cohan presents a case that Bear Stearns's dysfunctional management and aggressive corporate culture—even by the standards of Wall Street—made it particularly vulnerable. Unusually, several figures in Bear Stearns's management were tournament-caliber bridge players, including its last chairman, Jimmy Cayne, one of the best players in the world and notorious for his presence at tournaments and absence at Bear Stearns during the crisis. Cohan makes the intriguing implication that the *cognitive* skills involved in playing world-class bridge might distort the skills involved in making financial decisions at their highest levels.

The spring of 2009 also saw the release of Gillian Tett's *Fool's Gold: The Inside Story of J.P. Morgan and How Wall St. Greed Corrupted Its Bold Dream and Created a Financial Catastrophe* in May. Tett, the former global markets editor and current U.S. managing editor of the *Financial Times*, reconstructs the early history of the development of the credit derivatives market, which played a key role in the subprime crisis. If Cohan's account was the view from Bear Stearns, Tett's account is very much the view from J.P. Morgan (now formally JPMorgan Chase). Tett traces the origin of credit derivatives to an initiative of Morgan's swaps team at a Palm Beach resort hotel in 1994 (Tett mentions, in passing, earlier, less successful innovations in default-risk derivatives at Merrill Lynch and Bankers Trust). In a heady intellectual atmosphere of Friedrich von Hayek and Eugene Fama, this young team sought to create a successful derivative product that would protect against default risk, something all lending institutions have to deal with. This product would combine the virtuous motive of helping to expand capital into the greater economy with the self-interested motive of helping to expand Morgan's share of the derivatives market. Banks for the first time would be able to make loans without carrying the associated credit risks of those loans, which would be transferred to the buyers of the derivative.

At the cutting edge of financial engineering for its time, these new derivatives were "technically sweet," to borrow J. Robert Oppenheimer's postwar description of the atomic bomb. As a product, their design principles were similar to other consumer

[20] For the former, see Kowalski-Trakofler, Vaught, and Scharf (2003); for the latter, see Woolley et al. (2010).

success stories: they were easy for the investor to buy and sell; they could use a wide variety of starting materials in their bundled loans through the securitization process; and they conformed to (or, more strictly speaking, evaded) government and industry standards. Morgan's first BISTROs—broad index secured trust offerings—were issued in December 1997, and the product quickly became a hot item.

Tett's later story is primarily one of corporate culture and intellectual contagion. Tett, who began her career as a social anthropologist, has a fine eye for the group dynamics behind these processes. Financial firms throughout the United States and Europe quickly adopted the basic forms of Morgan's innovations, resulting in a Cambrian explosion of new derivatives—to use Tett's terminology, derivatives "perverted" from their original form and intent. At the same time, however, Morgan kept its original worries about "super-senior" risk and the lack of provenance within mortgage bundles to itself. The merger of Morgan with Chase Manhattan introduced a new, risk-seeking element to the culture of the new JPMorgan Chase, driving away most of J.P. Morgan's earlier talent, and paradoxically spreading new financial innovations to much less risk-averse corporate cultures. A later merger with Bank One introduced new management headed by Jamie Dimon to JPMorgan Chase, which consequently became concerned again about hidden risk within its derivative products. Tett makes the case that Dimon's skills—including his famous insistence on a "fortress balance sheet"—allowed JPMorgan Chase to survive the crisis when some of its largest competitors did not.

During the autumn of 2009, *New York Times* columnist Andrew Ross Sorkin published *Too Big to Fail: The Inside Story of How Wall Street and Washington Fought to Save the Financial System—and Themselves*. Its release came a little over a year after the critical events of September 2008 (speaking generally for all these books, one has to be impressed by their speed from crisis to print). Sorkin's account is perhaps the best single descriptive narrative of the top levels of the 2008 phase of the crisis that we have, and as memories fade, self-justifications harden, and participants leave the scene, it's likely to remain the best anecdotal summary of these events. As one of the *New York Times* reporters covering the crisis, Sorkin had an unusual amount of access to participants and observers both during and after the events of 2008. *Too Big to Fail* must represent the distillation of hundreds, if not thousands of hours of off-the-record interviews, tapes, videos, and more conventional sources.

However, Sorkin's wide scope and multiple viewpoints of the crisis represent a tradeoff with respect to deeper analysis. His book is probably best read in conjunction with other accounts as a reference point. For example, it throws former Treasury Secretary Henry M. Paulson's memoir (see below) into an entirely different light when Sorkin reveals that Paulson's deputy would routinely warn visitors that Paulson had no "social emotional quotient" at all. *Too Big to Fail* will also likely be used for later memoirists to craft their own accounts of events, an influence that future historians of the crisis should keep in mind. Along those historical lines, one wishes there was a convenient date- and time-stamp of the events in the page margin—or in the corner of the viewing screen—as one follows individual threads of the complicated decision-making processes Sorkin recounts. In fact, Sorkin's narrative would make an excellent front end to a multimedia database of materials pertaining to the crisis.

That fall also saw the publication of a book about the other "Paulson," Gregory Zuckerman's *The Greatest Trade Ever: The Behind-the-Scenes Story of How John Paulson Defied Wall Street and Made Financial History*, published in November

2009. Despite their eight-hundred year history, bubbles are still rather mysterious economic phenomena. One deep mystery of bubbles is their asymmetry. Why do so few investors try to take advantage of an obvious bubble? And why do even fewer investors manage to profit once a bubble bursts? Zuckerman, a reporter for the *Wall Street Journal*, tells the riveting story of the largest single beneficiary of the collapse of the housing bubble, a previously unknown hedge-fund manager named John Paulson.

Why did John Paulson succeed? Paulson's rare (but not unique) insight was to purchase CDS insurance on the most risky slices of mortgage bonds, the BBB tranches. These bonds would be the first to be hit in the event of default, which Paulson saw as inevitable in the collapse of the housing bubble. Derivative contracts like CDSs were generally unpopular because they represented "negative carry" trades, a situation in which buyers of such contracts are subject to a steady stream of sure losses. Its payoffs are similar to playing a slot machine, constantly putting in coins in the hopes of an enormous but uncertain jackpot some time in the future. In a normal market, someone obsessively buying CDS insurance would have a similar financial fate as someone obsessively playing the slots. Astonishingly, Paulson's initial purchases not only failed to run up the price of the insurance contracts, but the sellers tried to convince him he was making a mistake. The information-gathering function of the price discovery mechanism was clearly awry. Paulson's uniqueness came from his conviction, his deep pockets, and his ability to get out of his position. Without any single one of those qualities, Zuckerman implies, Paulson's record-breaking $4 billion payout in 2007 would have been much less spectacular.

Former Secretary of the Treasury Henry M. Paulson's account of the crisis—*On the Brink: Inside the Race to Stop the Collapse of the Global Financial System*—was released in February 2010. At first glance, Paulson's memoir appears to be derived from his personal diary of the crisis, revised and edited for publication. In fact, *On the Brink* is an almost wholly synthetic day-by-day account of the escalating series of crises during Paulson's time at Treasury, based on his prodigious memory, incomplete phone logs, and personal conversations with many of its participants after the fact (Paulson states he does not use email.)

It's become a truism that one should read memoirs by people at the center of great historical events with a careful eye toward score-settling, self-justification and, more rarely, self-blame; *On the Brink* would be unique if it lacked those elements. For the most part, however, Paulson presents himself as a competent man dealing with events almost beyond his control, often mistaken or uncertain about the magnitude of each impending phase of the crisis taking place while he and the Treasury Department managed to weather the collapse of Bear Stearns, Lehman Brothers, Fannie Mae, and Freddie Mac, and the financial near-apocalypse of September 2008.

In that respect, *On the Brink* is very much the Treasury view of the crisis of 2008. Similar memoirs from Timothy Geithner or Ben Bernanke will probably be some time in coming. In the meantime, however, policy-minded readers will find much to think about regarding the formal and informal constraints on the power of the United States's monetary institutions. One striking example is the policy aversion at the time to any cost figure near a trillion dollars or higher. Paulson and his colleagues believed that legislators would be too hostile to a trillion-dollar estimate for the Troubled Assets Relief Program, and instead chose $700 billion as the least-bad figure that might accomplish their goals. As it happened, Paulson was still surprised at the hostility he received from lawmakers. Was this

a case of political timidity or Hayekian local knowledge? Overall, Paulson's account of the crisis isn't particularly analytical, being more akin to a boxer's account of a fight the morning after, but it provides much raw material for subsequent analysis by others.

Of all the financial journalists in this review, best-selling author Michael Lewis is probably the best known. A former bond salesman at Salomon Brothers in the 1980s, his memoir of his short time on Wall Street, *Liar's Poker*, has become a financial classic. More recently, his book on the economics of baseball team development, *Moneyball*, has catalyzed popular interest in the use of statistical innovation in professional sports—perhaps the first time in history a bestseller has made statistics cool. *The Big Short: Inside the Doomsday Machine*, published in March 2010, examines the crisis from a similar perspective to Zuckerman's, by profiling a group of people who profited from the crisis. This is apparently something of a coincidence: Lewis read the coverage of John Paulson in the *Wall Street Journal*, while Zuckerman had read Lewis's elegy for the old Wall Street in *Portfolio* magazine which became the first and last sections of *The Big Short*.

Only a very few contrarians, outsiders, malcontents, and naifs bet against the housing bubble in Paulson's manner—Lewis estimates between ten and twenty people worldwide—and *The Big Short*, a rather short book itself, describes a significant fraction of them.[21] This is an extraordinary level of uniformity of opinion, and it's no surprise that the dissidents from the mainstream view were, at first glance, marginal figures at best, and more often considered crackpots. The reasons for this uniformity are complex. Lewis believes the past successes of Wall Street, and the enormous energies of innovation and profit which they unleashed, embedded false assumptions deep into the culture of Wall Street, assumptions that blinded the vast majority of its participants to the possibility that they might be mistaken. In Lewis's opinion, the financial crisis marked the passing of a fascinating but flawed cultural era on Wall Street.

In another coincidence of timing, financial journalist Roger Lowenstein's *The End of Wall Street* was published in April 2010, shortly after Lewis's elegy to the old Wall Street appeared. Lowenstein is perhaps best known for *When Genius Failed*, his account of the collapse of Long-Term Capital Management. *The End of Wall Street* is a similar chronicle of the top levels of the financial crisis, from large mortgage firms to banks to official Washington. Unlike Sorkin's account, Lowenstein's narrative presents a highly linear view of the crisis, with banks and institutions falling down like dominoes in a row. This is a legitimate approach, but it fails to capture the sense of a tectonic shift in the markets in 2007 and 2008. Lowenstein's later publication date, however, allows him to explore the continuation of economic policy in the new Obama administration, the beginnings of the new low-lending, high-unemployment era that followed, and the early political conflicts over governmental economic stimulus.

Lowenstein views the financial crisis as a failure of the market system and postindustrial capitalism, a sentiment that manages to sound surprisingly conventional in his hands—a measure, perhaps, of the depths of the crisis. Intriguingly, he considers the crisis a natural consequence of a financial system that, rather than extracting Marxist super-profits from society, extracted risk from its investments and dumped it on those members of society least able to handle it. The individual firm reduces its risk, but society as a whole has its risk increased. There

[21] Two of these figures, the Deutsche Bank trader Greg Lippmann and the neurologist turned hedge fund manager Michael Burry, were also profiled in Zuckerman's book.

are several economics and finance Ph.D. theses that need to be written to sort out this one idea.

In November 2010, Greg Farrell's book *Crash of the Titans: Greed, Hubris, the Fall of Merrill Lynch, and the Near-Collapse of Bank of America* came out. Farrell, a correspondent for the *Financial Times*, has written a strong narrative business history of Merrill Lynch in its final months, and the peculiar merger with Bank of America that followed in late 2008. Unlike earlier accounts described here, Farrell's book lacks a strong analytical focus, perhaps because by this time the basic narrative of the financial crisis seemed like well-trodden ground. Farrell employs a personality-driven model regarding the behavior of firms: personalities at the top create incentives (or disincentives) for its employees to follow, rather than the firm following the dictates of the market. For example, Merrill's adoption of a heavy load of CDOs is presented as a consequence of its chief executive Stanley O'Neal's dismantling of Merrill's earlier corporate culture rather than market competition or opportunities per se.

If a rising tide lifts all boats, a perfect storm will sink even the soundest. In Farrell's account, once again we see how the financial crisis exacerbated preexisting dysfunctions in the management structure, oversight, and corporate governance of financial institutions. According to Farrell, Merrill Lynch's final CEO, John Thain, appears to have miscalculated the length and depth of the storm of the crisis. Thain's guarded optimism that the crisis would pass and the market would rebound led him to make incorrect decisions on the size of the repairs needed by the company—although Farrell also keeps open the possibility that Merrill Lynch was an irreparable cause without an outside buyer. In the end, Bank of America, with its insular, regional corporate culture, became Merrill's last resort.

November also saw the publication of Bethany McLean and Joe Nocera's *All the Devils Are Here: The Hidden History of the Financial Crisis*. McLean is, of course, best-known for her breaking reportage of the Enron scandal, and Nocera is currently an op-ed columnist at the *New York Times*. Their book is an ensemble portrait of the subprime crisis, clearly of the second (or perhaps third) publishing cycle after the original event; in fact, many books mentioned earlier in this article are acknowledged as important sources of insight. Its strengths, however, are in its grounding in the nuts and bolts of the relevant industries and government organizations—most notably, in the bond rating firms and the mortgage originators—all the way up to the actions of the Federal Reserve Board.

McLean and Nocera tell a story of leading personalities in representative industries responding to incentives, especially to changes in the regulatory environment. These changes induced a coarsening in standard business practice. Established firms became corrupt in their pursuit of profit; corrupt firms became criminal. McLean and Nocera also tell a parallel story of regulatory capture, evasion, inundation, and ineffectiveness. With few exceptions, official Washington is excoriated for its inaction and complicity in this process. Local officials at the city and state level, on the other hand, are praised for their attempts to curb or halt the excesses at the ground floor of the crisis—although these attempts were often quashed by active lobbying and federal intervention. Avoiding policy prescriptions, McLean and Nocera's account concludes with a series of open-ended questions about the future of the government's role in mortgage finance.

Gretchen Morgenson and Joshua Rosner's book, *Reckless Endangerment: How Outsized Ambition, Greed, and Corruption Led to Economic Armageddon*, published in May 2011, extends this inquiry into the

government's past role in mortgage finance and in creating the conditions for the housing bubble to begin. Morgenson, a Pulitzer Prize-winning financial journalist at the *New York Times*, and Rosner, an independent Wall Street analyst who spotted early problems among the government-sponsored enterprises, trace the origins of the crisis to a program of systematic regulatory capture of Fannie Mae and Freddie Mac beginning in the early 1990s. The authors are particularly suited to this task: Rosner was an analyst of the industry as the regulations were implemented, while Morgenson specializes in financial scandals and conflicts of interest.

In many ways, *Reckless Endangerment* is a necessary work of regulatory archaeology. The Clinton administration's pursuit of a policy of low-income home ownership was captured, often willingly and far too easily, by profit interests. Fannie Mae and Freddie Mac, as government-sponsored enterprises, used their status as quasi-governmental organizations to gain business advantage, and used their business profits to gain political advantage, in a round-robin of influence peddling. Cronyism became the rule of the day, as with the Countrywide "Friends of Angelo" program to offer "sweetheart" loans to influential political figures, a program whose blatant nature one might expect to see in a developing nation or a corrupt municipality, rather than at the highest levels of the American government. As paired reading with Acharya et al.'s *Guaranteed to Fail*, this is especially illuminating. One significant scholarly problem with Morgenson and Rosner's account, however, is its lack of sourcing. Major assertions are left hanging in the text without an independent way to verify them. There is no footnote or endnote apparatus, and the index is poorly constructed. Much of *Reckless Endangerment* is apparently based on earlier reporting by Morgenson or Rosner dating back to the mid-1990s, but the individual articles aren't cited. One hopes that future editions will rectify this glaring omission.

4. *Fact and Fantasy*

There are several observations to be made from the number and variety of narratives that the authors in this review have proffered. The most obvious is that there is still significant disagreement as to what the underlying causes of the crisis were, and even less agreement as to what to do about it. But what may be more disconcerting for most economists is the fact that we can't even agree on all the facts. Did CEOs take too much risk, or were they acting as they were incentivized to act? Was there too much leverage in the system? Did regulators do their jobs or was forbearance a significant factor? Was the Fed's low interest-rate policy responsible for the housing bubble, or did other factors cause housing prices to skyrocket? Was liquidity the issue with respect to the run on the repo market, or was it more of a solvency issue among a handful of "problem" banks?

For financial economists—who are used to dealing with precise concepts such as no-arbitrage conditions, portfolio optimization, linear risk/reward trade-offs, and dynamic hedging strategies—this is a terribly frustrating state of affairs. Many of us like to think of financial economics as a science, but complex events like the financial crisis suggest that this conceit may be more wishful thinking than reality. Keynes had even greater ambitions for economics when he wrote, "If economists could manage to get themselves thought of as humble, competent people on a level with dentists, that would be splendid."[22] Instead, we're now more likely to be thought of as astrologers, making pronouncements and predictions without any basis in fact or empirical evidence.

[22] Keynes (1932, 373).

To make this contrast more stark, compare the authoritative and conclusive accident reports of the National Transportation Safety Board (NTSB)—which investigates and documents the who–what–when–where–and–why of every single plane crash—with the twenty-one separate and sometimes inconsistent accounts of the financial crisis we've just reviewed (and more books are surely forthcoming). Why is there such a difference? The answer is simple: complexity and human behavior.

While airplanes often crash because of human behavior or "pilot error," the causes of such accidents can usually be accurately and definitively determined with sufficient investigatory resources. Typically there are a small number of human actors involved—the pilots, an air traffic controller, and perhaps some maintenance crew. Also, the nature of accidents in this domain is fairly tightly constrained: an airplane loses aerodynamic lift and falls to the ground. While there may be many underlying reasons for such an outcome, investigators often have a pretty clear idea of where to look. In other words, we have sufficiently precise models for how airplanes fly so that we can almost always determine the specific causal factors for their failure through relatively linear chains of physical investigation and logical deduction. Human behavior is just one part of that chain, and thanks to flight data recorders and the relatively narrow set of operations that piloting an aircraft involves—for example, the pilot must lower the landing gear *before* the plane can land, and there's only one way to lower it—the complexity of the human/machine interface isn't beyond the collective intellectual horsepower of the NTSB's teams of expert investigators.

Now compare this highly structured context with piloting an investment bank, where the "instrument panel" is the steady stream of news reports, market data, internal memos, emails, text messages, and vague impressions that a CEO is bombarded with almost 24/7, not all of which is true; where the "flight controls" are often human subordinates, not mechanical devices or electronic switches; and where there is no single "flight data recorder," but rather hundreds of distinct narratives from various stakeholders with different motivations and intentions, generating both fact and fantasy. If we want to determine whether or not the failure of Lehman Brothers was due to "pilot error," like the NTSB, we need to reconstruct the exact state of Lehman prior to the accident, deduce the state of mind of all the executives involved at the time, determine which errors of commission and omission they made, and rule out all but one of the many possible explanations of the realized course of events.

Given that we can't even agree on a set of facts surrounding the financial crisis, nor do we fully understand what the "correct" operation of a financial institution ought to be in every circumstance, the challenges facing economists are far greater than those faced by the NTSB. However, the stakes are also far higher, as we've witnessed over the past four years. There is a great deal to be learned from the NTSB's methods and enviable track record, as Fielding, Lo, and Yang (2011) illustrate in their case study of this remarkable organization. And one of the most basic elements of their success is starting with a single set of incontrovertible facts. In other words, we need the equivalent of the "black box" flight data recorder for the financial industry, otherwise we may never get to the bottom of any serious financial accident.[23]

[23] This was precisely the motivating logic behind the Dodd Frank Act's creation of the Office of Financial Research, but its future is unclear given the current political stalemate that has brought a number of important legislative initiatives to a standstill.

An instructive example of the importance of getting the facts straight is the role that financial leverage played in the crisis, which is described in Lo and Mueller (2010, 50–51). On August 8, 2008, the former director of the SEC's Division of Market Regulation (now the "Division of Markets and Trading"), Lee Pickard (2008), published an article in the *American Banker* with a bold claim: a rule change by the SEC in 2004 allowed broker-dealers to greatly increase their leverage, contributing to the financial crisis.[24] In particular, Mr. Pickard (2008, 10) argued that before the rule change,

> . . . the broker-dealer was limited in the amount of debt it could incur, to about 12 times its net capital, though for various reasons broker-dealers operated at significantly lower ratios . . . If, however, Bear Stearns and other large broker-dealers had been subject to the typical haircuts on their securities positions, an aggregate indebtedness restriction, and other provisions for determining required net capital under the traditional standards, they would not have been able to incur their high debt leverage without substantially increasing their capital base.

He was referring to a change in June 2004 to SEC Rule 15c3–1, the so-called "net capital rule" by which the SEC imposes net capital requirements and, thereby, limits the leverage employed by broker-dealers. This story was picked up by a number of newspapers, including the *New York Times* on October 3, 2008 (Labaton 2008, A1):

> In loosening the capital rules, which are supposed to provide a buffer in turbulent times, the agency also decided to rely on the firms' own computer models for determining the riskiness of investments, essentially outsourcing the job of monitoring risk to the banks themselves.
>
> Over the following months and years, each of the firms would take advantage of the looser rules. At Bear Stearns, the leverage ratio—a measurement of how much the firm was borrowing compared to its total assets—rose sharply, to 33 to 1. In other words, for every dollar in equity, it had $33 of debt. The ratios at the other firms also rose significantly.

The reports of sudden increases in leverage from 12-to-1 to 33-to-1 seemed to be the "smoking gun" that many had been searching for in their attempts to determine the causes of the Financial Crisis of 2007–09. If true, it implied an easy fix according to Pickard (2008, 10): "The SEC should reexamine its net capital rule and consider whether the traditional standards should be reapplied to all broker-dealers."

While these "facts" seemed straightforward enough, it turns out that the 2004 SEC amendment to Rule 15c3–1 did nothing to change the leverage restrictions of these financial institutions. In a speech given by the SEC's director of the Division of Markets and Trading on April 9, 2009 (Sirri 2009), Dr. Erik Sirri stated clearly and unequivocally that "First, and most importantly, the Commission did not undo any leverage restrictions in 2004."[25] He cites several documented and verifiable facts to support this

[24] I thank Jacob Goldfield for bringing this example to my attention.

[25] SEC Rule 15c3–1 is complex, and not simply a leverage test. The rule does contain a 15-to-1 leverage test with a 12-to-1 "early warning" obligation. However, this component of the rule only limits unsecured debt, and did not apply to large broker-dealers, who were subject to net capital requirements based on amounts owed to them by their customers, i.e., a customer-receivable or "aggregate debit item" test. This test requires a broker-dealer to maintain net capital equal to at least 2 percent of those receivables, which is how the five large investment banks had been able to achieve higher leverage ratios in the 1990s than after the 2004 rule change (see figure 1). Similarly, their broker-dealer subsidiaries (which were the entities subject to the net capital rule) had long achieved leverage ratios far in excess of 15-to-1. The historical leverage ratios of the investment banks were readily available in their financial reports, and the facts regarding the true nature of the SEC net capital rule were also available in the public domain. I thank Bob Lockner for decoding the intricacies of the SEC net capital rule.

surprising conclusion,[26] and this correction was reiterated in a letter from Michael Macchiaroli, Associate Director of the SEC's Division of Markets and Trading to the General Accountability Office (GAO) on July 17, 2009, and reproduced in the GAO Report GAO–09–739 (2009, 117).

What about the stunning 33-to-1 leverage ratio reported by the press? According to the GAO (Report GAO–09–739, 2009, 40):

> In our prior work on Long-Term Capital Management (a hedge fund), we analyzed the assets-to-equity ratios of four of the five broker-dealer holding companies that later became CSEs and found that three had ratios equal to or greater than 28-to-1 at fiscal year-end 1998, which was higher than their ratios at fiscal year-end 2006 before the crisis began (see figure 6).

In footnote 68 of that report, the GAO observes that its 1999 report GAO/GGD–00–3 (1999) on Long-Term Capital Management " . . . did not present the assets-to-equity ratio for Bear Stearns, but its ratio also was above 28 to 1 in 1998." The GAO's graph of the historical leverage ratios for Goldman Sachs, Merrill Lynch, Lehman Brothers, and Morgan Stanley is reproduced in figure 1 (see section 1). These leverage numbers were in the public domain at the time these news stories were published, and easily accessible through company annual reports and quarterly SEC filings.

Of course, the arcane minutiae of SEC net capital rules may not be common knowledge, even among professional economists, accountants, and regulators. But two aspects of this story are especially noteworthy: (1) the misunderstanding seems to have originated with Mr. Pickard, a former senior SEC official who held the very same position from 1973 to 1977 as Dr. Sirri did from 2006 to 2009, and who was directly involved in drafting parts of the original version of Rule 15c3–1; and (2) the mistake was quoted as fact by a number of well-known legal scholars, economists, and top policy advisors.[27] Lo and Mueller (2010) conjecture that these interpretations of Rule 15c3–1 emerged through the apparent consistency and coincidence between the extraordinary losses of Bear, Lehman, and Merrill and the 2004 SEC rule change—after all, it seems perfectly plausible that a loosening of net capital rules in 2004 could have caused broker-dealers to increase their leverage. When new information confirms our priors, we usually don't ask why.

This example underscores the critical need to collect, check, and accumulate facts

[26] So what was this rule change about, if not about changing leverage restrictions? It was meant to apply only to the five largest U.S. investment banks which were at a competitive disadvantage in conducting business in Europe because they didn't satisfy certain European regulatory requirements dictated by the Basel Accord. By subjecting themselves to *broader* regulatory supervision—becoming designated "Consolidated Supervised Entities" or CSEs—these U.S. firms would be on a more equal footing with comparable European firms. As Sirri (2009) explains: "Thus the Commission effectively added an additional layer of supervision at the holding company where none had existed previously. While certain changes were made in 2004 to the net capital rule to conform more closely with the methods of computing capital adequacy that would be applied at the holding company, the changes were unrelated to the '12-to-1' restriction Thus, the Commission did not eliminate or relax any requirements at the holding company level because previously there had been no requirements. In fact, the Commission increased its supervisory access to the CSE investment bank holding companies." Now with respect to the net capital rule, Sirri (2009) explains that it had nothing to do with leverage constraints: "The net capital rule requires a broker-dealer to undertake two calculations: (1) a computation of the minimum amount of net capital the broker-dealer must maintain; and (2) a computation of the actual amount of net capital held by the broker-dealer. The '12-to-1' restriction is part of the first computation and it was not changed by the 2004 amendments. The greatest changes effected by the 2004 amendments were to the second computation of actual net capital."

[27] See, for example, Coffee (2008), Blinder (2009), Reinhart and Rogoff (2009, 213–14), Stiglitz (2009; 2010, 163), and Woodward (2009).

from which more accurate inferences can then be drawn.[28] Without the immutable hard platform of objective facts on which we can build an accurate narrative of the crisis that stands the test of time, there's little hope for scientific progress as the waves of public opinion toss our perspective in one direction or another. This is one of the most compelling reasons to read more than one account of the financial crisis, and to seek out those books that may not agree with our preconceptions, just in case we've been inadvertently misinformed. Readers will find the 21 books reviewed in this article to be useful but not unbiased or flawless inputs to their own critical thinking about the crisis. Given the complexity of the events surrounding this debacle, the best hope for arriving at a deeper understanding of financial crises and how to respond to them is through the collective intelligence of all economists, each of us laboring to develop our own interpretation that can inform and improve the consensus. Like the characters in *Rashomon*, we may never settle on a single narrative that explains all the facts; such a "super-narrative" may not even exist. But by working with a common set of facts, we have a much better chance of responding more effectively and preparing more successfully for future crises.

As of October 19, 2011, the *New York Times* has yet to print a correction of its original stories on the 2004 change to Rule 15c3–1, nor did the *Times* provide any coverage of Dr. Sirri's April 9, 2009 speech. Correcting mistaken views and factual errors may not be news, but it does make for good economic science.

[28] The unintentional propagation of pseudo-facts with its subsequent impact on general beliefs and actions is hardly unique to financial crises. The great sociologist Robert K. Merton (1987, 3), father of the economist, observed more than two decades ago that "establishing the phenomenon" cannot be taken for granted and provided several vivid examples drawn from the sciences and sociology in which mistaken beliefs were subsequently accepted and cited as fact by several experts before eventually being corrected.

References

Acharya, Viral V., Matthew Richardson, Stijn Van Nieuwerburgh, and Lawrence J. White. 2011. *Guaranteed to Fail: Fannie Mae, Freddie Mac and the Debacle of Mortgage Finance*. Princeton and Oxford: Princeton University Press.

Akerlof, George A. 1970. "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." *Quarterly Journal of Economics* 84 (3): 488–500.

Akerlof, George A., and Robert J. Shiller. 2009. *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton and Oxford: Princeton University Press.

Allen, Franklin, and Douglas Gale. 2002. "A Comparative Theory of Corporate Governance." University of Pennsylvania Wharton Financial Institutions Center Working Paper 03-27.

Bebchuk, Lucian A., Alma Cohen, and Holger Spamann. 2010. "The Wages of Failure: Executive Compensation at Bear Stearns and Lehman 2000–2008." Harvard University John M. Olin Center for Law, Economics, and Business Discussion Paper 657.

Bikhchandani, Sushil, David Hirshleifer, and Ivo Welch. 1992. "A Theory of Fads, Fashion, Custom, and Cultural Change in Informational Cascades." *Journal of Political Economy* 100 (5): 992–1026.

Blinder, Alan S. 2009. "Six Errors on the Path to the Financial Crisis." *The New York Times*, January 24.

Coffee, John C. 2008. "Analyzing the Credit Crisis: Was the SEC Missing in Action?" *New York Law Journal*, December 5.

Cohan, William D. 2009. *House of Cards: A Tale of Hubris and Wretched Excess on Wall Street*. New York: Random House, Doubleday.

Farrell, Greg. 2010. *Crash of the Titans: Greed, Hubris, the Fall of Merrill Lynch, and the Near-Collapse of Bank of America*. New York: Random House, Crown Business.

Fielding, Eric, Andrew W. Lo, and Jian Helen Yang. 2011. "The National Transportation Safety Board: A Model for Systemic Risk Management." *Journal of Investment Management* 9 (1): 17–49.

French, Kenneth R., et al. 2010. *The Squam Lake Report: Fixing the Financial System*. Princeton and Oxford: Princeton University Press.

Garnaut, Ross, and David Llewellyn-Smith. 2009. *The Great Crash of 2008*. Carlton, Victoria: Melbourne University Press.

Gorton, Gary B. 2010. *Slapped by the Invisible Hand: The Panic of 2007*. Oxford and New York: Oxford University Press.

Johnson, Simon, and James Kwak. 2010. *13 Bankers: The Wall Street Takeover and the Next Financial Meltdown*. New York: Random House, Pantheon Books.

Keynes, John Maynard. 1932. *Essays in Persuasion*. New York: Harcourt Brace.
Kowalski-Trakofler, Kathleen M., Charles Vaught, and Ted Scharf. 2003. "Judgment and Decision Making under Stress: An Overview for Emergency Managers." *International Journal of Emergency Management* 1 (3): 278–89.
Lewis, Michael. 2010. *The Big Short: Inside the Doomsday Machine*. New York and London: Norton.
Lo, Andrew W., and Mark T. Mueller. 2010. "Warning: Physics Envy May Be Hazardous to Your Wealth!" *Journal of Investment Management* 8 (2): 13–63.
Lowenstein, Roger. 2010. *The End of Wall Street*. New York: Penguin Group, Penguin Press.
Lucas, Deborah, and Robert McDonald. 2011. "Valuing Government Guarantees: Fannie and Freddie Revisited." In *Measuring and Managing Federal Financial Risk*, edited by Deborah Lucas, 131–54. Chicago and London: University of Chicago Press.
McLean, Bethany, and Joe Nocera. 2010. *All the Devils Are Here: The Hidden History of the Financial Crisis*. New York: Penguin Group, Portfolio/Penguin.
Merton, Robert K. 1987. "Three Fragments from a Sociologist's Notebooks: Establishing the Phenomenon, Specified Ignorance, and Strategic Research Materials." *Annual Review of Sociology* 13: 1–28.
Morgenson, Gretchen, and Joshua Rosner. 2011. *Reckless Endangerment: How Outsized Ambition, Greed, and Corruption Led to Economic Armageddon*. New York: Henry Holt and Company, Times Books.
Murphy, Kevin J. Forthcoming. "Pay, Politics and the Financial Crisis." In *Economic Lessons from the Financial Crisis*, edited by Alan S. Blinder, Andrew W. Lo, and Robert Solow. New York: Russell Sage Foundation.
Paulson, Henry M. 2010. *On the Brink: Inside the Race to Stop the Collapse of the Global Financial System*. New York: Business Plus.
Pickard, Lee A. 2008. "Viewpoint: SEC's Old Capital Approach Was Tried—and True." *American Banker*, August 8.
Pozsar, Zoltan, Tobias Adrian, Adam Ashcraft, and Hayley Boesky. 2010. "Shadow Banking." Federal Reserve Bank of New York Staff Report 458.
Rajan, Raghuram G. 2010. *Fault Lines: How Hidden Fractures Still Threaten the World Economy*. Princeton and Oxford: Princeton University Press.
Reinhart, Carmen M., and Kenneth S. Rogoff. 2009. *This Time Is Different: Eight Centuries of Financial Folly*. Princeton and Oxford: Princeton University Press.
Roubini, Nouriel, and Stephen Mihm. 2010. *Crisis Economics: A Crash Course in the Future of Finance*. New York: Penguin Press.
Shiller, Robert J. 2008. *The Subprime Solution: How Today's Global Financial Crisis Happened, and What to Do about It*. Princeton and Oxford: Princeton University Press.
Shilling, A. Gary. 1993. "Scoreboard." *Forbes* February 15: 236.
Sirri, Erik R. 2009. "Securities Markets and Regulatory Reform." Speech delivered to the National Economists Club, April 9. http://www.sec.gov/news/speech/2009/spch040909ers.htm.
Sorkin, Andrew Ross. 2009. *Too Big to Fail: The Inside Story of How Wall Street and Washington Fought to Save the Financial System—and Themselves*. New York: Penguin Press, Viking.
Stiglitz, Joseph E. 2009. "Capitalist Fools." *Vanity Fair*, January.
Stiglitz, Joseph E. 2010. *Freefall: America, Free Markets, and the Sinking of the World Economy*. New York and London: Norton.
Tett, Gillian. 2009. *Fool's Gold: How the Bold Dream of a Small Tribe at J. P. Morgan Was Corrupted by Wall Street Greed and Unleashed a Catastrophe*. New York: Simon and Schuster, Free Press.
Thomas, Landon, Jr. 2008. "Down $900 Million or More, the Chairman of Bear Sells." *New York Times*, March 28.
U.S. Government Accountability Office. 2009. "Troubled Asset Relief Program: Capital Purchases Program Transactions for the Period October 28, 2008 through September 25, 2009 (GAO-10-24SP): An e-Supplement to GAO-10-16." http://www.gao.gov/special.pubs/gao-10-24sp/file1.html.
Woodward. Susan. 2009. "The Subprime Crisis of 2008: A Brief Background and a Question." ASSA Session on Recent Financial Crises, January 3.
Woolley, Anita Williams, Christopher F. Chabris, Alex Pentland, Nada Hashmi, and Thomas W. Malone. 2010. "Evidence for a Collective Intelligence Factor in the Performance of Human Groups." *Science* 330 (6004): 686–88.
Zuckerman, Gregory. 2009. *The Greatest Trade Ever: The Behind-the-Scenes Story of How John Paulson Defied Wall Street and Made Financial History*. New York: Random House, Crown Business.