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Protecting Financial Markets: Lessons from the Subprime Mortgage Meltdown

Steven L. Schwarcz
Duke University Law School

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***Protecting Financial Markets: Lessons from the Subprime
Mortgage Meltdown***¹

Steven L. Schwarcz²

Abstract: Why did the recent subprime mortgage meltdown undermine financial market stability notwithstanding the protections provided by market norms and financial regulation? This article attempts to answer that question by identifying anomalies and obvious protections that failed to work, and then by examining hypotheses that might explain the anomalies and failures. The resulting explanations provide critical insights into protecting financial markets.

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² Stanley A. Star Professor of Law & Business, Duke University School of Law; Founding/Co-Academic Director, Duke Global Capital Markets Center. E-mail: schwarcz@law.duke.edu. The author thanks Richard Bookstaber, Kathleen C. Engel, Alan Hirsch, Jonathan C. Lipson, Joseph H. Sommer, . . . and participants in faculty workshops at Temple University, James E. Beasley School of Law, Duke Law School, The University of Tennessee (College of Law, College of Business Administration, and Corporate Governance Center), University of Utah S.J. Quinney College of Law, . . . , and a workshop on “Structured Finance and Loan Modification” at the United States Federal Reserve Bank of Cleveland for comments. He also thanks Mark Covey for excellent research assistance.

I. INTRODUCTION

Congress has been holding hearings on threats to the financial system in response to the recent subprime (or sub-prime) mortgage meltdown and its impact on the mortgage-backed, and other asset-backed, securities markets.³ Central banks worldwide have likewise expressed concern about this crisis and its potential systemic effects. The United States Federal Reserve Bank, for example, is attempting to reduce the likelihood that this crisis might affect other financial markets and the economy by cutting the discount rate, which is the interest rate the Federal Reserve charges a bank to borrow funds when a bank is temporarily short of funds,⁴ and also by cutting the federal funds rate that banks charge other banks on interbank loans.⁵ The European Central Bank and other central banks similarly have been cutting the interest rate they charge to borrowing banks.⁶

These steps, however, have directly impacted banks, not financial markets.⁷ Furthermore, changes in monetary policy, such as cutting interest rates, may not work quickly enough—or may be too weak—to quell panics, falling prices, and the potential for systemic collapse.⁸ This somewhat anachronistic focus on banks, not markets, ignores

³ See, e.g., *Systemic Risk: Examining Regulators' Ability to Respond to Threats to the Financial System: Hearing Before the H. Committee on Financial Services*, 110th Cong. (Oct. 2, 2007), available at http://www.house.gov/apps/list/hearing/financialsvcs_dem/ht1002072.shtml (hereinafter *Systemic Risk Hearing*).

⁴ See Greg Ip, Robin Sidel & Randall Smith, *Stronger Steps: Fed Offers Banks Loans to Ease Credit Crisis*, WALL ST. J., Aug. 18-19, 2007, Weekend Ed., at A1; <http://www.duke.edu/%7Echarvey/Classes/wpg/bfglosd.htm> (visited Aug. 20, 2007).

⁵ Greg Ip, *Fed's Rate Cut Could Be Last For a While*, WALL ST. J., Nov. 1, 2007, at A1; <http://www.newyorkfed.org/aboutthefed/fedpoint/fed15.html> (visited Nov. 25, 2007).

⁶ See, e.g., Randal Smith, Carrick Mollenkamp, Joellen Perry, & Greg Ip, *Loosening Up: How a Panicky Day Led the Fed to Act*, WALL ST. J., Aug. 20, 2007, at A8.

⁷ Ip, Sidel, & Smith, *supra* note 4, at A8 (observing that “the [Fed’s] discount window’s reach in the current crisis is limited by the fact that only banks can use it, and they aren’t the ones facing the greatest strains”).

⁸ Mortimer B. Zuckerman, *Preventing a Panic*, U.S. NEWS & WORLD REP., Feb. 11, 2008, at 64, 63 (observing that “[l]ower interest rates prompted by the Federal Reserve

the ongoing trend towards disintermediation—or enabling companies to access the ultimate source of funds, the capital markets, without going through banks or other financial intermediaries.⁹ We thus are using tools to protect the financial system that have not kept up with underlying changes in the system.¹⁰ In a financially disintermediated world, the old protections may no longer be reliable.

This article explores why the subprime financial crisis occurred notwithstanding the array of existing protections included in financial regulation, market norms and customs, and the market-discipline approach undertaken by the second Bush administration,¹¹ and what this crisis can teach us about protecting financial markets.¹² The article begins by identifying anomalies and obvious protections that failed to work.

Bank cannot fully counter the forces of credit and liquidity contraction” caused by the subprime mortgage crisis). Cf. Seth Carpenter & Selva Demiralp, *The Liquidity Effect in the Federal Funds Market: Evidence from Daily Open Market Operations*, 38 J. MONEY CREDIT & BANKING 901, 918-919 (2006) (concluding that although a change in monetary policy can begin to affect the cost of capital within a day, its full effects can take much longer); Serena Ng, Greg Ip, & Shefali Anand, *Fed Fails So Far In Bid to Reassure Anxious Investors*, WALL ST. J., Aug. 21, 2007, at A1.

⁹ Steven L. Schwarcz, *Enron and the Use and Abuse of Special Purpose Entities in Corporate Structures*, 70 U. CIN. L. REV. 1309, 1315 (2002). Capital markets are now the nation’s and the world’s most important sources of investment financing. See, e.g., McKinsey Global Institute, *Mapping the Global Capital Markets Third Annual Report* (Jan. 2007), reporting that as of the end of 2005, the value of total global financial assets, including equities, government and corporate debt securities, and bank deposits, was \$140 trillion, available at

http://www.mckinsey.com/mgi/publications/third_annual_report/index.asp.

¹⁰ Although there is some concern about capital levels at banks, the losses giving rise to this concern are not due to bad mortgage loans made by those banks but rather to investments in mortgage-backed securities or loans made to entities, such as hedge funds, holding mortgage-backed securities as assets. See *infra* note 51. See also David Wessel, *Magnifying the Credit Fallout*, WALL ST. J., March 6, 2008, at A2 (discussing the erosion of the capital level at banks due to the falling value of bank-owned mortgage loans and mortgage-backed securities).

¹¹ See, e.g., Anthony W. Ryan, Assistant Secretary for Financial Markets, U.S. Department of the Treasury, Remarks before the Managed Funds Association Conference (June 11, 2007) (transcript on file with author), at 2 (discussing the market-discipline approach).

¹² The term “subprime” includes both loans to borrowers of dubious creditworthiness and very large loans to otherwise creditworthy borrowers. MEGAN DORSEY & DAVID ROCKWELL, *FINANCING: RESIDENTIAL REAL ESTATE* 60 (8th ed. 1990).

The article then searches for lessons by examining various hypotheses of why these anomalies and failures may have occurred.

II. IDENTIFYING ANOMALIES AND FAILURES

The following represent anomalies arising from, and protections that failed to deter, the subprime mortgage meltdown: (A) If disclosure provides investors with all the information they need to assess investments, why did so many investors make poor decisions? (B) Securitization and other forms of structured finance (collectively, “structured finance”), pursuant to which mortgage-backed and other forms of asset-backed securities are issued, are supposed to diversify and reallocate risk to parties best able to bear it. Is there something structurally wrong about how this worked in the mortgage context? (C) Why did a problem with the subprime mortgage-backed securities markets quickly infect the markets for prime mortgage-backed securities and other asset-backed securities?¹³ (D) The second Bush administration expected that its market-discipline approach would be sufficient, along with existing protections, to protect against financial market instabilities. Why did this approach turn out to be insufficient? (E) Why did the rating agencies fail to anticipate the downgrades?

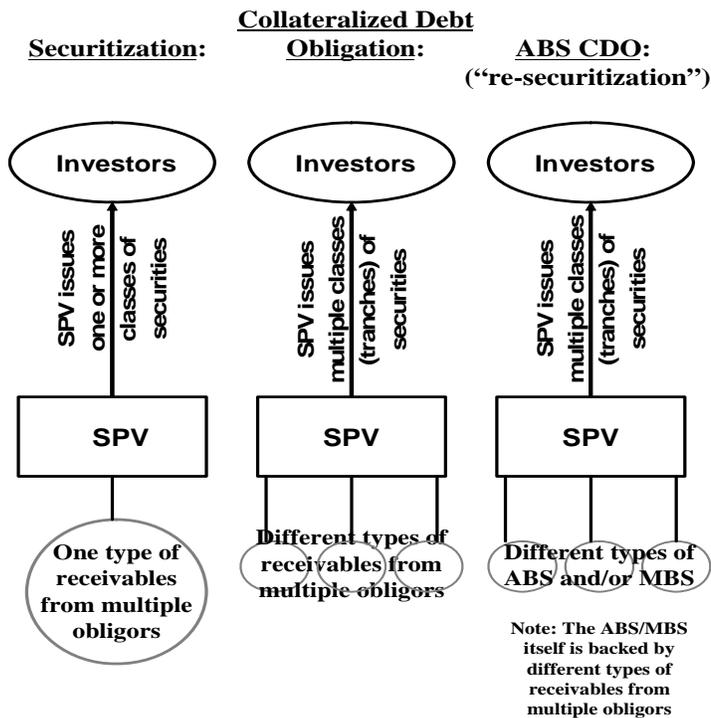
In order to examine hypotheses of why these anomalies and failures may have occurred, certain structured finance terminology must first be explained. The issuer of mortgage-backed and other forms of asset-backed securities in structured finance transactions is typically a special-purpose vehicle, or “SPV” (sometimes called a special-purpose entity, or “SPE”). These securities are customarily categorized as MBS, ABS, CDO, or ABS CDO.¹⁴ MBS means mortgage-backed securities, or securities whose payment derives principally or entirely from mortgage loans owned by the SPV. ABS means other asset-backed securities, or securities whose payment derives principally or entirely from receivables or other financial assets—*other than mortgage loans*—owned

¹³ For an explanation of the types of securities involved in the subprime financial crisis, see *infra* notes 14-19 and accompanying text.

by the SPV. Industry participants refer to transactions in which SPVs issue MBS or ABS as securitization.

The term “securitization” also technically includes CDO and ABS CDO transactions. CDO, or “collateralized debt obligation,” securities are backed by—and thus their payment derives principally or entirely from—a mixed pool of mortgage loans and/or other receivables owned by an SPV. ABS CDO securities, in contrast, are backed by a mixed pool of ABS and/or MBS securities owned by the SPV, and thus their payment derives principally or entirely from the underlying mortgage loans and/or other receivables ultimately backing those ABS and MBS securities.¹⁵ For this reason, ABS CDO transactions are sometimes referred to as “re-securitization.”

Schematically, the distinctions among these categories can be portrayed as follows:



¹⁴ There are arcane variations on the CDO categories, such as CDOs “squared” or “cubed,” but these go beyond this article’s analysis.

The classes, or “tranches,” of MBS, ABS, CDO, and ABS CDO securities issued in these transactions are typically ranked by seniority of payment priority. The highest priority class is called senior securities. In MBS and ABS transactions, lower priority classes are called subordinated, or junior, securities. In CDO and ABS CDO transactions, lower priority classes are usually called mezzanine securities—with the lowest priority class, which has a residual claim against the SPV, being called the equity.¹⁶

The senior and many of the subordinated classes of these securities are more highly rated than the quality of the underlying receivables.¹⁷ For example, senior securities issued in a CDO transaction are usually rated AAA even if the underlying receivables consist of subprime mortgages, and senior securities issued in an ABS CDO transaction are usually rated AAA even if none of the MBS and ABS securities supporting the transaction are rated that high. This is accomplished by allocating cash collections from the receivables first to pay the senior classes and thereafter to pay more junior classes (the so-called “waterfall” of payment). In this way, the senior classes are highly overcollateralized to take into account the possibility, indeed likelihood, of delays and losses on collection.

The subprime financial crisis occurred because, with home prices unexpectedly plummeting and adjustable-rate mortgage (ARM) interest rates skyrocketing,¹⁸ many

¹⁵ “Synthetic” CDOs, which do not appear to be relevant to this article’s analysis, own derivative instruments, such as credit default swaps, rather than receivables, ABS, or MBS.

¹⁶ In MBS and ABS transactions, the term “equity” is not generally used because the company originating the securities (the “Originator”) usually holds, directly or indirectly, the residual claim against the SPV.

¹⁷ The equity class is generally not rated.

¹⁸ Although rate increases on ARM loans (through rate re-sets) were not per se unexpected, the end of the liquidity glut made it harder for subprime borrowers to refinance into loans with lower, affordable, interest rates. *See* Kemba J. Dunham & Ruth Simon, *Refinancing May be Harder to Enjoy*, WALL ST. J., Nov. 24, 2007, at B1; Rick Brooks & Constance Mitchell Ford, *The United States of Subprime*, WALL ST. J., Oct. 11, 2007, at A1. *But cf.* Ruth Simon, *Rising Rates to Worsen Subprime Mess*, WALL ST. J.,

more borrowers defaulted than anticipated,¹⁹ causing collections on subprime mortgages to plummet below the original estimates. Thus, equity and mezzanine classes of securities were impaired, if not wiped out, and in many cases even senior classes were impaired.²⁰ Investors in these securities lost billions,²¹ creating a loss of confidence in the financial markets.

III. SEARCHING FOR LESSONS

A. If disclosure provides investors with all the information needed to assess investments, why did so many investors make poor decisions?

For this anomaly and failure, this article examines the following hypotheses:

Hypothesis: The disclosure was inadequate because the depth of the fall of the housing market exceeded reasonable worst-case scenarios. Mortgage loans, which were the asset class supporting the MBS as well as a significant portion of the CDO and ABS CDO securities, therefore turned out to be severely undercollateralized in many cases.

Any failure to envision the actual worst-case scenario may have reflected, to some extent, a failure to take a sufficiently long view of risk. Some explain the near-collapse of Long-Term Capital Management (LTCM), a hedge fund that lost hundreds of millions of dollars in 1998, as resulting from that type of failure.²² Investors and other market

Nov. 24, 2007, at A1 (reporting that many mortgages defaulted even before interest rates increased).

¹⁹ “Incentives and Failures in the Structured Finance Market: The Case of the Subprime Mortgage Market,” presentation by Anthony B. Sanders, Bob Herberger Arizona Heritage Chair Professor of Finance, Arizona State University, to the Federal Reserve Bank of Cleveland at its workshop on “Structured Finance and Loan Modification,” Nov. 20, 2007 (on file with author).

²⁰ Carrick Mollenkamp & Serena Ng, *Wall Street Wizardry Amplified Credit Crisis*, WALL. ST. J., Dec. 27, 2007, at A1 (reporting on the downgrade of one CDO’s triple-A rated tranches to junk status).

²¹ Reference in this article to “investors” means investors in capital market securities, not investors in the homes financed by the mortgage loans ultimately backing such securities.

²² See, e.g., Paul Krugman, *Roshomon in Connecticut*, SLATE MAG., Oct. 2, 1998.

participants looked to the recent past as an example of what could happen to home prices,²³ but they did not always look to worst-case possibilities, such as the experience of the Great Depression.²⁴

These types of failures are inevitable, though, because “reasonable worst-case scenarios” are judgment calls that are, necessarily, made *ex ante*. It does not appear unreasonable, for example, to have viewed the Great Depression as unique.²⁵ As Monty

²³ Jack Guttentag, *Shortsighted About the Subprime Disaster*, WASH. POST, May 26, 2007, at F02 (explaining that because housing prices had been rising for a long period of time, it was assumed that they would continue to rise).

²⁴ Christine Harper, *Death of VaR Evoked as Risk-Taking Vim Meets Taleb’s Black Swan*, available at <http://www.bloomberg.com/apps/news?pid=20601109&sid=axo1oswvqx4s&refer=home> (reporting that financial models at Merrill Lynch, Morgan Stanley, and UBS failed to foresee the decline in housing prices). *See generally*, Nassim Taleb, *The Black Swan: The Impact of the Highly Improbable* (2007). One commentator suggests that the disclosure also did not adequately address the relatively illiquid nature of the securities: “It is true that the level of default was unusually high, but the bulk of the problem is coming from liquidity issues—no one wants to hold these [securities], and if you try to find [a buyer] you have to trade them at a very low price.” E-mail from Richard Bookstaber, author, *A DEMON OF OUR OWN DESIGN*, *infra* note 35, to the author (Nov. 30, 2007). Lack of liquidity, however, appears to have been a standard disclosure item, such as the following disclosure taken from highlighted risk factors on p. S-28 of the March 12, 2007 Prospectus Supplement for Soundview Home Loan Trust 2007-WMC1, as Issuing Entity, Financial Asset Securities Corp., as Depositor, Countrywide Homes Loans Servicing LP, as Servicer: “There is no assurance that . . . a secondary market [in the securities] will develop or, if it develops, that it will continue. Consequently, you may not be able to sell your [securities] readily or at prices that will enable you to realize your desired yield. The market value of the [securities] are likely to fluctuate; these fluctuations may be significant and could result in significant losses to you.” I therefore believe that the problem was less failure of the illiquidity risk to be disclosed than investor failure to appreciate that disclosure. *See infra* notes 24-39 and accompanying text. Query, however, whether anyone knew—much less knew enough to disclose—the *extent* of the illiquidity problem. *See* e-mail from Bookstaber, *supra* (observing that “no one knew how levered funds were, and therefore how quickly they would need to dump [securities] if they faced a market shock”).

²⁵ *But cf.* Amir Sufi, “Lender Incentives, Credit Risk, and Securitization: Evidence from the Subprime Mortgage Crisis” (April 2008 draft on file with author) (arguing, at 17, that investors and rating agencies “likely did not fully appreciate that the mortgage supply expansion itself was in part driving house price appreciation in subprime areas”). In other words, Professor Sufi is arguing that home prices dropped radically, as a percentage, once

Python memorably put it (in a different context), “Nobody expects the Spanish Inquisition!”²⁶

Some failures to take a sufficiently long view of risk reflect behavioral bias due to associations with recent similar events. Those failures are discussed separately.²⁷

Hypothesis: The disclosure was adequate, but many investors failed to read it carefully enough or appreciate what they were reading.

This hypothesis has several possible sub-hypotheses contributing to the ultimate failure. The first is over-reliance, insofar as investors may have relied heavily, and perhaps in some cases exclusively, on third parties. For example, one commentator argues that investors over-relied on the underwriter or arranger selling them the securities:

Investors have the prospectuses to rely on, but the reality is that they have not taken any responsibility for reading the detail of the documentation or digesting the risks involved. These investors are still under the impression that the arranger will look after their interests and are yet to appreciate the need to negotiate what are highly complicated bilateral agreements.²⁸

Because this flies in the face of *caveat emptor*, it seems dubious unless the underwriter/arranger’s interests were aligned with that of the investors.²⁹ Those interests were somewhat aligned, however, in ABS CDO transactions where underwriters customarily purchased some portion of the “equity” tranches in order to demonstrate their belief in the securities being sold. In this context, aligning the interests of sellers and investors actually may have worked against investor caution.

mortgage money tightened, and that investors and rating agencies should have anticipated that possibility.

²⁶ Monty Python, *The Spanish Inquisition*, transcript available at people.csail.mit.edu/paulfitz/spanish/script.html (last visited Feb. 28, 2008) (quoting Monty Python’s Flying Circus: The Spanish Inquisition (BBC television broadcast Sept. 22, 1970).

²⁷ See *infra* notes 37-39 and accompanying text (discussing the availability heuristic).

²⁸ Daniel Andrews, *The Clean Up: Investors Need Better Advice on Structured Finance Products*, 26 INT’L FIN. L. REV. 14, 14 (Sept. 2007).

Investors also may have over-relied on rating-agency ratings, without necessarily engaging in (or at least fully performing) their own due diligence. This article later examines why rating agencies failed to anticipate the downgrades.³⁰ Even if investors performed their own due diligence, agency-cost conflicts³¹ and lack of economy of scale³² may have limited the extent to which they could have done a better job of assessing creditworthiness than the rating agencies.

Another sub-hypothesis is that, as a result of a market “bubble,” “many investors, swept up in the euphoria of the moment, failed to pay close attention to what they were buying.”³³ Bubbles can start quite easily. If, for example, a particular stock unexpectedly gains in value, the losers (e.g., those shorting the stock) will tend to withdraw from that market and the winners will tend to increase their investment, driving up the price even further. Soon other winners are attracted to the stock and other losers cut their losses and stop shorting the stock. This process is aided by almost inevitable explanations of why it is “rational” for the price to keep going up and why the traditional relationship of price to earnings does not apply. Even investors who recognize the bubble as irrational may buy in, hoping to sell at the height of the bubble before it bursts.³⁴ In these ways, price movements can become somewhat self-sustaining.³⁵

²⁹ This form of the hypothesis, of course, is now even more dubious as a predictor of (at least near-term) future investor reliance.

³⁰ See Part III.E, *infra*.

³¹ See *infra* notes 46-50 and accompanying text.

³² Individual investors face relatively high costs to assess the creditworthiness of complex ABS, ABS CDO, and ABS CDO securities, whereas rating agencies make this assessment on behalf of many individual investors, thereby achieving an economy of scale.

³³ Alan S. Blinder, *Six Fingers of Blame in the Mortgage Mess*, N.Y. TIMES, Sept. 30, 2007, at BU 4.

³⁴ Sam Segal, *Tulips Portrayed: The Tulip Trade in Holland in the 17th Century*, in THE TULIP: A SYMBOL OF TWO NATIONS 181 (Michael Roding & Hans Theunissen eds., 1993).

³⁵ RICHARD BOOKSTABER, *A DEMON OF OUR OWN DESIGN: MARKETS, HEDGE FUNDS, AND THE PERILS OF FINANCIAL INNOVATION* 169–70 (2007).

Compare the tulip “bubble” in 17th century Holland, in which certain tulips were highly prized and their bulbs were sold for thousands of guilder. Almost everyone got caught up in the excitement of buying and selling tulip bulbs, usually on credit and with the intention of making a quick profit, but many who speculated on credit were left with crushing debts when the market finally crashed.³⁶

Occasional bubbles may well be an inevitable side effect of a market economy.

A third sub-hypothesis is bounded rationality. Bubbles do not necessarily require individual investors to behave irrationally. In contrast, investors can make poor decisions, notwithstanding disclosure, because of their bounded rationality. There are at least two ways in which this can occur. To some extent, investor failure in the subprime financial crisis may have resulted from herd behavior.³⁷ To some extent also, it may have resulted from the availability heuristic, under which people overestimate the frequency or likelihood of an event when examples of, or associations with, similar events are easily brought to mind. People typically overestimate the divorce rate, for example, if they can quickly find examples of divorced friends.³⁸ Similarly, once past financial crises recede in memory and investors are making money, investors always “go for the gold.”³⁹

³⁶ Segal, *supra* note 34, at 17–20.

³⁷ Cf. Steven L. Schwarcz, *Rethinking the Disclosure Paradigm in a World of Complexity*, 2004 U. ILL. L. REV. 1, 14-15 (observing and explaining this behavior in a related context).

³⁸ Paul Slovic, Baruch Fischhoff & Sarah Lichtenstein, *Facts Versus Fears: Understanding Perceived Risk*, in JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 463, 465 (Daniel Kahneman et al. eds., 1982).

³⁹ Cf. Larry Light, *Bondholder Beware: Value Subject to Change Without Notice*, BUS. WK., at 34 (Mar. 29, 1993) (“[b]ondholders can—and will—fuss all they like. But the reality is, their options are limited: higher returns or better protection. Most investors will continue to go for the gold.”) (discussing, in the context of but several years after the “Marriott split,” that investors favor higher interest rates over “event risk” covenants once examples of events justifying the covenants have receded in memory, even though they could reoccur).

Hypothesis: The disclosure was inherently inadequate because the transactions were so complex that many investors could not understand them.⁴⁰

This hypothesis turns on the extraordinary complexity of CDO and ABS CDO transactions. The prospectus itself in a typical offering of these securities is, in the author's experience, hundreds of pages long.⁴¹

This hypothesis, if true, would extend the thesis in *Rethinking the Disclosure Paradigm in a World of Complexity*⁴² beyond investors in an Originator's⁴³ securities to investors in an SPV's securities. The proposal of that article nonetheless can help to inform the analysis. That article proposes that investors in an Originator's securities be protected in a supplementary manner by restricting conflicts of interest in complex transactions for which disclosure would be insufficient.⁴⁴ The rationale is that, absent conflicts, the Originator's management will make decisions that more closely reflect the interests of the Originator's investors.

The same approach has potential application to investors in an SPV's securities, particularly when the SPV transaction is so complex (as some CDO and ABS CDO transactions apparently were) that disclosure would be insufficient. In that context, there are at least two ways in which material conflicts arise. For securities backed by subprime

⁴⁰ See, e.g., *Credit & Blame: How Rating Firms' Calls Fueled Subprime Mess*, WALL ST. J., Aug. 15, 2007, at A1 (quoting a market observer): "A lot of institutional investors bought [mortgage-backed] securities substantially based on their ratings [without fully understanding what they bought], in part because the market has become so complex." Cf. Blinder, *supra* note 33 (arguing that the MBS, especially the CDOs, "were probably too complex for anyone's good"). See also Malcolm Gladwell, *Open Secrets: Enron, Intelligence, and the Perils of Too Much Information*, NEW YORKER, Jan. 8, 2007 (distinguishing between transactions that are merely "puzzles" and those that are truly "mysteries"). To the extent complexity is merely a puzzle, investment bankers theoretically could understand it.

⁴¹ The disclosure documents ordinarily consist of a prospectus and a prospectus supplement, each close to two-hundred pages long.

⁴² Schwarcz, *supra* note 37.

⁴³ The term "Originator" is defined *supra* note 16.

⁴⁴ Schwarcz, *supra* note 37, at 30. See also *id.* at 32-33 (showing how to identify these transactions, defined as "disclosure-impaired transactions").

mortgages, the interests of mortgage originators, absent their taking a prior or *pari passu* risk of loss, are misaligned with that of investors in those securities.⁴⁵ To mitigate this type of conflict, perhaps mortgage originators should be required to take some risk of loss. Secondly, agency-cost conflicts arise when the interests of individual investment bankers who structure, sell, or invest in securities are misaligned with the interests of the institutions for which they work.⁴⁶ For example, certain losses of institutional investors such as Bear Stearns appear to have resulted from losses in CDO investments by controlled or managed hedge funds.⁴⁷ If managers of those hedge funds were paid according to hedge-fund industry custom—in which “fund managers reap large rewards on the upside without a corresponding punitive downside”⁴⁸—they would have had significant conflicts of interest with the institutions owning the hedge funds.⁴⁹ To mitigate this type of conflict, these individuals should be paid in a manner that better aligns their interests with the interests of the institutions for which they work.

Restricting conflicts of interest, as a supplement to disclosure, is only a second-best solution. It would not, for example, solve the problem that, even absent conflicts, individual investment bankers might have insufficient incentives to try to completely

⁴⁵ See *infra* notes 57-67 and accompanying text.

⁴⁶ Most investors were institutions. SEC Staff Report of the Task Force on Mortgage-Backed Securities Disclosure, *Staff Report: Enhancing Disclosure in the Mortgage Backed Securities Markets*, Jan. 2003, available at <http://www.sec.gov/news/studies/mortgagebacked.htm> (visited Feb. 23, 2008) (reporting that investors in MBS are “overwhelmingly institutional”).

⁴⁷ Kate Kelly, Serena Ng & David Reilly, *Two Big Funds At Bear Stearns Face Shutdown—As Rescue Plan Falters Amid Subprime Woes, Merrill Asserts Claims*, WALL. ST. J., June 20, 2007, at A1.

⁴⁸ James Surowiecki, *Performance-Pay Perplexes*, NEW YORKER, Nov. 12, 2007, at 34. Hedge funds sometimes impose a limited punitive downside, that managers who lose money may not receive future bonuses until they subsequently make money above a “high watermark.” MARK J. P. ANSON, *THE HANDBOOK OF ALTERNATIVE ASSETS* 361 (2003). Generally, however, there is no clawback of past bonuses, so these managers can go to another hedge fund where they will not be subject to this liability. *Id.* at 85 (reporting that “clawbacks are rare in the hedge fund world”).

⁴⁹ In this regard, the reader should distinguish these conflicts of interest not only from the agency-cost problem discussed above but also from the potential conflict of interest discussed *infra* notes 57-65 and accompanying text between mortgage originators and investors.

understand the highly complex transactions in which they recommend their institutions invest. Such individuals might, for example, view the possibility of losses as remote, or anticipate being in a new job if and when losses occurred, or simply feel safe following the herd of other bankers.⁵⁰

There do not, however, appear to be any perfect solutions. Government already takes a somewhat paternalistic stance to mitigate disclosure's inadequacy by mandating minimum investor sophistication for investing in complex securities, yet sophisticated investors and qualified institutional buyers (QIBs) are the very investors who lost the most money in the subprime financial crisis.⁵¹ And any attempt by government to restrict firms from engaging in complex transactions would be highly risky because of the potential of inadvertently banning beneficial transactions.⁵²

Hypothesis: Even when disclosure is adequate and investors understand it perfectly (i.e., they have perfect knowledge of the risk), disclosure alone will be inadequate to address at least systemic risk in financial markets.

⁵⁰ Schwarcz, *supra* note 37, at 2, 14-15. Outside of an institutional-industry context, there may be further misalignment of incentives because of higher employee turnover. *Id.* at 14 (observing that employee turnover reduces accountability).

⁵¹ See, e.g., Jenny Anderson, *Wall St. Banks Confront a String of Write-Downs*, N.Y. TIMES, Feb. 19, 2008, at C1 (reporting that “major banks . . . have already written off more than \$120 billion of losses stemming from bad mortgage-related investments”); Randall Smith, *Merrill’s \$5 Billion Bath Bares Deeper Divide—After Big Write-Down Tied to Mortgage Debt, O’Neal Asserts Control*, WALL ST. J., Oct. 6, 2007, at A1 (reporting a total of \$20 billion in write-downs by large investment banks).

⁵² Cf. *infra* note 59 and accompanying text (cautioning against “throwing out the baby with the bathwater”). Although otherwise beyond this article’s scope (*see supra* note 14), certain CDO products, the so-called CDOs “squared” and “cubed,” might be worthy of special consideration because they are subject to “cliff risk,” or suddenly losing 100% of their value. See, e.g., Michiko Whetten & Mark Adelson, Nomura Fixed Income Research, *CDOs-Squared Demystified* 12-13 (Feb. 4, 2005); *Leverage and Junk Science: A Credit Crunch Cocktail*, TOTAL SECURITIZATION, Sep. 20, 2007. In this context, the tort law doctrine of “unavoidably unsafe products” may help to inform a regulatory analysis. In tort law, an “unavoidably unsafe product” is subject to strict liability unless its utility outweighs its risk. Joanne Rhoton Galbreath, *Products liability: What Is an “Unavoidably Unsafe” Product*, 70 A.L.R.4th 16, §3 (1989). For example, the vaccine

Systemic risk is the risk that (i) an economic shock such as market or institutional failure triggers (through a panic or otherwise) either (x) the failure of a chain of markets or institutions or (y) a chain of significant losses to financial institutions, (ii) resulting in increases in the cost of capital or decreases in its availability, often evidenced by substantial financial-market price volatility.⁵³ Disclosure alone will be inadequate to prevent systemic risk because, like a tragedy of the commons, the benefits of exploiting finite capital resources accrue to individual market participants, each of whom is motivated to maximize use of the resource, whereas the costs of exploitation, which affect the real economy, are distributed among an even wider class of persons.⁵⁴ Investors are therefore unlikely to care about disclosure to the extent it pertains to systemic risk.

Should disclosure therefore be supplemented to address systemic risk? I address this in a separate article,⁵⁵ proposing, among other things, a liquidity provider of last resort to purchase securities in collapsing markets in order to mitigate market instability that would lead to systemic collapse. The liquidity provider of last resort would make its purchases at a deep enough discount to (i) make a profit, or at least be repaid, and (ii) mitigate moral hazard by impairing existing investors.

Summary. The discussion above suggests that multiple causes, viewed collectively, help to explain why so many investors make poor investment decisions notwithstanding disclosure. Although there do not appear to be empirical ways to test the validity of these explanations, some investors may have taken too brief a view of risk in the housing market or have been swayed by the fact that, in recent memory, home prices had only been rising. Some investors may have simply followed the herd in their investments, while others—possibly recognizing the bubble forming in the market for CDO and ABS CDO securities—may have invested anyway, hoping prices would

for rabies is inherently dangerous, but rabies can result in death so the vaccine is not subject to strict liability. RESTATEMENT (SECOND) OF TORTS § 402A cmt. k (1965).

⁵³ See Schwarcz, *infra* note 55.

⁵⁴ In other words, the externalities of systemic failure include social costs that can extend far beyond market participants.

continue to rise and their investments would rise in value. Investors also may have relied excessively on credit ratings, without performing their own due diligence. In the case of investments in ABS CDO transactions, investors additionally may have over-relied on the judgment of underwriters who had purchased portions of the “equity” tranches. Finally, certain of the CDO and ABS CDO transactions may have been so complex that disclosure was inherently inadequate.

B. Is there something structurally wrong about how structured finance worked in the mortgage context?

For this anomaly, this article examines the following hypotheses:

Hypothesis: Structured finance facilitated an easy-entrant and undisciplined mortgage lending industry by enabling mortgage lenders to sell off loans as they are made (“originate and distribute”). This created moral hazard to the extent mortgage lenders therefore did not have to live with the credit consequences of their loans. For that reason, which was probably exacerbated by the fact that they could make money on the volume of loans originated,⁵⁶ the underwriting standards of mortgage lenders naturally fell.⁵⁷

Anecdotal evidence suggests this hypothesis has at least some truth.⁵⁸ One solution would be to limit the originate-and-distribute model, but that would be like

⁵⁵ Steven L. Schwarcz, *Systemic Risk* (working paper, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1008326).

⁵⁶ This may have been further exacerbated by certain mortgage lenders, without balance-sheet assets, simply advancing to borrowers the proceeds of selling the loans. Confidential discussion between author and monoline insurance executive (Oct. 18, 2007).

⁵⁷ *See, e.g.,*

<http://www.federalreserve.gov/newsevents/testimony/bernanke20070920a.htm>. There is also speculation that some mortgage-loan originators might have engaged in fraud by manipulating borrower income, and that some borrowers may have engaged in fraud by lying about their income, in each case to qualify borrowers for loans. *See, e.g.,* Vikas Bajaj, *A Cross-Country Blame Game*, N. Y. TIMES, May 8, 2007, at C1. If such fraud occurred, it would exacerbate but is unlikely to be significant enough to have caused the subprime financial crisis.

⁵⁸ To some extent the drop in underwriting standards under the originate-and-distribute model may reflect distortions caused by the recent liquidity glut, in which lenders

“throwing out the baby with the bathwater.” An originate-and-distribute model is critical to the underlying funding liquidity of banks⁵⁹ as well as many corporations.⁶⁰

A better solution, already discussed, would be to require mortgage lenders and other Originators to retain a risk of loss.⁶¹ In many non-mortgage securitization transactions, for example, it is customary for Originators to bear a direct risk of loss by overcollateralizing the receivables sold to the SPV.⁶² This is not always done in mortgage securitization because mortgage loans are inherently overcollateralized by the value of the real-estate collateral (and thus investors can effectively be overcollateralized even if the Originator bears no risk of loss). It needs to be done, however, to mitigate moral hazard. In this context, one might ask why investors and other parties, such as credit insurers, who ultimately bear the risk of loss in an originate-and-distribute model do not monitor the underlying loans. Although in theory they should, the practical limits suggested by this article—including complexity of disclosure, herd behavior, and, as will be discussed, possible excessive diversification of risk that undermines any given investor’s incentive to monitor⁶³—help to explain this failure to monitor.

competed aggressively for business and allowed otherwise defaulting borrowers to refinance. See Ravi Balakrishnan et al., *Globalization, Gluts, Innovation or Irrationality: What Explains the Easy Financing of the U.S. Current Account Deficit?* 12 (Int’l Monetary Fund, IMF Working Paper No. 07/160, July 2007) (discussing this liquidity glut).

⁵⁹ See, e.g., Joseph R. Mason, “Mortgage Loan Modification: Promises and Pitfalls” (undated Powerpoint presentation to the Federal Reserve Bank of Cleveland at its workshop on “Structured Finance and Loan Modification,” Nov. 20, 2007) (showing that 58% of mortgage liquidity in the United States, and 75% of mortgage liquidity in California, has come from structured finance).

⁶⁰ See Xudong An, Yongheng Deng & Stuart A. Gabriel, *Value Creation Through Securitization: Evidence from the CMBS Market* 3 (Feb. 18, 2008) (SSRN working paper no. 1095645) (concluding that despite the recent mortgage crisis, securitization has created value in the financial markets).

⁶¹ See *supra* notes 45-46 and accompanying text.

⁶² Vincent Ryan, *Debt in Disguise*, CFO MAGAZINE, Nov. 2007 (reporting that most securitization agreements include overcollateralization).

⁶³ See *infra* notes 71-73 and accompanying text.

Some investors have taken comfort by the limited risk of loss imposed on mortgage originators through representations and warranties.⁶⁴ Representations and warranties, however, are not always effective, being costly to enforce and becoming illusory for mortgage originators that are unable, as in the current subprime mortgage meltdown, to pay damages for breach.⁶⁵ Prudent investors should insist that mortgage originators retain some direct risk of loss to mitigate moral hazard.⁶⁶ For this same reason, for example, banks buying loan participations insist that the bank originating the loan retain a minimum portion, typically at least ten per cent of the loan exposure, even if the loan itself is overcollateralized.⁶⁷

Another possible solution is to regulate the loan underwriting standards applicable to mortgage lenders. This approach would be akin to the Federal margin regulations G, U, T, and X imposed in response to the 1929 stock market crash.⁶⁸ The then-falling stock values caused margin loans—that is, loans to purchase publicly-listed, or margin, stock—to become undercollateralized, in turn causing bank lenders to fail. To protect against a repeat of this problem, the margin regulations require margin lenders to maintain two-to-one overcollateralization when securing their loans by margin stock that has been

⁶⁴ Sanders, *supra* note 19.

⁶⁵ *Cf.* Sanders, *supra* note 19 (arguing that mortgage originators be required to post capital, to backstop their representations and warranties, for loans originated and then sold). Representations and warranties are even more patently illusory for mortgage originators lacking assets, which simply advance to borrowers the proceeds of selling the loans. *See supra* note 56.

⁶⁶ The market actually was beginning to adjust in this fashion shortly before the subprime mortgage crisis started. Jon D. Van Gorp, “Capital Markets Dispersion of Subprime Mortgage Risk” 10 (unpublished Nov. 2007 manuscript, on file with author) (observing that, at the beginning of 2007, “early payment default protection became standardized across the market,” requiring loan originators to repurchase loans that fail to make any of their first two or three scheduled payments).

⁶⁷ This is observed from the author’s experience. *Cf.* Blinder, *supra* note 33 (suggesting that mortgage loan originators “retain a share of each mortgage”). *Also cf. supra* note 28 and accompanying text (discussing underwriters retaining a portion of the equity when selling ABS CDO securities).

⁶⁸ *Cf.* Blinder, *supra* note 33 (suggesting a “suitability standard” for selling mortgage products and that all mortgage lenders be placed under federal regulation).

purchased, directly or indirectly, with the loan proceeds.⁶⁹ Imposing a minimum real-estate-value-to-loan overcollateralization on all mortgage loans secured by the real estate financed would likewise protect against a repeat of the subprime mortgage problem. Unfortunately, though, it would have a high price, potentially impeding and increasing the cost of home ownership and imposing an administrative burden on lenders and government monitors.⁷⁰

Hypothesis: Structured finance dispersed subprime mortgage risk so widely that there was no clear incentive for any given investor to monitor it.

Structured finance generally diversifies and reallocates risk, which is normally salutary.⁷¹ Might it have excessively dispersed subprime risk?⁷²

⁶⁹ 12 C.F.R. § 221.

⁷⁰ One might also consider imposing lending “suitability” standards and predatory-lending restrictions. For example, North Carolina’s Home Loan Protection Act, among other things, mandates that lenders verify borrower income and also review the borrower’s ability to repay the loan after introductory rates adjust upwards. N.C. Gen. Stat. § 24-1.1E (amended by 2007 N.C. Sess. Laws 352). The U.S. Congress also has been considering mortgage suitability standards and anti-predatory lending restrictions. See, e.g., proposed H.R. 3915, Mortgage Reform and Anti-Predatory Lending Act of 2007. There is dispute, however, whether the North Carolina law has negatively impacted home ownership. Compare Nanette Byrnes, *These Tough Lending Laws Could Travel*, BUS. WK., Nov. 5, 2007, at 70 (reporting that North Carolina’s housing market has not, according to “academic studies,” been negatively impacted) (see http://www.planning.unc.edu/pdf/CC_NC_Anti_Predatory_Law_Impact.pdf) with Byrnes, *supra* (reporting that groups such as the Mortgage Bankers Association argue that tough loan underwriting standards will prevent needy borrowers from obtaining mortgage loans); G. Marcus Cole, _____, __ Utah L. Rev. __ (forthcoming 2008). See also Raphael W. Bostic, Kathleen C. Engel, Patricia A. McCoy, Anthony Pennington-Cross & Susan M. Wachter, *State and Local Anti-Predatory Lending Laws: The Effect of Legal Enforcement Mechanisms*, 60 J. ECON. & BUS. 47 (2008) (lending evidence to the argument that anti-predatory lending laws have not curtailed credit mortgage markets). Some argue also that the “borrowers are not victims of inappropriate loan prospecting (such as predatory lending). Rather, they [or, at least, many] were willful participants.” Sanders, *supra* note 19. But cf. Gretchen Morgenson, *Blame the Borrowers? Not So Fast*, N.Y. TIMES, Nov. 25, 2007, at BU 1.

⁷¹ Douglas Elmendorf, *Notes on Policy Responses to the Subprime Mortgage Unraveling*, The Brookings Institutions, footnote 6, available at http://www.brookings.edu/~media/Files/rc/papers/2007/09subprimemortgageunravelling/09useconomics_elmendorf.pdf (visited Dec. 27, 2007).

If this hypothesis is true, it would call into question whether incentives should be better aligned to promote monitoring, for example by limiting the degree of risk dispersion. To some extent this article already proposes a variant on that approach, by suggesting that loan originators in an originate-and-distribute model retain some minimum percentage or amount of risk.⁷³

Hypothesis: Structured finance can make it difficult to work out problems with an underlying asset class—in this case, for example, making it difficult to work out the underlying mortgage loans because the beneficial owners of the loans are no longer the mortgage lenders but a broad universe of financial-market investors. As a result, mortgage defaults result in unnecessarily high losses.

News stories observe that homeowners have been unable to restructure, or “modify,” their loans because they cannot identify who owns the loans.⁷⁴ Laws protecting mortgage borrowers, however, suggest this concern may be overstated. For example, “[u]pon written request by the obligor, the servicer shall provide the obligor, to

⁷² The very assumption that structured finance reallocates risk to parties best able to bear it also may have failed in the subprime context. *See, e.g.*, e-mail from Bookstaber, *supra* note 24 (indicating that “[r]ather than spreading the risk to those who were most comfortable holding the assets and taking the risk, many of the [holders] were ‘hot money’ hedge funds that would have to run for cover at the very time the risk taking function was most critical”).

⁷³ *See supra* note 67 and accompanying text (proposing this to mitigate moral hazard).

⁷⁴ Gretchen Morgenson, *More Home Foreclosures Loom as Owners Face Mortgage Maze*, N.Y. TIMES, Aug. 6, 2007, at A1. A somewhat related issue is that, at least heretofore, individual borrowers cannot use Chapter 13 bankruptcy to restructure their home mortgage loan liabilities. *See* 11 U.S.C. § 1322(b)(2) & (b)(5). Bills have been introduced into both houses of Congress to amend Chapter 13 and allow for restructuring of home mortgages by bankruptcy courts. *See* Emergency Home Ownership and Mortgage Protection Act of 2007 (H.R. 3609) and Helping Families Save their Homes in Bankruptcy Act of 2007 (S. 1236). In a corporate reorganization context, however, debtors can, with the lender’s consent, use bankruptcy to restructure their secured-loan liabilities. *Compare* 11 U.S.C. § 1123(a)(5) with 11 U.S.C. §§ 1126 (c) & 1129(a)(7) & (a)(8).

the best knowledge of the servicer, with the name, address, and telephone number of the owner of the obligation or the master servicer of the obligation.”⁷⁵

In theory, servicers bridge the gap between beneficial owners of the loans and the mortgage lenders. It is typical, for example, for originators of securitized mortgage loans, or a specialized servicing company such as Countrywide Home Loans Servicing LP, to act as the servicer for a fee.⁷⁶ In this capacity, the servicer ordinarily retains power to restructure the underlying loans, so long as restructuring changes are “in the best interests” of the investors holding the securities.⁷⁷ Subject to that constraint, the servicer may even change the rate of interest, the principal amount of the loan, or the maturity dates of the loan if, for example, the loan is in default or, in the servicer’s judgment, default is reasonably foreseeable.⁷⁸

In practice, though, even when a servicer has the power to restructure a mortgage loan and restructuring is in the best interests of investors, the servicer may be reluctant to engage in restructuring if there is uncertainty that the transaction will generate sufficient

⁷⁵ 15 U.S.C. § 1641(f)(2). Identification would be even less of a problem if the underlying receivables are not consumer assets, like mortgage loans, since the amounts involved in consumer receivables are typically relatively small.

⁷⁶ JAMES A. ROSENTHAL & JUAN M. OCAMPO, *SECURITIZATION OF CREDIT: INSIDE THE NEW TECHNOLOGY OF FINANCE* 49-51 (1988) (explaining the general structure of a grantor trust when the originator of asset-backed securities services the pool of assets); Gretchen Morgenson, *Countrywide Is Upbeat Despite Loss*, N.Y. TIMES, Oct. 27, 2007, at C1 (reporting that Countrywide is the nation’s largest loan servicer). In addition to a primary servicer, there are often other servicers involved in MBS transactions including a specialized servicer who services defaulted mortgage loans. *See* Mortgage Bankers Association, Presentation to the Securities and Exchange Commission on the Proposed Asset-Backed Securities Rule, Sept. 23, 2004, available at www.sec.gov/rules/proposed/s72104/mba092304.ppt (last visited March 5, 2008).

⁷⁷ Morgenson, *supra* note 74. Sometimes, however, the servicer is limited as to the percentage of loans in a given pool that can be restructured. Morgenson, *supra* note 74 (observing that a servicer might, for example, be permitted to restructure only 5% of the loans).

⁷⁸ This example is taken from § 3.01, at 88, of the Pooling and Servicing Agreement dated as of March 1, 2007, among Financial Asset Securities Corp., as Depositor, Countrywide Homes Loans Servicing LP, as Servicer, and Deutsche Bank National Trust

excess cash flow to reimburse the servicer's costs.⁷⁹ A mortgage loan servicer, for example, "[m]ust 'spend \$750-\$1000 to do a [loan] mod[ification] [and] can't charge the borrower . . . or [if there is insufficient excess cash] the securitization trust. . . . [B]y contrast, all foreclosure costs are reimbursed.'"⁸⁰ Servicers also may sometimes prefer foreclosure over restructuring because the former is more ministerial and thus has lower litigation risk.⁸¹ The litigation risk is exacerbated by the fact that, in many MBS, CDO, and ABS CDO transactions, cash flows deriving from principal and interest are separately allocated to different investor tranches.⁸² Therefore, a restructuring that, for example, reduces the interest rate would adversely affect investors in the interest-only tranche,⁸³ leading to what some have called "tranche warfare."⁸⁴

Summary. The discussion above indicates there is little structurally wrong about how structured finance worked in the mortgage context. Although the originate-and-distribute model of structured finance may have created a degree of moral hazard, the model is critical to underlying funding liquidity. Moreover, the moral hazard cost can be mitigated if, as likely will occur in the future, investors learn from the subprime crisis and

Company, as Trustee, relating to Soundview Home Loan Trust Asset-Backed Certificates, Series 2007-WMC1.

⁷⁹ Presentation by Joseph R. Mason, Associate Professor of Finance & LeBow Research Fellow, LeBow College of Business, Drexel University, to the Federal Reserve Bank of Cleveland at its workshop on "Structured Finance and Loan Modification," Nov. 20, 2007 (notes on Mason's presentation on file with author) (observing that servicers will prefer to foreclose, even if it is not the best remedy, when foreclosure costs but not modification costs are reimbursed).

⁸⁰ Mason, *supra* note 59.

⁸¹ Presentation by Kathleen C. Engel, Associate Professor of Law, Cleveland-Marshall College of Law, to the Federal Reserve Bank of Cleveland, Nov. 20, 2007 (notes on this presentation on file with author).

⁸² Van Gorp, *supra* note 66, at 7-8.

⁸³ The conflicts among tranches can become even more complicated because subprime MBS, CDO, and ABS CDO securities sometimes also include prepayment-penalty tranches, and the different tranches "have different priorities relative to one another for the purpose of absorbing losses and prepayments on the underlying subprime mortgage loans." *Id.* at 8.

⁸⁴ Telephone Interview with Alan Hirsch, Director, North Carolina Policy Office (Feb. 20, 2008) (describing tranche conflicts as a significant reason why servicers choose foreclosure over restructuring).

require mortgage originators to retain a direct risk of loss that goes beyond the sometimes illusory risk borne through representations and warranties.

Structured finance can make it more difficult to work out problems with the underlying financial assets, in this case mortgage loans, but the increased difficulty may be able to be managed. Parties should consider, for example, writing underlying deal documentation that sets clearer and more flexible guidelines, and ideally more certain reimbursement procedures, for loan restructuring—especially when such restructuring is superior to foreclosure.⁸⁵ Investors (and servicers) should prefer foreclosure to restructuring if restructuring merely delays an inevitable foreclosure.⁸⁶

There nonetheless might be a residual structural concern insofar as structured finance may have dispersed subprime mortgage risk so widely that there is no clear incentive for any given investor to monitor the risk. Whether that has occurred is uncertain. Even if it has, the evil is not so much risk dispersion per se as the failure to align incentives sufficiently to promote monitoring.

C. Why did a problem with the subprime mortgage-backed securities markets quickly infect the markets for prime mortgage-backed securities and other asset-backed securities?⁸⁷

⁸⁵ In the current subprime crisis, of course, the underlying deal documentation is already in place. Because existing documentation cannot be easily renegotiated, the government might consider legislating changes. Any such changes that are subsidized in whole or part by government, however, could foster moral hazard, potentially making future homeowners more willing to take risks when borrowing.

⁸⁶ Engel, *supra* note 81.

⁸⁷ *Cf.* Andrews, *supra* note 28, at 15 (observing from the subprime financial crisis that “liquidity in markets for structured investments can disappear immediately as soon as there are any shocks—no buying or selling at all in an entire sector”—although not explaining why this occurred). A somewhat related question might be why the U.S. domestic real estate collapse is having a significant impact overseas. The answer is that a significant amount of the CDO and ABS CDO securities backed (directly or indirectly) by such real estate was purchased by foreign investors. Jenny Anderson & Heather Timmons, *Why a U.S. Subprime Mortgage Crisis is Felt Around the World*, N.Y. TIMES, Aug. 31, 2007, at C1.

Understanding this anomaly can help to expand an understanding of how market risk can become systemic. For this anomaly, this article examines the following hypotheses:

Hypothesis: The MBS, ABS, CDO, and ABS CDO markets are inherently tightly coupled, both within and among such markets.

By “tight coupling,” I mean, with thanks to Rick Bookstaber, the tendency for financial markets to move rapidly into a crisis mode with little time or opportunity to intervene.⁸⁸ Tight coupling could result from various mechanisms, even as elementary as investor panic, guilt-by-association, or loss of confidence.⁸⁹ In the subprime crisis, once investors realized that highly-rated subprime mortgage-backed securities could lose money, they began shunning all complex securitization products.⁹⁰ This explanation appears to have had particular force for asset-backed commercial paper—not surprisingly, since commercial paper is effectively a substitute for cash (albeit one that yields a return). Investor reaction also may have been magnified by the dramatic shift away from the liquidity glut of the past few years, which had obscured the problem of defaults by enabling defaulting borrowers to refinance with ease.⁹¹

Tight coupling also may have been caused by adverse selection: investors were no longer sure which securitization investments or counterparties were good and which were

⁸⁸ *Systemic Risk: Examining Regulators’ Ability to Respond to Threats to the Financial System: Hearing Before the H. Committee on Financial Services*, 110th Cong. (Oct. 2, 2007), available at http://www.house.gov/apps/list/hearing/financialsvcs_dem/ht1002072.shtml (statement of Richard Bookstaber). Bookstaber himself borrows this term from engineering nomenclature.

⁸⁹ See, e.g., *A Flight to Simplicity*, FT.com, Oct. 21, 2007.

⁹⁰ Cf. Markus Brunnermeier, “2007 Liquidity Crisis” (on file with author) (speculating that when investors realized how difficult it was to value mortgage structured products, the volatility of all structured products increased).

⁹¹ Cf. *supra* note 58 and accompanying text.

bad (CDO and ABS CDO products being especially difficult to value⁹²), so they stopped investing in all securitization products.⁹³ Incongruously, adverse selection may have been made worse by the otherwise salutary effect of securitization to disperse risk: investors were unable, in part exacerbated by the indirect holding system for securities under which third parties cannot readily determine who ultimately owns specific securities,⁹⁴ to ascertain to whom the risk was dispersed.

Hypothesis: The MBS, ABS, CDO, and ABS CDO markets are not inherently tightly coupled, but tight coupling resulted from convergence in hedge-fund quantitatively-constructed investment strategies.⁹⁵

Professors Khandani and Lo hypothesize, for example, that when a number of hedge funds experienced unprecedented losses during the week of August 6, 2007, they rapidly unwound sizable portfolios, likely based on a multi-strategy fund or proprietary-

⁹² Many CDO and ABS CDO products are valued by models rather than market price because they are issued in private placements and not freely traded. Valuation models are imperfect because they are based on assumptions. Floyd Norris, *Reading Write-Down Tea Leaves*, N.Y. TIMES, Nov. 9, 2007, at C1 (discussing the problems related to using valuation models). See generally Ingo Fender & John Kiff, *CDO rating methodology: Some thoughts on model risk and its implications*, Bank of International Settlements, Working Paper 163, Nov. 2004, available at <http://www.bis.org/publ/work163.htm> (last visited March 6, 2007) (discussing the problems associated with the valuation models used by rating agencies).

⁹³ See, e.g., Zuckerman, *supra* note 8 (arguing that “the credit system has been virtually frozen” because “few people even know where the liabilities and losses are concentrated”).

⁹⁴ Under the indirect holding system for securities, intermediary entities hold securities on behalf of investors. Issuers of the securities generally record ownership as belonging to one or depository intermediaries, which in turn record the identities of other intermediaries, such as brokerage firms or banks, that buy interests in the securities. Those other intermediaries, in turn, record the identities of investors that buy interests in the intermediaries’ interests. See Steven L. Schwarcz, *Intermediary Risk in a Global Economy*, 50 DUKE L.J. 1541, 1547-48 (2001). Because of this ownership chain, there is no single location from which third parties can readily determine who ultimately owns specific securities. *Id.* at 1583.

⁹⁵ Cf. Schwarcz, *supra* note 55, at 13 n. 50 & 14 (discussing the danger of converging hedge-fund investment strategies).

trading desk.⁹⁶ These initial losses then caused further losses by triggering stop/loss and de-leveraging policies.⁹⁷ To this extent, hedge fund strategies, and not securitization or structured finance per se, are responsible for the subprime financial crisis.

To what extent does this hypothesis turn, however, on CDO and ABS CDO securities being mark-to-model, not mark-to-market (because such securities are not actively traded, there is no established market price to which to mark them)? If shared models are wrong, an unanticipated error is shared by everyone.

Summary. The discussion above provides three explanations for why a problem with the subprime mortgage-backed securities markets quickly infected the prime markets.⁹⁸ Faced for the first time with the reality that highly-rated tranches of sub-prime MBS could lose money, investors appear to have lost confidence, shunning all complex securitization products. To this extent, future investors should try to better understand these types of investments so that confidence is built on a firmer foundation.

Adverse selection also helps to explain the rapid infection. Investors became uncertain which securitization products, and indeed which securitization counterparties,

⁹⁶ Amir Khandani & Andrew W. Lo, “What Happened to the Quants in August 2007” (Sept. 20, 2007) (SSRN working paper no. 1015987).

⁹⁷ *Id.*

⁹⁸ There also might have been amplifying mechanisms that exacerbated or expanded market losses. For example, highly leveraged hedge funds apparently borrowed money from banks and invested in significant amounts of MBS, CDO, and ABS CDO securities backed by subprime mortgages. Paul J. Davies & Gillian Tetti, “*A flight to simplicity*”—*Investors jettison what they do not understand*, FIN. TIMES (London), Oct. 22, 2007, at 11 (reporting that hedge funds borrowed large amounts of money to invest in CDO securities). Failure of these hedge funds resulting from losses on these securities can affect the bank lenders. Another possible amplifying mechanism is that certain bank-sponsored investment conduits purchased AAA-rated CDO and ABS CDO securities with the proceeds of short-term commercial paper. As the CDO and ABS CDO securities were marked down in value and investors failed to roll over their commercial paper, the bank sponsors faced the prospect of having to make payments to the conduits pursuant to liquidity and credit-enhancement facilities. Carrick Mollenkamp & Margot Patrick, *Credit Crunch: Citigroup Moves to Quell SIV Concerns*, WALL ST. J., Sep. 7, 2007 at C2

were good and which were bad. They therefore stopped investing in all securitization products. Adverse selection can be mitigated through information, in this case, for example, by valuing the securities and ascertaining the holdings of securitization counterparties. Because there was no market for CDO and ABS CDO securities, however, these securities could not be valued at “market.” Valuation therefore was priced off quantitative models. Marking-to-model, however, creates intrinsic valuation uncertainties, and indeed the valuations priced off those models proved hopelessly unreliable. The indirect holding system for securities also made it very difficult to ascertain whether CDO and ABS CDO securities were held by securitization counterparties, and as long as that system continues to dominate securities holdings this difficulty will remain.

The third explanation is also related to valuation. Absent a real market, valuation of CDO and ABS CDO securities must, as indicated, be priced off quantitative models. It is critical, then, that the range of models used by investors be sufficiently diverse that errors in one model will not cut across all models.

D. Why was the market-discipline approach, along with other existing protections, insufficient?

Under a market-discipline approach, the regulator’s job is to ensure that the private sector exercises the type of diligence that enables markets to work efficiently.⁹⁹

For this failure, this article examines the following hypotheses:

(reporting that Citibank was unable to raise money through the sale of asset-backed commercial paper). *See also infra* note 122 and accompanying text.

⁹⁹ *Cf.* Ben S. Bernanke, Chairman, Board of Governors, U.S. Federal Reserve System, Remarks at the Federal Reserve Bank of Atlanta’s 2006 Financial Markets Conference, Sea Island, Georgia (May 16, 2006) (transcript available at <http://www.federalreserve.gov/Boarddocs/speeches/2006/200605162/default.htm>), at 6 (observing that, to the extent hedge funds are regulated solely through market discipline, government’s “primary task is to guard against a return of the weak market discipline that left major market participants overly vulnerable to market shocks”).

Hypothesis: For reasons already discussed in this article, certain foundations of a market-discipline approach have rotted.

Regulators implement a market-discipline approach by ensuring that market participants have access to adequate information about risks and by arranging incentives so that those who influence an institution's behavior will suffer if that behavior generates losses.¹⁰⁰ In the recent financial crisis, however, disclosure inadequately conveyed information about the risks for various reasons,¹⁰¹ including possibly that certain of the structured finance transactions were too complex to be adequately disclosed.¹⁰² Furthermore, the incentives of managers did not appear to be fully aligned with those of their institutions, so managers would not necessarily suffer—and, more importantly, they would not expect to suffer—if their behavior generated losses to their institutions.¹⁰³ Additionally, in the context of systemic risk, there are fundamental misalignments between institutional and financial market interests.¹⁰⁴ Market discipline alone is therefore an insufficient approach.

Hypothesis: A market-discipline approach failed for other reasons.

¹⁰⁰ See *id.* Cf. Ben S. Bernanke, Chairman, Board of Governors, U.S. Federal Reserve System, Remarks at the New York University Law School, New York, New York (Apr. 11, 2007) (transcript available at <http://www.federalreserve.gov/boardDocs/speeches/2007/20070411/default.htm>) (observing that “[r]eceivership rules that make clear that investors will take losses when a bank becomes insolvent should increase the perceived risk of loss and thus also increase market discipline” and that, in “the United States, the banking authorities have ensured that, in virtually all cases, shareholders bear losses when a bank fails”).

¹⁰¹ See generally Part III.A, *supra*.

¹⁰² See *supra* notes 40-42 and accompanying text.

¹⁰³ See *supra* notes 45-50 and accompanying text (observing potential agency-cost conflicts between investment bankers who structured, sold, or invested in securities and the institutions for which they worked).

¹⁰⁴ See *supra* notes 71-73 and accompanying text (arguing that structured finance may have dispersed subprime mortgage risk so widely that there was no clear incentive for any given investor to monitor it). See also *infra* note 108 and accompanying text (observing that from the standpoint of systemic risk, a market-discipline approach is inherently suspect because no firm has sufficient incentive to limit its risk taking in order to reduce the danger of systemic contagion for other firms).

One such reason might be the simple human greed of market participants.¹⁰⁵ Until recently, it appeared that a market-discipline approach worked well for the banking and securities-brokerage industries, which in large part have been subject to this regulatory approach.¹⁰⁶ Did something change to increase the potential for greed? Query also whether “greed” is the appropriate term, or whether this hypothesis turns on the desire by market participants to increase risk-adjusted performance, which itself may be motivated by (among other things) greed.

Another such reason is that, absent prescriptive rules, market discipline is undermined by the availability heuristic¹⁰⁷ as well as the almost endemic shortage of funding for regulatory monitoring.

Hypothesis: At least regarding systemic risk, market discipline is inherently suspect because no firm has sufficient incentive to limit its risk taking in order to reduce the danger of systemic contagion for other firms.

Recall that the externalities of systemic failure include social costs that can extend far beyond market participants, resulting in a type of tragedy of the commons.¹⁰⁸ Thus, a firm that exercises market discipline by reducing its leverage will marginally reduce the

¹⁰⁵ Cf. Roberta Romano, *A Thumbnail Sketch of Derivative Securities and Their Regulation*, 55 MD. L. REV. 1, 79 (1998) (discussing greed as a central factor that, in the hedge-fund context, transforms a successful hedging or moderately risky investment strategy into one of high-risk speculation). Bernanke suggests, however, a possible alternative psychological explanation, at least in the case of the failure of market-discipline in the case of LTCM’s investors: that those “[i]nvestors, perhaps awed by the reputations of LTCM’s principals, did not ask sufficiently tough questions about the risks that were being taken to generate the high returns.” Bernanke, *supra* note 99, at 1. Compare the “over-reliance” hypothesis, *supra* note 28 and accompanying text.

¹⁰⁶ See, e.g., Albert J. Boro, Jr., Comment, *Banking Disclosure Regimes for Regulating Speculative Behavior*, 74 CAL. L. REV. 431, 471 (1986); Helen A. Garten, *Banking on the Market: Relying on Depositors to Control Bank Risks*, 4 YALE J. ON REG. 129, 129–30, 129 n.1 (1986).

¹⁰⁷ See *supra* notes 37–38 and accompanying text.

¹⁰⁸ See *supra* notes 52–54 and accompanying text.

overall potential for systemic risk; but if other firms do not also reduce their leverage, the first firm will likely lose net asset value relative to the other firms.¹⁰⁹

Summary. The discussion above shows that a market-discipline approach must be supplemented and that market discipline is particularly suspect as a protection against systemic risk.

E. Why did the rating agencies fail to anticipate the downgrades?

This failure is particularly problematic to the extent of investor over-reliance on rating-agency ratings.¹¹⁰ For this failure, this article examines the following hypotheses:

Hypothesis: Rating agencies failed because of conflicts of interest in the way they are paid.

Rating agencies are customarily paid by the issuer of securities, but investors rely heavily on their ratings.¹¹¹ This is technically a conflict, but it is not usually a material conflict. Ratings, for example, are made independently of the fee received.¹¹² Furthermore, the reputational cost of a bad rating usually far exceeds the income received by giving the rating.¹¹³

In the subprime crisis, though, the conflict would have been more material than normal because ratings were given to innumerable issuances of CDO and ABS CDO securities, each issuance (and rating) earning a separate fee. Assuming arguendo this created a material conflict, there is no easy solution. The question of who pays for a rating is difficult. Historically, rating agencies made their money by selling subscriptions, but that may not generate sufficient revenue to allow rating agencies to hire the top-flight

¹⁰⁹ E-mail from Bookstaber, *supra* note 24.

¹¹⁰ *See supra* notes 30-32 and accompanying text.

¹¹¹ Steven L. Schwarcz, *Private Ordering of Public Markets: The Rating Agency Paradox*, 2002 U. ILLINOIS L. REV. 1, 3, 15.

¹¹² *Id.* at 16.

¹¹³ *Id.* at 14.

analysts needed to rate complex deals.¹¹⁴ And even if there were an easy way to get investors to pay for ratings, that might create the opposite incentive: to err on the side of low ratings in order to increase the rate of return to investors—thereby increasing the cost of credit to companies.¹¹⁵

Hypothesis: Rating agencies failed to foresee that the depth of the fall of the housing market could, and indeed did, exceed their worst-case modeled scenarios?

This hypothesis provides an obvious explanation, but it begs the question of whether the rating agency models were reasonable, at least when viewed ex ante. That question is, effectively, identical to the earlier question of whether the failure by investors to envision the actual worst-case scenario may have reflected, to some extent, a failure to take a sufficiently long view of risk.¹¹⁶ The earlier analysis proposed two possible answers: that the failure simply reflected a failed judgment call, made ex ante, of what the worst-case could be like; and that the failure also may have reflected behavioral bias caused by the availability heuristic.

It is unlikely that the failure of rating-agency models reflected significant behavioral bias, since these models are constructed by multiple trained and experienced analysts.¹¹⁷ To the extent the failure reflected a failed ex ante judgment call, this type of

¹¹⁴ Cf. *id.* at 16 n. 94. For other possible ideas of how to avoid conflicts of interest in paying rating agencies, see Alan S. Blinder, *Economic View: The Case for a Newer Deal*, N.Y. TIMES, May 4, 2008, at BU 5 (noting ideas of his Princeton University colleagues, such as paying rating agencies with some of the securities they rate, or having a governmental entity pay rating agencies from the proceeds of a tax levied on issuers). Professor Blinder admits the difficulty of avoiding conflicts of interest, requesting that “If you have a better idea, write your legislators.” *Id.*

¹¹⁵ To the extent ratings affect not only new investors but also existing investors, this analysis is complicated by the inherent conflict between those two sets of investors. Cf. Steven L. Schwarcz, *Temporal Perspectives: Resolving the Conflict Between Current and Future Investors*, 89 MINN. L. REV. 1044 (2005).

¹¹⁶ See *supra* notes 22-27 and accompanying text.

¹¹⁷ In order to qualify as a Nationally Recognized Statistical Rating Organization (NRSRO), the rating agency must employ “an adequate number of staff members with the education and experience necessary to competently evaluate an issuer’s credit.”

failure may be inevitable—even for rating agencies—because the exercise of judgment involves an inherent risk of error. The hope is that rating agencies, through their institutional memory, will learn from experience and exercise better judgment in the future.

At least one commentator argues that the rating agency failure likely reflected an under-appreciation of how an oversupply of mortgage money was artificially driving up home prices in subprime areas.¹¹⁸ This would be rather surprising, if true, given rating agency sophistication. It also is possible that the rating-agency models may have failed because of fraud in the borrower-income data.¹¹⁹ To this extent, rating agencies may be stymied because they have little alternative in most cases but to accept as true the data they receive.¹²⁰

Hypothesis: Rating agencies failed to fully appreciate the correlation in subprime mortgage loans when analyzing CDOs, especially ABS CDOs.

Early CDOs and ABS CDOs had highly diversified underlying assets.¹²¹ Later CDOs and ABS CDOs were still diversified but were more susceptible to a finance-based link in which prices of the underlying assets start to move in lockstep as investors hedge

Arturo Estrella et al., *Credit Ratings and Complementary Sources of Credit Quality Information*, Bank of International Settlements, Bank Committee on Banking Supervision Working Paper No. 3, Aug. 2000, 51, available at http://www.bis.org/publ/bcbs_wp3.htm (last viewed March 18, 2008). *But cf.* Gerry McNamara & Paul Vaaler, “A Management Research Perspective on How and Why Credit Assessors ‘Get it Wrong’ When Judging Borrowers” (undated draft, on file with author, suggesting that rating-agency models may have failed in part because of systematic biases resulting from behavioral factors).

¹¹⁸ See Sufi, *supra* note 25.

¹¹⁹ See *supra* note 57.

¹²⁰ Schwarcz, *supra* note 111, at 6 (observing that rating agencies do not, and cannot pragmatically, rate for fraud).

¹²¹ One explanation for the erosion of diversification is the growth of synthetics. See Jody Shenn, *Overlapping Subprime Exposure Mask Risks of CDOs, Moody’s Says*, BLOOMBERG.COM, Apr. 4, 2007, available at <http://www.bloomberg.com/apps/news?pid=20601170&sid=aszosOrxVmjk&refer=home> (last visited March 19, 2008) (reporting that the growth of synthetics in the CDO market has created situations where assets and the synthetic products derived from those assets are in the same CDO causing the CDO to be exposed to the same risk twice).

their exposure to those assets.¹²² Furthermore, even though later ABS CDOs had significant diversification in the ABS and MBS securities included therein, there was an underlying correlation in the subprime mortgage loans backing the different MBS securities. Rating agencies, however, continued to use historical cash-flow models which did not anticipate the degree of price convergence or correlation of subprime loans.¹²³

Summary. Rating agencies obviously failed to anticipate the worst-case scenario represented by the subprime meltdown. Although this failure might have resulted in part from conflicts of interest in the way rating agencies are paid, that is unlikely since payment is independent of the rating and the reputational cost of issuing bad ratings usually far exceeds the payment received. In any event, there is no easy solution to the dilemma of how rating agencies can be paid without creating conflicts with either issuers or investors.

A more likely explanation for the failure is that ratings are judgment calls by human beings, and mistakes inevitably will be made.¹²⁴ One might argue that rating agencies should be more conservative, or that government should mandate more conservative ratings, but overprotection itself has a cost. If rating agencies had used more conservative models, requiring greater overcollateralization, those models would have been decried as wasteful if housing prices has not collapsed.

¹²² E-mail from Bookstaber, *supra* note 24 (discussing this link).

¹²³ Statement of Mark Adelson, Member, Adelson & Jacob Consulting, LLC, *The Role of the Credit Rating Agencies in the Structured Finance Market*, in *Hearing Before the Subcommittee on Capital Markets, Insurance and Government Sponsored Enterprises, H. Committee on Financial Services*, 110th Cong. (Sept. 27, 2007). Another possible hypothesis is that there has been rating-agency “grade inflation.” For arguments that such grade inflation occurred, *see* Charles W. Calomiris, “Not (Yet) a ‘Minsky Moment,’” at 18 (Oct. 2, 2007 draft, on file with author) (arguing that “[g]rade inflation has been concentrated particularly in securitized products, where the demand is especially driven by regulated intermediaries”). However even if there was grade inflation, the consequences are unclear since investors were probably not misled but simply did not care so long as the securities purchased were in fact rated investment grade.

¹²⁴ *Cf.* Standard & Poor’s, *New Actions to Strengthen Ratings* (Feb. 7, 2008) (on file with author) (proposing various procedural review steps to minimize human failure in the ratings process).

Whatever the reasons are for the failure by rating agencies to anticipate the downgrades, it should be noted that rating agencies may not be perfect but the *idea* of rating agencies is important. Individual investors face relatively high costs to assess the creditworthiness of complex securities. Rating agencies can make this assessment on behalf of many individual investors, thereby achieving an economy of scale.¹²⁵

IV. CONCLUSIONS

This article has suggested various insights into protecting financial markets. Additional insight comes by recognizing that most of the causes of the discussed anomalies and failures can be divided into three categories: (i) conflicts; (ii) complacency; (iii) complexity.¹²⁶

The first category, conflicts, is the most tractable. Once identified, conflicts can often be managed. For example, this article has shown that the excesses of the originate-and-distribute model can be managed by aligning the interests of mortgage lenders and investors by requiring the former to retain a risk of loss. Some conflicts, though, may be harder to manage in practice, such as conflicts in how rating agencies are paid.

The second category, complacency, is less tractable because solutions to complacent behavior can require changing human nature, an obviously impossible task. After a crisis, everyone focuses on avoiding that crisis in the future (though hopefully also avoiding the all-too-human tendency to fall into the rut of fighting the “last war”¹²⁷). But bounded rationality makes the crisis fade with alacrity from perceived reality.¹²⁸

¹²⁵ *See supra* note 32.

¹²⁶ I am grateful to Professor Jonathan Lipson for suggesting these categories.

¹²⁷ *Systemic Risk: Examining Regulators’ Ability to Respond to Threats to the Financial System: Hearing Before the H. Committee on Financial Services*, 110th Cong. (Oct. 2, 2007), available at

The subprime mortgage crisis appears to have discredited, though, at least one form of complacency: widespread investor obsession with securities that have no established market and, instead, are valued by being marked-to-model.

Other forms of complacency are rational and can only be addressed through structural changes. For example, investors will almost certainly continue to over-rely on rating-agency ratings, so long as the cost of making independent credit investigations remains high. If rating agencies continue to provide unreliable ratings, perhaps investors should consider whether innovative collective-action approaches, such as collective credit determinations, might prove more reliable.¹²⁹

The third category, complexity, is least tractable.¹³⁰ Complexity can deprive investors and other market participants of the information needed for markets to operate effectively. It was, for example, a central culprit responsible for the failure of disclosure in the subprime crisis. Even beyond disclosure, complexity is increasingly a metaphor for the modern financial system and its potential for failure, illustrated further by the tight coupling that causes markets to move rapidly into a crisis mode; the potential convergence in quantitatively-constructed investment strategies; the layers inserted between obligors on loans and other financial assets and the assets' beneficial owners, which make it difficult to work out underlying defaults¹³¹; and the problem of adverse selection, in which investors, uncertain which investments or counterparties are sound, begin to shun all investments. Solving problems of financial complexity may well be the ultimate 21st century market goal.

http://www.house.gov/apps/list/hearing/financialsvcs_dem/ht1002072.shtml (statement of the author, at p. 68 of transcript).

¹²⁸ Cf. *supra* note 39 and accompanying text (observing that investors quickly forget past finance crisis and “go for the gold”).

¹²⁹ Collective approaches, though, might face potential antitrust hurdles.

¹³⁰ Cf. Michael Mandel, *The Economy's Safety Valve*, BUS. WK., Oct. 22, 2007, at 36 (observing that “in today’s complex and globally integrated financial markets, it’s almost impossible for regulators to plug every hole”).

These categories are broad, but they do not capture everything. One might propose, for example, a fourth category: cupidity. Greed, however, is so ingrained in human nature and so intertwined with the other categories that it adds little insight to view it as a separate category.

These categories also do not capture the problem of systemic risk, whose uniqueness arises from a type of tragedy of the commons. Because the benefits of exploiting finite capital resources accrue to individual market participants whereas the costs of exploitation are distributed among an even wider class of persons, market participants have insufficient incentive to internalize their externalities. Government, however, can provide solutions, such as creating a liquidity provider of last resort to purchase securities in collapsing markets (albeit at profitable discounts to minimize moral hazard) in order to mitigate market instability that would lead to systemic collapse.

A final possible inquiry is to ask whether periodic financial market instabilities are harmful or, in the long run, possibly helpful to the economy. For example, perhaps the subprime financial crisis, or something like it, was needed to turn around the incentive-distorting liquidity glut of the past few years?¹³² Financial market instabilities are believed to be acceptable if they are “relatively limited in scope,” even if deep in their narrow impact.¹³³ Indeed, such instabilities “may serve as critical safety valves.”¹³⁴ There are, however, two concerns. On a distributional level, market instabilities impact people, and in the subprime crisis many of those affected have been “low-income” individuals.¹³⁵

¹³¹ See, e.g., Telephone Interview with Hirsch, *supra* note 84 (observing that, because of these layers, the “instruments were so complex that no one followed the trail”).

¹³² Cf. Balakrishnan et al., *supra* note 58 (discussing the liquidity glut).

¹³³ Mandel, *supra* note 130, at 34.

¹³⁴ *Id.* at 34.

¹³⁵ Mandel, *supra* note 130, at 36-37. That many of the affected individuals have been “low-income” individuals does not conflict with this article’s earlier observation (*see* text accompanying note 51, *supra*) that QIBs are the investors who lost the most money in the subprime crisis. Low-income individuals lost money not as investors but as foreclosed homeowners.

On a more fundamental level, there is “no guarantee that the next crisis won’t spread and turn into the Big One, which undermines the whole financial system.”¹³⁶

¹³⁶ Mandel, *supra* note 130, at 37. Cf. Michael D. Bordo, Bruce Mistrach, & Anna Schwartz, NBER Working Paper Series (No. 5371), *Real Versus Pseudo-International Systemic Risk: Some Lessons From History* 9 (1995) (discussing how normal market expansions and contractions can turn into market crises in situations of “speculative mania”). See also Vikas Bajaj & Louise Story, *Mortgage Crisis Spreads Past Subprime Loans*, N.Y. TIMES, Feb. 12, 2008, at 1 (discussing the spread of the subprime crisis to other markets).