

The YPFS Lessons Learned Oral History Project

A Special Project: *Inside the CDO Machine*

Rosalind Z. Wiggins* and Andrew Metrick†

In this issue of the *Journal of Financial Crisis*, we feature *Inside the CDO Machine*—a special undertaking recently completed under the auspices of the Yale Program on Financial Stability Lessons Learned Oral History Project by Steven H. Kasoff, a Yale School of Management Fellow and former equity partner and head of real estate and structured products investments at the Elliott Management Corp., a global hedge fund. For the project, Kasoff undertook a series of interviews with industry professionals to focus on one of the critical derivatives products of the Global Financial Crisis (GFC), collateralized debt obligations (CDOs), and how they became so important to the events of the crisis.

As the *Inside the CDO Machine* project materials evidence, in the decade prior to the crisis, new complex products, including CDOs, were developed that took advantage of the mortgage boom and responded to the great investor demand for high-yield securities. “ABS CDOs became the main investment vehicle for the riskiest investment-grade securities in the private-label mortgage market.”¹

In its final report on the causes of the GFC, the Financial Crisis Inquiry Commission (FCIC) found, among other things, that CDOs “turned out to be some of the most toxic assets during the crisis”² and were key elements in spreading risk throughout the financial system and in accelerating the crisis.³

These CDOs—composed of the riskier tranches—fueled demand for nonprime mortgage securitization and contributed to the housing bubble . . . Many of these risky

* Director, the Global Financial Crisis Project, Senior Editor, Yale Program on Financial Stability (YPFS), Yale School of Management, and Project Manager, the Lessons Learned Oral History Project, YPFS.

† Janet L. Yellen Professor of Finance and Management, and YPFS Founder and Director, Yale School of Management.

¹ See Greg Feldberg, Larry Cordell, and Danielle Sass, “The Role of ABS CDOs in the Financial Crisis,” *Journal of Structured Finance* 25, no. 2 (Summer 2019): 10–27 [URL: <https://papers.ssrn.com/abstract=3443043>].

² Financial Crisis Inquiry Commission (FCIC). Website: Resource Library: CDO Library. <http://fcic.som.yale.edu/resource/staff-data-projects/cdo-Library>.

³ FCIC, *The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States* (Washington, DC: US Government Printing Office, 2011); see “Chapter 8: The CDO Machine” (127–55) and “Conclusions of the Financial Crisis Inquiry Commission” (xv–xxviii).

assets ended up on the balance sheets of systemically important institutions and contributed to their failure or near failure in the financial crisis.⁴

Scholars estimate that during the GFC, “write-downs on ABS CDOs [totaled] \$410 billion . . . with \$325 billion assumed by AAA and ‘super-senior’ securities, which had minimal capital, margin, or liquidity requirements.”⁵ Under then-existing regulations, some firms investing in these securities were permitted to take on excessive leverage, “imperiling their solvency and placing them at the center of the financial crisis.”⁶

As a former peer, Kasoff had unique access to the *Inside the CDO Machine* project participants; could garner their confidence; and understood their language, nuances, and anecdotes. This entrée allowed Kasoff, along with Matt Lieber, one of our Lessons Learned interviewers, to question at length six individuals in key roles in the CDO business as it evolved, exploring developments from inside the industry. In addition, Kasoff contributed his own extensive interview.

Drawing upon his own experiences and these interviews, Kasoff has written a monograph, “Anatomy of a Trade: The Making of a Subprime CDO,” a detailed and insightful parable that illustrates the insiders’ points of view—the motives, structural maneuvering, and evolution of this pivotal market. The form also makes the complicated topic accessible for most readers and highlights the usefulness of the interviews as source material. This main work includes a glossary of key terms and is accompanied by a companion piece, “Wall Street’s Subprime Debacle: Firsthand Accounts from *Inside the CDO Machine*,” which provides details about the project and participants:

Inside the CDO Machine

- *Wall Street’s Subprime Debacle: Firsthand Accounts from Inside the CDO Machine*—by Matthew A. Lieber and Steven H. Kasoff
- *Anatomy of a Trade: The Making of a Subprime CDO* by Steven H. Kasoff
- Lessons Learned Interview Summaries
 - Steven H. Kasoff
 - James Finkel
 - Sohail Khan
 - Stephen King
 - Eric Kolchinsky
 - Chris Ricciardi
 - Brian Stoker

⁴ FCIC 2011, 155.

⁵ Cordell, Feldberg, and Sass 2019, 10.

⁶ Cordell, Feldberg, and Sass 2019, 10.

The full-length *Inside the CDO Machine* project interviews are available on the [Lessons Learned website](#). We urge you to explore them for their rich insights. Also available on the website are dozens of other Lessons Learned interviews.

The Lessons Learned Oral History Project grew out of the Yale Program on Financial Stability (YPFS), which began in 2013 with the mission to preserve, create, and share knowledge about financial crises and how regulators and policymakers prevent, diagnose, and combat these rare and unprecedented events. You may learn more about YPFS from our program [website](#), and you may access our published cases in the [Journal of Financial Crises](#).

Wall Street's Subprime Debacle: Firsthand Accounts from *Inside the CDO Machine**

Matthew A. Lieber[†] and Steven H. Kasoff[‡]

The primary catalyst that triggered the Global Financial Crisis (GFC) of 2007–09 was the market for subprime mortgage securities in the US. The engine driving the subprime surge, collateralized debt obligations—CDOs—have been much cited but less well understood. Using new securitization and derivative products, along with unprecedented leverage, CDOs enabled dealers and investors to multiply and concentrate subprime risk to the point that it became a systemic threat. This market grew rapidly during the years preceding the crisis, fueled by aggressive (and often fraudulent) mortgage loan underwriting, unrealistic expectations for continued growth in home prices, and highly levered institutions with access to artificially low interest rates.

The observations, perceptions, and actions of participants in the subprime markets remain poorly documented and incompletely understood. Seeking to deepen our understanding, this study has produced seven interview summaries and one article telling the story of a hypothetical CDO deal.

This article is organized in four parts. First, it presents our research questions and methods in relation to the existing knowledge on the topic. Second, it describes what we think are the study's main contributions. Third, it previews the Lessons Learned summaries and interviews from each of the participants. And last, it identifies what we believe are some of the unique values from the project.

1. Research Questions, Existing Knowledge, and Our Methods

The aims of this study are to document and probe the mix of economic assumptions, investment strategies, and incentives at work—and to test the validity of certain well-established narratives. We interviewed a set of individual market participants—financial engineers, marketers, executives, analysts, and investors—who collectively made up “the CDO machine.” In one-to-two-hour-long interviews, we asked them about their experiences at the forefront of CDO markets in relation to the following questions:

- How did the novel capabilities unleashed by the CDO markets interact with the strategic mindsets and operational thinking inside Wall Street dealer firms?

* This article is part of a special project of the Yale Program on Financial Stability Lessons Learned Oral History Project: *Inside the CDO Machine*, which can be accessed at our website here, <https://som.yale.edu/centers/program-on-financial-stability/lessons-learned-oral-history-project>.

[†] Interviewer, Yale Program on Financial Stability Lessons Learned Oral History Project.

[‡] Yale School of Management Fellow and former equity partner and head of real estate and structured products investments at the Elliott Management Corp., a global hedge fund.

- What motivated hedge funds and other investors to short subprime securities? And how did their thinking and actions evolve from 2004 to 2008?
- Were the buyers of CDOs naive? What made CDOs so appealing to them?
- Why were the rating agencies incapable of accurately assessing the risk of CDOs?
- What led Wall Street dealers to shift from producing CDOs for sale to taking risk positions in them?

Research involving the subprime collapse has tended to follow one of two tracks. On the one hand, scholars and policy experts investigating the financial crisis have focused on institutional factors such as excessive leverage, regulatory fragmentation, and a vulnerable shadow banking regime.¹

These structural accounts identify the subprime debacle as the trigger of a larger financial crisis that was driven by multiple causes.² Not surprisingly, multistranded explanations replete with impersonal, and often arcane, causes are hard for even the most informed observers to digest and disseminate.

On the other hand, narrative treatments of the subprime CDO markets featuring human-level accounts have reached a wider audience. In these works, journalists and filmmakers tell compelling stories and provide more salient, monocausal explanations.³ Their narrative accounts offer vivid human color and suspense, with a seductive Wall Street villain lurking at any turn. The adaptation of these works to film was natural, appropriate, and broadly influential.⁴

¹ Financial Crisis Inquiry Commission (FCIC), *The Financial Crisis Inquiry Report* (Washington, DC: US Government Printing Office, 2011) [URL: <https://ypfs.som.yale.edu/financial-crisis-inquiry-commission-0>]. See also Gary Gorton and Andrew Metrick, "The Financial Crisis of 2007–2009," in *Routledge Handbook of Major Events in Economic History*, eds. Robert Whaples and Randall Parker (Abingdon: Routledge, 2013) [URL: <http://ssrn.com/abstract=2003388>].

² *FCIC Report* 2011, and Frederic S. Mishkin, "Over the Cliff: From the Subprime to the Global Financial Crisis," *Journal of Economic Perspectives* 25, no. 1 (2011): 49–70.

³ Two important books are Michael Lewis, *The Big Short: Inside the Doomsday Machine* (New York: W.W. Norton, 2011) and Gregory Zuckerman, *The Greatest Trade Ever: The Behind-the-Scenes Story of How John Paulson Defied Wall Street and Made Financial History* (New York: Broadway Business, 2009). Andrew Ross Sorkin's *Too Big to Fail: The Inside Story of How Wall Street and Washington Fought to Save the Financial System* (New York: Penguin Books, 2010) also reports on CDO markets within the urgent crisis dealings of big bank CEOs and Washington leaders.

⁴ The film *The Big Short* (directed by Adam McKay, Paramount Pictures, 2015, 130 minutes) grossed \$133 million worldwide. *Margin Call* (J.C. Chandor, Lionsgate, 2011, 109 minutes) is a critically acclaimed thriller inspired by Lehman Brothers. *Inside Job* (Charles Ferguson, Sony Pictures Classics, 2010, 108 minutes) won the 2010 Academy Award for Best Documentary. The film *Too Big to Fail* (Curtis Hanson, HBO Films, 2011, 98 minutes), based on the Sorkin book, featured William Hurt as Hank Paulson and Paul Giamatti as Ben Bernanke and earned 10 Emmy award nominations.

Analytically, the methods involved in the narrative recountings have a number of issues. Beginning with the raw material, first person accounts of key market actors can be difficult to access and assemble. They are time-consuming (if not impossible) to collect, and they are one-sided by definition. The statements can be unreliable if the human source is motivated to embellish or obfuscate. Moving along, creating a narrative from the anecdotal data—the journalist’s art—is another major step. Packaging these narratives into a book with an arc and then dramatizing the book into a gripping film are third and fourth levels of art. For the reporting that they do and the powerful narratives that they create, these books and films have contributed a good deal to public and elite understanding of the financial crisis. And then they stopped, around 2011. No one wanted to read the story anymore.

Not surprisingly, much of the storytelling in the narrative treatments of the crisis (and particularly in the subprime CDO markets) paints an unrealistic, binary picture in which some people were fools and others had perfect knowledge and vision. What misunderstandings the narrative works have created and popularized is an open question. Thus, the key focus in our interviews has been on the omissions in both strands of the literature:

- What important details and events did the writers cut from the books and the films because they were too arcane, too messy, or morally ambiguous?
- What did market actors know, see, experience, or later realize? And how does their intelligence square or not with institutional knowledge from the more academic accounts?

One other factor limiting the popular works is their timing. Concentrated around 2010, the books and films lack the perspective and knowledge available to us and our interviewees in 2021. For example, the popular works tend to lump together the subprime debacle and the GFC, even though it is not obvious why the subprime bust spread as widely as it did.⁵

Why and how did a small amount of subprime mortgages trigger a systemic financial crisis? As we now know,⁶ the permissive stance of regulators, rating agencies, and central banks created the conditions in which the largest, most globally integrated Wall Street dealer firms used derivatives to recklessly amass excessive leverage. Multiple weak spots together made the system vulnerable in a big way. The subprime CDO bust was an intervening event, related to the systemic vulnerability in multiple ways. Yet, the predominant person-based narratives turn the CDO business into a monolithic Wall Street actor and the main cause of the GFC. The linkage between subprime markets and the Global Financial Crisis goes beyond such extant

⁵ Gary Gorton, “The Big Short Shrift,” review of *The Big Short* and *The Greatest Trade Ever*, *Journal of Economic Literature* 49, no. 2 (June 2011) [URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1768032]. Gorton criticizes the books by Lewis and Zuckerman for the limits of their economic vision and the absence of a larger explanation.

⁶ See Larry Cordell, Greg Feldberg, and Danielle Sass, “The Role of ABS CDOs in the Financial Crisis,” *Journal of Structured Finance* 25, no. 2 (Summer 2019): 10–27. [URL: <https://papers.ssrn.com/abstract=3443043>]. See also *FCIC Report* 2011, Mishkin 2011, and Gorton and Metrick 2013.

CDO machine-based popular explanations. “There is no substitute for digging into the workings of the financial machine,” as Adam Tooze writes, for it is “there we will find both the mechanism that tore the world apart and the reason why that disintegration came as such a surprise.”⁷ The findings from the interviews help us understand what went wrong.

2. A Deeper Understanding

This study contributes in three ways toward a richer, more accurate understanding of the mindsets and incentives at work in the subprime CDO machine. First, by interviewing financial industry professionals who were leading players in the market at the time, it offers a valuable window into the mindset of market participants. With their firsthand knowledge of the CDO machine, market participants bring a perspective and intelligence that are distinct from those of regulators, analysts, or scholars. The legal and reputational concerns that they have as financial industry leaders, however, often make it difficult if not impossible to access their views in detail as this study has done. By collecting input from seven actors across the industry, the study offers a sampling of market thinking and a more balanced picture than reports focusing on one person or institution. The interviewees represent a cross section of the industry. They include voices from the structuring units, institutional sales, executive ranks, the buy side, a rating agency, and hedge funds; represented are investors taking both short and long positions.

Second, the collection summarizes the most important lessons learned from each of its interviewees and highlights distinctive perspectives of each. The insights from the human source narratives have been enriched from hindsight. The intervening years have allowed the interviewees to reflect on the period and to incorporate the latest knowledge of the financial crisis, including, for example, the relationship between the subprime boom and the GFC.

Third, in the “Anatomy of a Trade: The Making of a Subprime CDO” article, the collection presents an integrated snapshot—in fictionalized form—of the CDO machine and how it worked. The reader will recognize the patterns identified in the summaries. The *Anatomy of a Trade* article integrates the different perspectives in the form of one hypothetical deal, sketching for the reader how the various pieces and agents involved in this one trade fit together.

Considering the interviews as a unit, a number of common themes emerge. First, there was enormous complexity and uncertainty about the direction of the market, even as it began to unravel in 2007. Second, in their own way, each participant spotted warning signs well before the crisis hit. Simultaneously, it made sense for each—industry norms and market forces exerted pressure on them—to continue to support the production of CDOs in greater volumes and further on the timeline than they otherwise might have. Third, the application of financial models developed for conventional credit instruments to housing-backed

⁷ Adam Tooze, *Crashed: How a Decade of Financial Crises Changed the World* (London: Penguin Books, 2018), 22.

securities was mistaken, but this mistake was murky at the time (and it remains so). The rating agencies, under new financial pressure, played a key role as gatekeeper sanctioning subprime CDO investments. Fourth, an overwhelming force that all actors testify to is the remarkable demand for higher-yield credit at the time. Meanwhile, fifth, the regulatory regime enabled large institutions to leverage positions on highly rated CDOs without limit. Sixth, the regulatory authorities allowed institutions to invent and operate a subprime market without reliable guardrails. Seventh, excessive leverage at banks was becoming a systemic flaw. Large financial institutions made many large mistakes, though they varied in their capability to correct, absorb, and recover from them. Eighth, large mistakes became massive and systemically destructive only within those institutions that had thrown off the controls and removed risk management tasks and responsibilities from their operational units.

By sharing with us their recollections and their keenest lessons learned over the ensuing decade, our interviewees provide accounts that help us put together the pieces of the systemic debacle. These market participants explain in detail a number of ways that the CDO market failed to function. Crucial to their testimonials, however, is the dilemma of localized market intelligence and tunnel vision. While each participant recognized certain warning signs during 2007–08, at the time, none of them could entirely see the broader picture of dysfunction. Each was wrapped up in a subsection of the CDO market, a midlevel operator or a rising executive, unable or unwilling to see the big picture. Describing a kind of financial “fog of war,” their accounts reveal human and institutional elements of uncertainty, career hierarchies, and personal interactions within the CDO market that influenced their actions.

3. Highlights from the Individual Interviewees

The following summaries and the full interviews give voice to a variety of individual experiences and takeaways, which we summarize here.

Kicking off the interview series, our coauthor Steve Kasoff provides background on the credit derivatives business. From his experience in the 1990s with Wall Street dealers, he traces the development of CDOs in their first instance to distressed debt from commercial real estate failures. Hedge funds recognized an investment opportunity, Kasoff explains, giving wind to the sector. CDOs made up of pools of debt from various industries gone wrong enabled them to extract value from undervalued assets.

In the early 2000s, the inclusion of residential mortgage debt in CDOs and the ensuing demand from large banks and insurers triggered a further round of innovation. The “pay-as-you-go” credit default swap (CDS) enabled more investors, on a global scale, to join the subprime boom using synthetic CDOs. Kasoff explains how the regulatory regime and the role of the rating agencies were crucial to the CDO machine. Notably, regulators did not require insurers to hold capital against CDS exposures. Meanwhile, rating agencies provided the AAA ratings that institutional investors needed, using faulty models and brushing off criticism on their way to record profits from CDO issuances. Shorting subprime CDOs was more fraught, lonely, and costly than many imagine, Kasoff explains. When the downturn did

come, it occurred far more suddenly and massively than anyone in the market had been expecting—including short sellers.

Few parts of the subprime CDO machine gained more infamy from the events of 2007–08 than the rating agencies. Eric Kolchinsky, a former Moody's analyst, explains how a once stodgy, marginal institution transformed into a competitive oligopoly bent on maximizing profits—and why the agencies fell short in their risk assessment. Formerly private partnerships, the rating agencies became publicly held companies dedicated to shareholder value during this time. The surging credit derivative industry presented major challenges to the agencies, which were not accustomed or equipped to analyze complex structured products. In the absence of an optimal methodology, profit incentives spurred agency directors to normalize the use of inapt models and faulty assumptions. A whistleblower in 2009, Kolchinsky reflects on rating agency reform a decade later: while there has been widespread recognition that rating agency shortcomings were central to the subprime boom and bust, post-crisis reforms were relatively minor. In contrast to bank regulation, the rating agency regime continues along the same general lines—and with some of the same vulnerabilities.

The generalized blindness to systemic risk in 2005–07 takes specific form in Sohail Khan's discussion of investment mindsets among dealers and institutional clients. As managing director for fixed-income sales at Citigroup during the period, Khan handled accounts of both large institutional investors and hedge funds. In his interview, Khan identifies what he calls three “fundamental truths”—core assumptions that were absolutely unquestionable in the minds of market participants at the time: (1) housing prices never go down nationally; (2) any losses will be normally distributed; and (3) you can break up debt products. Khan's anecdotes provide more than one breathtaking example of these kinds of blindness, which were shared by producers, rating agencies, and investors. The overriding priority of dealers was to maximize revenue from fees by producing and moving greater CDO volumes. At peak boom, Wall Street firms shifted to holding tranches of CDOs they had produced. But not all of the big dealers were reckless in the same measure—a crucial detail that emerges from Khan's interview. What he calls the “provenance” of the CDO structuring group—where it originated from and sat in relation to the firm's institutional hierarchy—shaped its approach to risk management.

Brian Stoker offers a strong argument for the logic of US credit markets, a damning indictment of top leadership at two Wall Street firms, and criticism of the financial regulatory regime before and after the crisis. As a midlevel banker at Merrill Lynch and Citigroup, Stoker structured CDOs, managed the warehouses, and then helped liquidate the firm's book as the market began to tank in 2007. He explains how regulatory practices facilitated the expansion of CDO issuance. Allowing insurers to allocate zero capital against their swap exposures made the negative basis trade easy. It became advantageous for dealers to buy and hold AAA tranches, Stoker explains, detailing their off-balance-sheet maneuvers to grow their upside exposure. Investors and dealers were not behaving fraudulently, Stoker makes clear, but rather in a self-interested way within the permissive rules and norms of the system. The glaring malpractice he attests to occurred at the senior management level of the largest

banks, who closed their eyes to the growing risk in the interests of short-term profits. Financial crises happen every 10 years, Stoker concludes, yet each one tends to be dismissed as an unforeseen “100-year event.”

Dubbed “the grandfather of CDOs,” Chris Ricciardi brings a perspective that encompasses his successive roles as pioneering financial engineer, field general running production armies, and buy-side executive. The essential purpose of a CDO, Ricciardi clarifies, is to create long-term leverage on an illiquid asset. He takes issue with several popular conceptions: short selling did not cause the financial crisis, nor were rating agencies to blame for modeling home values using the inflated prices that they had been appraised at; furthermore, the volume of asset-backed securities (ABS) issuance was too small to have caused the GFC. Rather, Ricciardi highlights the “funding mismatch” within large institutions that took long-term risk while funding it with very short-term liabilities. The concentration of risk in certain large overleveraged investment banks created a systemic vulnerability. In the absence of any regulatory limit on short selling, the massive volume of shorts drove other CDO investors to sell at massive losses. Had the securities been held to maturity, the recovery in housing prices would have undone any major losses. Ricciardi expresses support for a limit on the volume of shorts.

As the boom accelerated, it spawned a cottage industry known as the CDO manager. Overwhelming demand for CDOs spurred dealer firms to outsource the management of the CDOs. Veteran Wall Street insider Jim Finkel takes us through the short rise and fall of the CDO manager niche from his experience. The CDO manager would select the portfolio of assets for a CDO, working closely with the dealer that would market the CDO to investors. The CDO manager then managed those assets over the lifetime of the CDO. The business model was fee based with relatively fixed costs and a strong incentive to increase assets under management.

The prudent investment philosophy that Finkel instilled in his firm soon ran against the pressures of the market. He saw the CDO manager’s role as clearly on the buy side, but many manager firms aligned more with the dealers in their behavior. With global investors crowding into the market on the buy side, Wall Street dealers pushed CDO managers to select dubious investments. Finkel’s Dynamic Credit Partners avoided buying the most toxic assets; he later discovered that some of these were designed for short sellers. The problem of CDOs as an asset class, Finkel concludes, was not the design of the security but rather the velocity and volume of the debt being securitized during the boom. The rating agencies succumbed to a perverse incentive to sign off on senior CDO tranches as being AAA quality. Major dealer firms were riven and out of control, addicted to fee revenue from CDO issuance. US regulators were mistaken, Finkel suggests, in failing to rein in these players.

Stephen King shares a vivid perspective on the subprime CDO market saga from his position as head of an ABS correlation desk at Barclays. Managing a delta-hedged portfolio of credit derivatives required King to constantly evaluate market assumptions in relation to his own assumptions. Hedging to limit risk, constantly updating his model, and stress testing his portfolio before the crisis enabled King and his team to emerge whole—an exception among

CDO market makers. They observed the surge in demand on the part of large banks for AAA risk. The high yields from CDOs enabled the banks to subsidize their corporate credit lending operations, a core business, that were hard-pressed by the low interest rate environment. The herd behavior into CDOs made a mistaken market consensus even more damaging, worsening the collapse that would come.

4. Bringing It All Together; Looking Back and Looking Ahead

Considered together, the testimonials of these market participants provide a perspective distinct from those of the crisis response actors commonly profiled—the lawyers, regulators, and economists leading the government authorities. Interestingly, in comparison to the government actors, the market participants we interviewed are equally nuanced in their assessments of 2007 and 2020 but consistently more negative about the present and future crisis outlook. Regarding the pandemic crisis and the sharp but brief recession it caused, they recognize the crucial success of the federal interventions of 2020. Looking forward, they express concerns about the risks from moral hazard, overborrowing, and the unintended consequences of repeated massive interventions.

Lastly, in addition to the interview summaries, the “Anatomy of a Trade” article presents a parable, a sketch in eight parts of a single fictitious subprime CDO transaction. Informed by expert interviews, documentary research, and the author’s firsthand experience, the anatomy breaks down the different parts of the CDO origination process and shows the ways that they connect. It reveals the sequence of key events in the creation of a typical CDO. Beginning with a hedge fund manager’s proposal, moving to a large Wall Street dealer, then proceeding to a buy-side investor’s discussion, each scene reveals different players interacting with each other. Their give and take reflects the various perspectives documented in the expert interviews within one imaginary deal.

Delving into the details of the subprime CDO trade of 2005–07 is potentially valuable in two regards. First, it helps us better understand the Global Financial Crisis, specifically the ways that the subprime market was connected to structural vulnerabilities that propelled contagion through a global system. Second, beyond the GFC, we suspect that students of financial crises will recognize patterns in the CDO machine that transcend this particular era and relate to other crises—past, present, and future.

Anatomy of a Trade: The Making of a Subprime CDO*

Steven H. Kasoff†

Author's Note

This article presents a short story, a sketch in eight parts of a single fictitious subprime collateralized debt obligation (CDO) transaction. The story is informed by expert interviews, documentary research, and the author's firsthand experience.

This anatomy of a subprime trade breaks down the different parts of the CDO origination process and shows the ways that they connect. The fictionalized format helps do that as vividly as possible. The timing of the story's chapters shows the sequence of key events in the creation of a typical CDO, beginning with a hedge fund manager's proposal to his investment committee. From ensuing scenes inside a large Wall Street dealer to the buy-side investor's discussion, we see various players interacting with each other. The give and take from the different sides distills the different perspectives documented in the expert interviews into one imaginary deal.

The fictionalized account also allows the anatomy of the subprime trade to move freely, unconstrained by real-world confidentiality concerns. In conducting our oral history research, we recognized the obligations of the investors and market actors we interviewed to maintain complete confidentiality on matters pertaining to their present and former employers and clients. Our standard interviewing rules, therefore, were to not ask about or discuss particular deals, people, or firms they had been involved with. There are no real clients or counterparties in this story.

Writing in the story format also helped us to distill the essence of the events, players, and deal structures. This anatomy, therefore, is a simplified, stylized version of what typically was happening during the subprime CDO era. Many of the more technical details naturally fell by the wayside. For more complete and technical details, the reader should refer to the interview summaries and full transcripts at the Yale Program on Financial Stability archive.

The reader will find two graphics that help visualize the pieces and links within a CDO deal. The first shows the structure of a typical CDO. The second depicts the trades and parts of a synthetic subprime CDO in which a hedge fund has participated on the short side. A glossary of key terms follows the story.

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† Yale School of Management Fellow and former equity partner and head of real estate and structured products investments at the Elliott Management Corp., a global hedge fund.

Delving into the details of the subprime CDO trade of 2005–07 is potentially valuable in two regards. First, it helps us come to a better understanding of the Global Financial Crisis (GFC), specifically the ways that the subprime market was connected to the key factors and dynamics that propelled contagion throughout the global system. Second, beyond the GFC, we suspect that students of financial crises will recognize particular dynamics and patterns in the CDO deal-making that transcend this particular era and relate to other crises—past, present, and future.

We hope that the reader finds the story illuminating and is inspired to read the interviews. As the interviews demonstrate, the scenes detailed in the anatomy story will be completely familiar and recognizable to those who lived through that period—a “real fiction,” a genuine representation of one deal from start to finish.

Disclaimer

The following is a series of fictionalized descriptions of actual behaviors and activities observed by the author, directly or through contemporaneous secondhand accounts of others. These descriptions are a mosaic of many such observations; as such, none of the parties or events described represent any specific firm, person, or singular event, including the author or his former employers, and any similarities are purely coincidental.

Hedge Fund Internal Meeting

Presentation by Portfolio Manager to Investment Committee (excerpt)

Fall 2005

Background

- The market for subprime mortgages has grown significantly in recent years.
- This growth has been fueled by historically low interest rates and strong home price appreciation (HPA) in all regions.
- Housing affordability is poor, pushing additional borrowers into subprime.
- Subprime borrowers are stretching to buy homes that they can't afford, both in terms of price (LTVs above 80, and often above 90) and budget (DTI above 40).
- These borrowers have the worst credit scores—it is not atypical to see younger borrowers, first-time home buyers, and self-employed workers. Most also have significant other installment debt (auto, cards, etc.).
- More recently, loan underwriting standards have fallen, and it is now common that borrowers don't document income, employment, assets, etc.

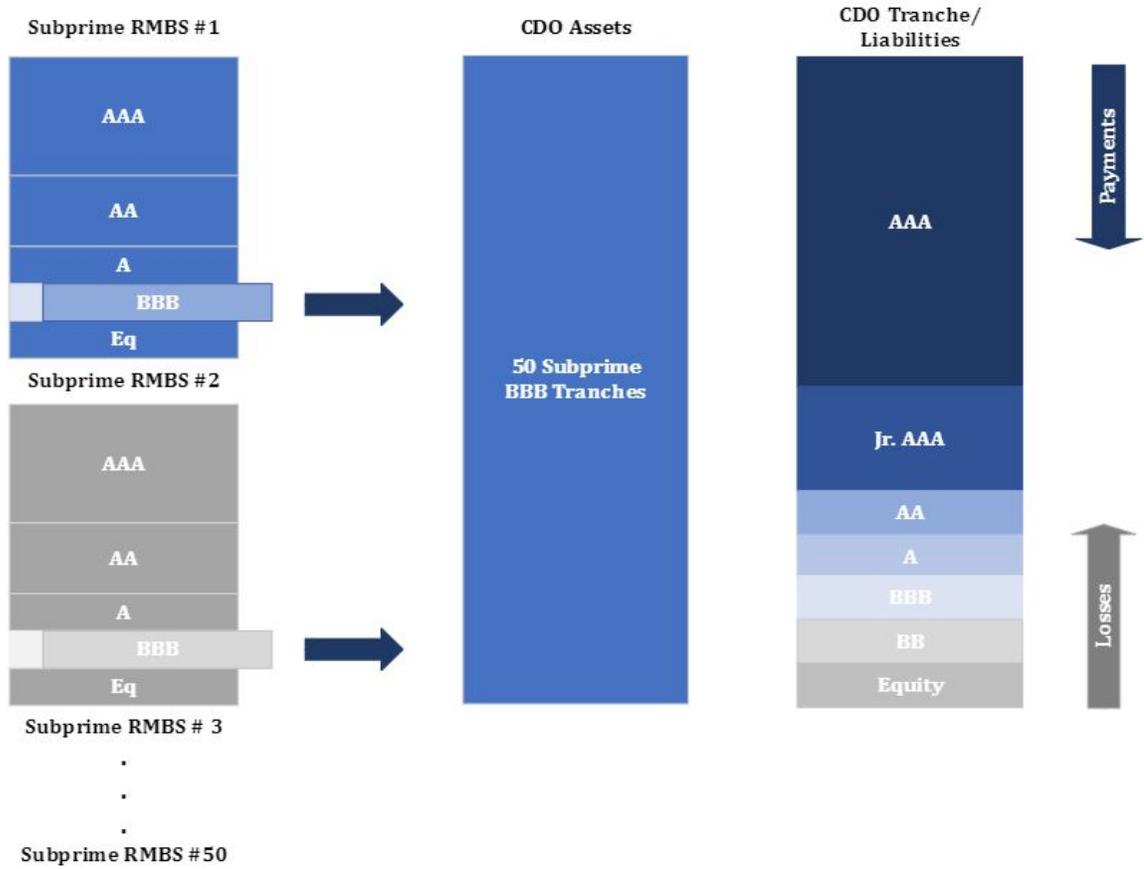
Subprime RMBS Structure

- Typically, 70–80% of the capital structure is AAA, with skinnier tranches at each rating category below that.
- We focused on BBB tranches, which generically represent the 2–6% slice of the securitization, e.g. 2% subordination and 6% thick. Losses exceeding 7–10% of the mortgage pool will wipe out this tranche (this threshold exceeds the subordination amount because most structures can also use excess spread to absorb losses).
- RMBS servicers typically advance unpaid mortgage P&I (principal and interest) to the structure. When defaulted mortgages are eventually resolved, any collections first reimburse these advances, which will increase the severity of loss severity.
- Despite being so junior in the structure, the BBB rating drives demand from real money investors such as insurance companies, and in recent years, the fast-growing “ABS CDO” market. Please refer to the attached diagram.
- BBB tranches (and often there are separate BBB+, BBB, and BBB- tranches) trade between LIBOR+100 and LIBOR+300, with variations based on rating, collateral quality, and market conditions.

Investment Proposal and Rationale

- Subprime borrowers represent the bottom 10–20% of the mortgage market by credit quality. In the event of even a mild recession, they are disproportionately more likely to encounter financial stresses that could lead to an inability to pay their mortgages.
- Most RMBS pools have high geographic concentrations in states that have experienced significant HPA in recent years (CA, FL, AZ, TX, NV). A correction in home prices in these regions will increase loss severities, likely well beyond the market's expectations. (We also believe negative HPA correlates with higher default rates.)
- BBB tranches can be shorted using the newly standardized “pay-as-you-go” CDS. We would trade under existing ISDAs and trading lines. The cost is similar to the trading spreads on the cash tranches (e.g., 100–300 bp). Unlike corporate CDS, these CDS do not expire—they last for the entire life of the reference tranche.
- Initial margin (IM) will be 3–6% of notional (2–3x the CDS spread). As the product matures, we expect that margin requirements will drop further. However, even at these IMs, the trade is very efficient to carry.
- Domestic consumption is a major driver of the US economy. In a recession, even a mild or regional event, consumption is the key underlying factor connecting (1) the stock prices of our core long positions and (2) subprime borrower financial health.
- Therefore, subprime CDS represents a highly leveraged option on US macro conditions. Although priced as a very out of the money (OTM) option, we believe the potential for payoff is far higher than implied by market prices.
- Comparing subprime CDS to our other hedges (mostly S&P puts and 10-year Treasury calls), we find this to compare very favorably and recommend reallocating a large portion of our hedge book into this product.

Figure 1: Structure of a Typical CDO



Source: Created by Yale Program on Financial Stability.

Large Investment Bank/Broker-Dealer Internal Meeting
RMBS/CDO Structuring/Trading Desk—Transcript (excerpts)
Fall 2005

RMBS Head Trader: As you know, we recently agreed with the rest of the Street on the final ISDA docs for the standardized “pay-as-you-go” CDS. It was a long night in a windowless conference room, with a lot of stale pizza. But I can already say that it was worth it.

Risk Manager: I agree with that as well. When we first started trading subprime CDS, each confirm was bespoke and negotiated with the counterparties. Unlike trading bonds, or even some of the vanilla corporate CDS, we can’t just assign the old trade over to the new counterparty. There’s no central clearing either. So, if we bought protection on something for 125 bp and then sold protection on that same thing to someone else at 135 bp, we still have some risk. Both trades will live on our books for years. We did make 10 bp running, which might have a PV [present value] of a half point. And yes, we book that into P&L immediately. But if something goes wrong and the credit event terms don’t match in the two trades, we could have real exposure. With the standardized template, we still live with two trades, but at least the terms match exactly and we don’t have any residual risk except counterparty credit. I can say that our regulators and auditor are also very pleased with this.

RMBS Head Trader: Thanks. Now that you’ve put everyone to sleep, let me say what we all actually care about. Our customers like this product, and they want to trade it. A lot. Our volumes are up a ton, and the bid/ask in the market has held up. You can all see the P&L, and it’s going to get even better. Even if we tighten the bid/ask, which we might want to do, so we can be a dominant market maker.

Structured Credit Sales Manager: Let me expand on that thread. This trade is getting a lot of attention in the hedge fund community. We certainly pitched it aggressively at the ABS East conference a few weeks ago in Boca. But it’s taken on a life of its own. The hedgies love it. And these are guys that never traded RMBS before. They’re smart guys and have done some homework, but they’re really just focused on it as a macro trade. They don’t know how to analyze these structures. Some of them don’t even have Intex, but they’re still trading, just from the pool strats in the prospectus. They don’t know which shelves trade rich or anything like that. So, I think bid/ask spreads will hold up for a while. The scale of demand is big, and they’re impatient to get the trade on.

Head of CDO Structuring: So, as everyone knows, the hedge funds are on the short side of this trade. And apparently some of the banks, our competitors, are also holding a lot of the shorts for themselves. On the long side, we’ve been placing some of this with insurance companies and other real money investors, but as volumes grow, it’s clearly the CDOs that will buy most of it. We’re seeing it already. Ramping up a normal ABS CDO is so hard. It takes months, and we have to warehouse that risk along the way. Now that timeline gets compressed. We make just as much per deal. Actually more, since we can make the deals larger. And we can do even more deals.

Risk Manager: I wanted to ask about the collateral posting. There's a mismatch there, right? Also, I mentioned counterparty risk a few minutes ago—

RMBS Head Trader: Sorry to interrupt. Actually, not really sorry. By the way, do you even need to be at this meeting? Stop worrying about counterparty risk. The hedge funds are all on the short side. If the market blows up, we don't need to worry about their credit, because their trades will be in the money. And the CDOs hold cash collateral. So, no risk there, right?

Head of CDO Structuring: Yes, that's an important feature of the synthetic CDO. Even though the CDO's "assets" are all synthetic, e.g., they've sold protection via CDS, the CDO tranches they create are still cash. So those AAA, AA, A, etc. tranches that we sell are for cash. That cash sits in a trust within the CDO, and if there's a CDS credit event, we just call up the CDO's trustee and they send us some of that cash.

Risk Manager: But we have a funding exposure, don't we? If the trade goes in the money for the hedge fund, we post collateral to them. But we don't get any from the CDO. I know it's there; it's not a credit risk. But we have to fund the difference, unlike a normal back-to-back between regular counterparties, where we're posting and receiving equal collateral.

Head of CDO Structuring: Well, yes, that's true. But not a big issue. You said it—no credit risk, just funding temporarily. What's our balance sheet now? \$100 billion? 200? Our CP trades at LIBOR minus 5. I think we can swing this without breaking a sweat. But if it really bothers you, there are some European banks that would intermediate this for us. So, we'd face them on the CDS, and then they face the CDO on a back-to-back. I think they'd charge us 5 bp running, which is a great business for them and a dumb thing for us to do.

RMBS Head Trader: Well, this is so fascinating . . . It reminds me why I couldn't stand being a structurer and moved to trading. What everyone needs to know is this—how the market really works. The CDO managers, when they start ramping up a deal, they come up with a list of the best subprime bonds. Yeah, that's an oxymoron, but whatever. Even the hedge funds know those are not the ones they want to short. Or they will but at a tight spread. Then my structurer friend here needs to have a tough call to explain that the CDO portfolio needs to have enough yield for us to syndicate the whole thing. So now they need to hold their nose and look for slightly hairier subprime bonds that they're willing to buy. So that works, sort of. The yield is good but not great. The arb still doesn't work.

Head of CDO Structuring: That's the nature of the product. The CDO assets need to yield enough to pay the CDO tranches and still have something extra left over. Otherwise, no one would create them. A good CDO manager will find ways to generate yield, but they'll do it smartly. That's why they're getting paid.

RMBS Head Trader: Is that so? I'll take your word for it. Now back in the real world—what actually happens is that there are a couple smart hedge funds. They also know the difference between regular crappy subprime originators and the really horrid ones. And they do an OWIC. Get it? Like a BWIC, bids wanted in comp, when you sell a bond? But they're soliciting

people to offer protection on the worst subprime bonds they can find. And guess what? Those CDO managers that you guys think are so talented—that you take to London, Frankfurt, Singapore, and Tokyo, spending my profits on unnecessary boondoggles—they convince themselves that it's OK to have 5% or 10% of their portfolio in those turds. That's how they get the yield they need, and my structuring friend here puts it into his Excel, and he's happy. And like he said, the timeline is fast, and the deal closes, and we make a nice profit. If it eventually goes sideways, I'm glad you're the ones that'll need to explain it to your accounts that you sold it to.

Conversation Among Principals of Soon-to-Be Created CDO Manager (currently employed at large mutual fund company)

Summary of Email Exchange

January 2006

Portfolio Manager: Our annual bonuses get paid next week. As soon as the checks clear, you and I need to be ready. We'll both resign on the same day.

Senior Analyst: I'm ready but a bit nervous. I know it'll be a big step for me, but I'm worried about the risk. How long before we can start taking a salary? You've already made a lot of money. I don't have much saved up.

Portfolio Manager: I'm putting in a lot of that cash to fund the start-up expenses. And I'm giving you equity in the business. I told you already that the team at our favorite investment bank is ready to open a warehouse for us and start taking us on the road to meet investors.

Senior Analyst: I know. We have a good track record. Will our current employer let us use those numbers? Can they stop us?

Portfolio Manager: Sure, we can use it. And everyone knows us anyway. A lot of that is publicly available. You just stay on top of the market. A few weeks after we leave, we'll be up and running at our new office. And you can start buying as much of the new issue pipeline as you can. We need to ramp up that first deal fast, so we can get it into the market. Then we start receiving fees.

Senior Analyst: How many deals do we need to do before the fees cover our running costs?

Portfolio Manager: Probably two or three. Then after that it all goes to the bottom line. We should be able to crank out a deal every quarter. In two years, we'll have \$4 billion of AUM. Do the math on the fees from that!

Senior Analyst: That's a lot of bonds to buy. Can we use CDS also? That would make it much easier.

Portfolio Manager: Sure. You've seen these synthetic CDOs? More and more. The banks love them too! They have hedge funds banging down their doors to short subprime. Those guys have no idea which deals are good or bad. Some of the banks are even shorting too.

Senior Analyst: The banks? Why would they do that? Are they worried about the market?

Portfolio Manager: A lot of reasons that might not have anything to do with the market. Maybe they're hedging their RMBS origination business. Or even these warehouses they do for us. They take that risk themselves. Or some risk manager decided it was a good idea. Maybe they'll even short some bonds to us, to help speed up the ramp up of our deal.

Senior Analyst: You know they're about to launch the ABX Index. What if all those hedge funds and banks just want to short that? We can't just buy ABX as the assets for our CDO. Our investors expect us to build a differentiated portfolio.

Portfolio Manager: The dealer's trading desk will handle that. If a hedge fund shorts ABX and the dealer buys it, then what happens? They can't sell it to CDOs, as you pointed out. And I think the CDOs have priced everyone else out of the market. So, the dealers just synthetically sell us some other subprime bonds. That's what they do. They keep that basis risk on their books. Just like how the corporate CDS traders have been doing for the last few years.

Senior Analyst: And you really think the hedge funds will buy protection on the better subprime deals? They don't know the difference? I heard a rumor that a bunch of hedge funds were doing group trips to see the housing markets in California, Arizona, Florida. I think they're starting to get smarter on this.

Portfolio Manager: Some will. Others will just think it's a macro trade and buy anything. And some will decide that they're too cheap to short the bad deals. They'll want to short the better deals because the spreads will be lower.

Large European Commercial Bank Internal Communication

Email from Internal Treasury Manager to Senior Department Head (excerpt)

February 2006

I would like to follow up on our meeting last week regarding investments in CDOs backed by US subprime risk. During that meeting, you commented that the lending environment that the bank faces in its core business lines has become very competitive. In some key markets, the bank must lend at levels that are unprofitable, such as for long-standing corporate customers or to maintain market share or franchise perception. The proposed investments in subprime CDOs can provide a level of profitability that may help offset these lower-margin areas.

We propose a significant investment of the bank's balance sheet in CDO tranches with ratings of AAA, AA, and A. These tranches carry spreads over LIBOR well in excess of similarly rated alternatives, yet carry the same requirements for reserves, under both the existing and

proposed new regulatory and risk-based capital rules. As such, the ROE to the bank is very compelling.

In the case of AAA-rated tranches, we can expect yields of L+30 bp. In contrast, AAA-rated corporates yield less than LIBOR. We can also buy insurance on the tranches from a monoline insurance company at a cost of 8–10 bp per annum. While arguably unnecessary from a credit perspective, doing so reduces the regulatory capital required to zero. As we fund our balance sheet at LIBOR minus 5 bp, we net earn 25 bp running, while using no capital; an infinite ROE (return on equity). This is the “negative basis trade” we discussed.

Tranches rated AA and A yield L+60 bp and L+150 bp, respectively. The capital required is low as well, also making these investments very efficient and with high ROEs. By comparison, A-rated corporates yield L+30–40 bp.

There were a number of questions asked about the risks of the US housing market, and in particular the subprime part of that market. It is correct that subprime borrowers have weaker credit than prime borrowers. It is also correct that loan underwriting standards have deteriorated in the past two years. These headline risks are the primary reason that yields are wider than for similarly rated alternatives. However, that risk is mitigated in a number of important ways, leading to our conclusion that subprime CDOs represent an excellent risk-reward profile. The mitigants are summarized below.

1. *Asset value*: Subprime mortgages represent a first lien on the home. These mortgages are originated at 80–90 LTV. Even if we accept that the borrower is not a strong credit, the fallback for repaying the mortgage is anchored by the value of the house.
2. *HPA history*: Our economics team has done a robust macro analysis of the US housing market and believes the downside risks to be small. While the market may cool off, and could even drop in select regions, such a scenario is unlikely to result in significant default rates. In fact, at the national level, the US housing market has not experienced a year-over-year drop in house prices since the 1930s.
3. *Homeowner equity*: As mentioned in #1, homeowners have equity in their homes. This provides a first-loss cushion in the event of a default. Additionally, it provides a sense of ownership that is important for borrower behavior. Homeowners will likely continue paying their mortgage regardless of the home value unless they experience a stressful personal event such as loss of employment.
4. *Structural subordination in the subprime RMBS*: The BBB tranches of the subprime RMBS securitizations typically have 4–5% subordination. Historically, lifetime losses on subprime mortgage pools have been less than 2%. Therefore, the losses need to significantly exceed historical levels before those tranches will absorb losses.
5. *Structural subordination in the CDO*: Even if losses occur as described in #4, the CDO offers another layer of subordination. Subordination levels for the A, AA, and AAA are

typically 10%, 15%, and 30%, respectively. Therefore, losses on a few outlier RMBS will not impact our CDO tranches. Only if a significant portion of the underlying RMBS experience losses will we be at risk.

6. *Rating agencies:* The rating agencies have devoted significant time and resources to monitoring and rating these transactions. As risk-averse organizations that have been in business for nearly a century, and without the profit goals of other financial market players, they have a strong incentive to preserve their reputation. As such, we believe the ratings are likely conservative estimates of the true risk.
7. *CDO manager expertise:* We have conducted numerous meetings with CDO managers and have ranked them according to their skills and experience. While there is no doubt that some RMBS tranches are riskier than others, we believe that the CDOs we will propose for investment have savvy CDO managers that will navigate the market effectively.

Hedge Fund Internal Phone Call

Conversation between Portfolio Manager and General Partner—Transcript (excerpt)
March 2006

Portfolio Manager: Hi. I wanted to run a new idea by you. We've been shorting subprime for a few months now and have a decent position. There's good liquidity in ABX, so we use that a lot. But as we've built up our research capabilities, we've been able to identify subprime deals that have much riskier mortgages in them.

General Partner: Yes, that's great work. I want to keep shorting those deals. As much as we can. Even if it's more expensive than ABX.

Portfolio Manager: Right. Totally agree. The problem is that the CDO managers still have some discipline. We've found some deals where the risks are layered in subtle ways, and the CDO managers don't mind taking those. But most of what we want to short . . . the CDO managers don't want. If we pay up, they'll take a few here and there, but it's limited. And we're not the only hedge fund trying to get these.

General Partner: OK, so what's the new idea?

Portfolio Manager: I've been talking to one of the dealers, and they have a new CDO manager that they're trying to help launch. These are guys with a decent reputation. They recently left a big mutual fund company, and they had a five-star rating. But they want to get a couple CDOs ramped up quickly. So the opportunity is for us to "partner" with them, to sponsor the deal.

General Partner: Partner? What does that mean?

Portfolio Manager: Well, “partner” is the wrong word. Our relationship will still be arm’s length. But we’re going to put a list together of 50–100 subprime tranches that we want to short. Not all of them can be the crappiest deals, but a lot of them can be. The CDO manager might kick a few out, but we’ll negotiate to get a list that we all agree on—\$500 million of total size. We’ll short the whole thing, and the new CDO will take the long side. Instant ramp-up for them and block size for us.

General Partner: OK, that sounds good. At what price?

Portfolio Manager: The dealer will validate that it’s a midmarket price, and maybe they’ll take a few basis points out for themselves. But we get a big trade on right away, without having to fight in the market on the bid lists. The CDO manager is under pressure to get started, so I think they’ll accept more of the bad subprime bonds than others might.

General Partner: So, what do you think the average spread will be on our shorts? Maybe 250 bp? So \$500 million, we’ll pay \$12.5 million per year? That’s a lot, so let’s make sure we’re shorting enough of the ones we really hate.

Portfolio Manager: OK, so here’s the part that’s most interesting. We’ve seen a few other hedge funds do this already. Not only will we short the subprime tranches into the CDO, we’ll also buy the equity tranche of the CDO.

General Partner: Buy it? Explain that to me.

Portfolio Manager: I just emailed you a diagram that describes the CDO and the trades we would do. Keep in mind that the equity is only 4% of the CDO. So \$20mm of investment. But while the portfolio is performing, the equity will pay out \$5–\$6mm per year, depending on how tightly the other CDO tranches get priced. So, of the \$12.5mm per year that we pay as CDS premium into the CDO, the CDO uses about \$7mm to pay interest costs on the senior tranches. Then the rest of it gets paid to the equity tranche, so we’re getting back almost half of what we paid. And we’ve only given up the first 4% of upside on the shorts.

General Partner: I see it now. It’s like a correlation trade. If the CDO portfolio has losses on a few of the bonds we shorted, our gains on the shorts will be offset by losses on the CDO equity. But the market and the rating agencies and everyone else have mispriced the correlation.

Portfolio Manager: Exactly. How could only a few of these take losses? If some do, then the housing market is rolling over and subprime borrowers are defaulting *en masse*, and most of the other deals will take losses too. It’s sort of like all or nothing. We save almost half the cost of the short position, and we only sacrifice the first \$20mm of potential gains.

General Partner: I love it. It means we can increase our position size to a lot more than what I was targeting. For the same cost. And so, if we’re wrong and the market never cracks, this CDO equity just keeps paying out \$5–\$6mm per year?

Portfolio Manager: Yes, but it's even better than that. If you own the equity, or technically just a majority of it, then you also have a call option. After two years, you can basically unwind the whole trade. The CDO, the short positions, everything. With our other shorts, or ABX, there's the mark-to-market risk. If spreads tighten, it marks against us. And we just keep paying the CDS costs for maybe five to seven years until the deals pay off.

General Partner: Wow, this market makes my head spin. There's so much that's mispriced! This CDO equity basically has a call option on a high vol asset. The other CDO tranches are short that option. Do the senior tranche buyers even know it?

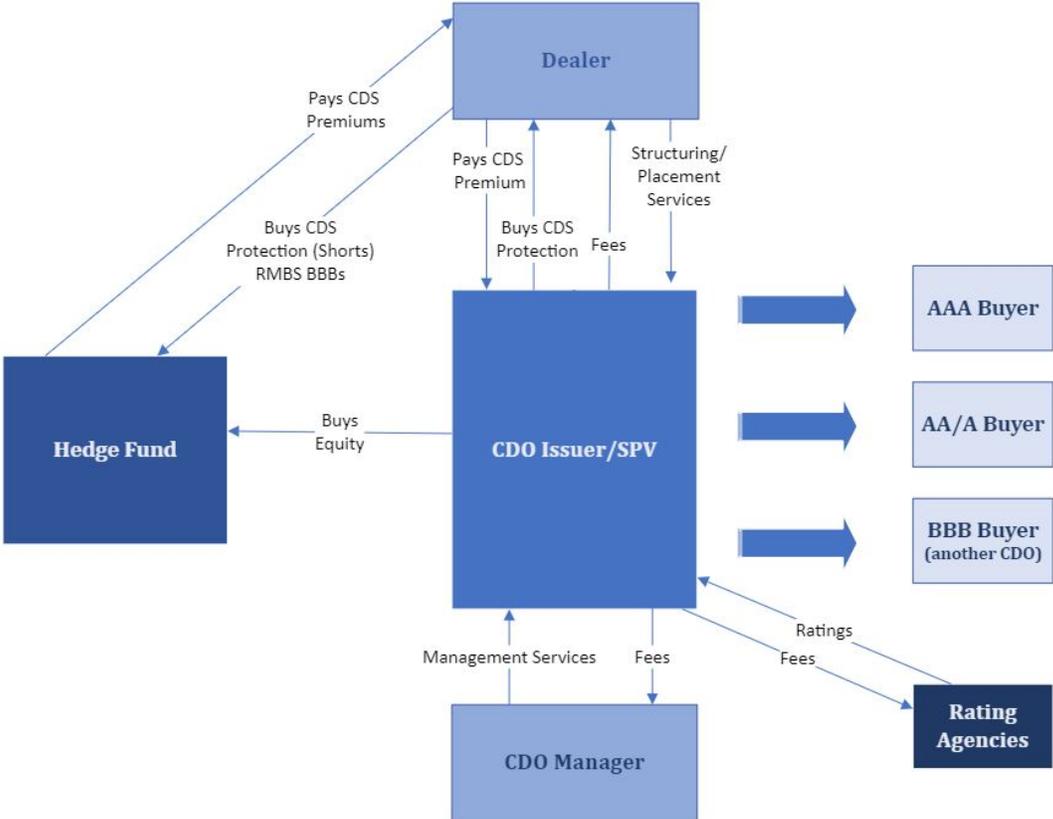
Portfolio Manager: I don't think so. They buy it because they look at the ratings. And the spreads are higher than on other stuff with the same ratings. They don't speak our language. Correlation, vol, etc.

General Partner: Clearly, that's true. The guy buying the CDO's BBB tranche? He's just above our equity in terms of risk. It's almost the same risk if you understand how high the correlation is. And the CDO equity gets 25% returns, and the BBB gets L+325. Wow. Even if the market falls apart, if it takes a few years, then the CDO equity could have a positive return and the BBB will take a bath. So the more junior tranche is actually less risky!

Portfolio Manager: Yes. In fact, I know you'll love this. The next thing we're working on is trying to short the CDO tranches. The BBB or the single A. For exactly the reasons you just said. The risk is even more mispriced and concentrated than for the subprime bonds.

General Partner: This is unbelievable. Someday, someone's going to write a book about this. Let's try to keep our positioning as quiet as possible. I don't want to be in that book . . .

Figure 2: Synthetic Subprime CDO with Hedge Fund Participation



Source: Created by Yale Program on Financial Stability.

Hedge Fund Portfolio Manager and Head Trader at Broker-Dealer's ABS/CDO Trading Desk

Phone Call Transcript (excerpt)

April 2006

Hedge Fund PM: Hey, has your structuring team heard back from the CDO manager? We'd love to get the portfolio finalized so we can execute the trade.

ABS/CDO Trader: I know, I know. But you keep proposing really ugly subprime bonds, and they're getting tired of rejecting them.

Hedge Fund PM: Good. That's the idea. If they're so worn down and anxious to get this done, they should just accept my revised portfolio. And by the way, I did also add a few of the better-quality subprime deals. I hope they appreciated that.

ABS/CDO Trader: They did. But those also trade at tighter spreads, so it's helpful and also not helpful.

Hedge Fund PM: Well, sorry, that's how markets work. The better stuff is more expensive!

ABS/CDO Trader: Thanks for explaining that to me. I've only been market-making for 15 years.

Hedge Fund PM: And did you ask your structuring team about the CDO bucket? Could our CDO own 5% or 10% of other CDO tranches? We'd really like to short some of those. In return, we could also remove some of the other subprime bonds they hate. That should be a win-win.

ABS/CDO Trader: Structurally, it'll work. The rating agencies have already let a few other deals do this. We just need to convince our CDO manager. They didn't love it.

Hedge Fund PM: So, do you think they'll eventually agree? You can be very persuasive when you want to be.

ABS/CDO Trader: Thanks. That's why I do this job. Not for the money. It's really for all that validation from smart guys like you. OK, but seriously, I think we can make this happen, but there's another condition.

Hedge Fund PM: Of course there is. How much will it cost me?

ABS/CDO Trader: No, it's not like that. We'll find a way to get this. The CDO will have maybe 7% or 8% allocated to BBB tranches of other CDOs. But you don't get to short all of that into the CDO. You need to share some with me.

Hedge Fund PM: You want to short some of these CDO tranches? I thought you were just a market maker.

ABS/CDO Trader: Yes, but this isn't really a market. You're not the only hedge fund that wants to short CDO tranches. And no one wants to be long them. Well, not enough people anyway. And every new CDO that gets created just adds to the supply. The last few CDOs we did, we couldn't sell all of the BBBs. So guess who is the proud owner?

Hedge Fund PM: You could sell them today if you wanted to. Just not at par.

ABS/CDO Trader: You'd like to think so. In fact, with all the fees we earned from those CDOs, my basis in the BBBs is actually just 95. And guess how many bids I have there? The market is really thin. You want them?

Hedge Fund PM: Funny. So you want to short those CDO tranches into our CDO?

ABS/CDO Trader: Maybe. That would be great. But it could be different CDOs instead. They're all basically the same risk, right? But I need to take half of it. If we can get \$40 million of our CDO portfolio allocated to other CDO tranches, I get to short \$20 million, and you can have the other half.

Hedge Fund PM: OK, if that gives you enough incentive to make this happen, and quickly, I suppose I can live with that.

CDO Preliminary Offering Circular¹

Risk Factors—Conflicts of Interest (excerpt)

May 2006

Initial Equityholder may enter into credit derivative transactions relating to Collateral Securities in the Issuer's portfolio. On or after the Closing Date, the Initial Equityholder may enter into credit derivative transactions relating to a substantial portion of the Collateral Securities in the Issuer's portfolio, under which it takes a short position (for example, by buying protection under a credit default swap relating to such obligation or security) or otherwise hedges certain of the risks to which the Issuer is exposed. The Issuer and Noteholders will not receive the benefit of these transactions by the Initial Equityholder and, as a result of these transactions, the interests of the Initial Equityholder may not be consistent with those of Noteholders.

¹ This section is sourced from the offering document of an actual (and very typical) 2006 CDO, with only minor edits. These paragraphs represent a very small portion of the "Risk Factors" section, which is more than 40 pages long. The first paragraph discloses that the anonymous investor (likely a hedge fund) that is buying the equity tranche is also taking short positions in many of the assets owned by the CDO. This creates potential conflicts of interest because this investor may have influenced the selection of those assets (although that risk is inadequately disclosed) and the investor may not have bought the equity tranche because they expected it to perform well.

The second paragraph discloses that other assets bought by the CDO may have been structured or underwritten by the dealer structuring this CDO. Implied is that the dealer may still own those assets and have an incentive to sell some of those assets to the CDO.

Certain Conflicts of Interest Involving the Initial Purchaser. The Initial Purchaser or its Affiliates may structure issues of Collateral Securities and arrange to place such Collateral Securities with the Issuer. The Initial Purchaser or an Affiliate thereof also may have acted as underwriter, agent, placement agent, or dealer for a significant portion of the Collateral Securities.

CDO Manager Portfolio Manager and Head of CDO Structuring at Broker-Dealer

Phone Call Transcript (excerpt)

May 2006

Head of CDO Structuring: Our syndication process for your CDO is almost done. All of the tranches except the BBB are oversubscribed, and that's not far off. But the levels are a bit wider than we had modeled.

CDO Manager PM: Why is that? How much wider?

Head of CDO Structuring: Well, there's a few reasons. The market's been up and down lately. Nothing fundamental, as far as I can tell, but there are a lot of other CDOs in the market right now. And a big pipeline of deals that everyone wants to get into the market before summer. We also had two investors pass on your deal. They decided that they're not going to buy deals from a "first-time manager." But they liked you and will probably buy your next one.

CDO Manager PM: OK, but you're still going to price it?

Head of CDO Structuring: Yes. We have approval to take down up to \$10 million of your BBBs if we need to. But we're going to price that 25 bp wider than we modeled. The rest of the capital structure is close to the model. It averages to about 3–4 bp wider for the whole CDO.

CDO Manager PM: That's OK, right? You said after we price this one, you could open a warehouse for our next CDO. We'd really like to get started.

Head of CDO Structuring: Yes, we're working on getting that credit approved. For this CDO, though, the extra 3–4 bp of funding cost just means that you need to get a bit more yield into your portfolio. I emailed you some thoughts on how you could do that.

CDO Manager PM: You want me to buy the BBB tranche of those other CDOs. Those are deals you underwrote, so I assume you couldn't sell them? And also swap out a few of the better RMBS for some riskier ones.

Head of CDO Structuring: You're the CDO manager, of course, and the credit decisions are entirely yours to make. That's not something we want to be involved with. I was just presenting the math. There are a lot of constraints in managing a CDO, as you well know. And what I emailed was just a few hypothetical ideas that would make the math work. Anything else you come up with, as long as the math works . . . that's up to you.

CDO Manager PM: Great. You say that, but then you show me a very aggressive offer on those bonds you want to sell me.

Head of CDO Structuring: Sure, that's the trading desk. He decides what price to offer it. Think of it as a favor. It's a better price than you can get from any other dealer on anything similar in risk. He's axed, that's true. He wants to sell it. But he could've offered it to someone else too.

CDO Manager PM: OK, fine. I'll have my guy call him later today. It's just a small part of the overall portfolio. I really want this deal done so we can start working on the next one. And listen to me, for this next one, you need to give me time to buy bonds in the market. I don't want to do this again, where we let a hedge fund short the whole portfolio.

Head of CDO Structuring: I get it. And you'll have more time. But everything is a trade-off, and everything has a cost. You got really fast execution by doing it this way. And we charged less too since we didn't have to hold your warehouse risk for two months. Even when you're doing it your way, just remember it's still the hedge funds that drive the other side of this trade.

CDO Manager PM: Yes, I get it. It'll be really nice a year from now. I'm imagining the global ABS conference next year. Maybe we'll all be hanging out at that club in Barcelona. The one by the beach. The housing market will be up another 10%, and these hedge funds will want to get out of their money-losing shorts and move on to something completely different. Maybe I'll buy them a few drinks and try not to gloat.

Glossary²

2/28 ARM or 3/27 ARM	Two commonly marketed types of subprime mortgage. The interest rate on the mortgage would be fixed for either two or three years (usually at a very low “teaser” rate). After that point, the mortgage would become an adjustable-rate mortgage (ARM), in which the rate would reset periodically, but at a higher spread above a benchmark interest rate for the remaining 28- or 27-year period.
ABCP	Asset-backed commercial paper. A short-term investment vehicle that matures between 90 and 270 days. Typically, firms use ABCP to finance short-term needs. [James Chen, “Asset-Backed Commercial Paper (ABCP),” Investopedia, updated May 12, 2020, https://www.investopedia.com/terms/a/asset backed commercial paper.asp].
ABS	Asset-backed securities. A type of fixed-income security whereby a pool of assets is deposited into a special purpose entity, and one or more securities (often called “tranches”) are issued. The cash flows of those securities are backed by the cash flows generated by the asset pool. Typically, the assets are those that have stable and predictable cash flows, especially when pooled together so that the risks of individual assets are offset by the benefits of a large and diversified pool. The most common forms of ABS are those backed by mortgages (MBS, CMBS, RMBS), credit card receivables, auto loans, or other debt (CDOs).
ABX Index	A standardized CDS product that was created in 2006. The initial ABX Index comprised 25 tranches from recent subprime RMBS transactions. Market participants could buy or sell protection on those 25 tranches with a single trade. As a result, ABX was highly liquid (more so than CDS on individual subprime tranches) and was used actively by many in the market to hedge risk or speculate.

² Matthew A. Lieber contributed this glossary.

Aircraft ETC	Aircraft equipment trust certificate. A form of ABS in which the assets being securitized are large airplanes, typically under long-term leases to established airlines. The ETC benefits from the predictable cash flows during the lease term but is exposed to risk at the end of the lease, based on renewal lease rates or aircraft residual values at that time. The ETC is also exposed to the airlines' credit risk.
Alt-A	A classification of residential mortgage that was used in the years before the GFC. Alt-A mortgages did not satisfy the criteria for prime mortgages but were less risky than subprime.
arb	Arbitrage. CDOs are sometimes referred to as "arbitrage CDOs." For a CDO to be economical to create, the sum of the values of each tranche must be equal to, or greater than, the cost of purchasing the assets to be owned by the CDO. Although not an arbitrage in the classical sense, when used in this context, the "CDO arb" is meant as a shorthand for the relative value between the yield on the CDO assets and the required yield to sell the tranches. When the CDO arb is larger, the expected return to the equity tranche will increase, leading to more CDOs being created. Eventually, the increased supply will cause tranche yields to increase and/or drive down the yields of the assets. In either case, an equilibrium level will be achieved.
AUM	Assets under management. For companies that manage money for a fee, on behalf of clients, AUM is the primary measurement of size. Since most investment management fee arrangements are a simple percentage of AUM (hedge funds are the main exception), a company with more AUM will have proportionately higher revenue.

BWIC

Bids wanted in "comp" (competition), also referred to as a bid list. A common process used by both dealers and investors to sell illiquid securities, such as ABS or CDO tranches. Similar to a traditional closed auction, a list of securities for sale is circulated to interested parties. At a specific time, bids can be submitted, and the seller will sell each bond to the highest bidder. Typical market practice is for the seller to disclose to all parties the "cover bid" (next highest bid) but not the winning bid, which protects a buyer that may have overpaid (e.g., a "wide cover"). If none of the bids meet the seller's "reserve" price, the bond will not trade.

CDO

Collateralized debt obligation. A form of ABS in which the assets being securitized are other forms of debt. The most common form of CDO is the collateralized loan obligation (CLO), which is backed by syndicated loans of large, non-investment-grade corporations. For a few years before and during the GFC, there was significant issuance of CDOs backed by tranches of subprime RMBS, often referred to as "ABS CDOs" or "subprime CDOs."

CDO squared

A less common form of CDO. A CDO squared would own tranches of other CDOs. In 2007 and early 2008, CDO squareds were at times created as a way for dealers or other owners of CDO tranches to sell off some of that risk.

CDS

Credit default swap. A derivative product whereby two parties agree to exchange risk on a specific asset, such as a corporate bond, or ABS tranche, known as the "reference obligation." The "protection buyer" will pay a fixed fee (the "CDS premium"), typically every month or quarter, to the "protection seller." In the event of specific "credit events," such as a default on the reference obligation, the protection seller will be obligated to make a payment to the protection buyer or purchase the reference obligation at par. For this reason, buying protection is very similar to having a short position, and selling protection is similar to taking a long position.

CLO	Collateralized loan obligation. A security backed by a pool of corporate loans, issued often by firms with low credit ratings or by private equity firms conducting leveraged buyouts [Troy Segal, "Collateralized Loan Obligation (CLO)," Investopedia, updated March 10, 2022, https://www.investopedia.com/terms/c/clo.asp].
CMBS	Commercial Mortgage-backed securities. Mortgage-backed securities backed by commercial mortgages, e.g., mortgages secured by a first lien on commercial properties, such as office buildings, retail properties, multifamily rental buildings, hotels, and industrial facilities.
Correlation trading	Dealers' correlation trading desks create and sell (or buy) tranches of risk backed by portfolios of corporate credit (or ABS securities). Because they are trading only slices of the risk of the underlying portfolio, they need to hedge that risk using smaller quantities of CDS on each of the underlying credits in the portfolio. The key variable in determining the proper hedge ratios is the correlation of default risk among and between the credits in the portfolio.
CUSIP	Committee on Uniform Securities Identification Procedures. A unique identifying code for securities.
DCP	Dynamic Credit Partners. A CDO manager firm founded in 2003 by Jim Finkel and Tonko Gast.
Delta hedging	An options trading strategy aimed at reducing the risk associated with price movements in the underlying [James Chen, "Delta Hedging," Investopedia, updated January 28, 2021, https://www.investopedia.com/terms/d/deltahedging.asp].
DTI	Debt-to-income ratio. An important statistic in assessing the credit quality of a mortgage. Indicates the borrower's ability to make the required payments on the mortgage. Usually calculated as the required monthly mortgage payment divided by the borrower's monthly income. Some versions of DTI also add other installment debt payments (such as auto loan payments) to the numerator.

Freddie and Fannie	Freddie Mac and Fannie Mae. Formally known as the Federal Home Loan Mortgage Corp. (FHLMC) and the Federal National Mortgage Association (FNMA). Freddie and Fannie are government-sponsored enterprises that support the mortgage and housing markets by purchasing or guaranteeing prime mortgages. Most of those mortgages are then securitized into a special type of MBS, which is extremely liquid and trades at very tight spreads. The majority of mortgages originated in the US are purchased by or guaranteed by Freddie and Fannie.
GFC	Global Financial Crisis.
Hedge funds	Private investment funds managed by sophisticated managers. Unlike mutual funds, hedge funds have wide latitude to invest in very risky assets, use leverage, or take short positions.
HPA	Home (or house price appreciation. The aggregate change in house prices over a period of time. The primary index used to measure HPA is the Case-Shiller index, which publishes data at the US national level, as well as for many large metropolitan areas. HPA is important for mortgage credit, since the value of the house is the collateral securing the mortgage.
Intex	An independent analytics company that developed a system for monitoring and analyzing a variety of MBS and ABS products, including subprime RMBS and CDOs. In the years before the GFC, a significant number of investors in these products used Intex as their primary analysis tool.
ISDA	An "ISDA" is shorthand for an "ISDA Master Agreement," which is the standard document that governs all forms of swap agreements, including CDS.
LTV	Loan-to-value ratio. An important statistic in assessing the credit quality of a mortgage. Indicates how much equity the homeowner has in the property.
MBS	Mortgage-backed securities. A general term for ABS in which a pool of mortgages is securitized.

NAIC	National Association of Insurance Commissioners. The NAIC sets rules for how much regulatory capital, or reserves, insurance companies are required to hold against assets in their general account. Previously, the required amounts were generally based on the asset's rating from a rating agency such as Moody's or S&P.
Negative basis trade	A trade in which a bond or ABS tranche is purchased and then the owner also uses a CDS to buy protection on that same bond or tranche. If the spread on the bond is higher than the cost of the CDS protection, the owner will earn the net difference. Although counterintuitive, this is referred to as a "negative basis" (for most corporate bonds, the bond spread is usually lower than the CDS spread, which is a positive basis). Regulated banks and insurance companies often executed this trade by buying AAA CDO tranches and then buying protection using CDS (or sometimes an insurance policy) from a monoline insurer. The risk was deemed to be zero, so the regulatory capital requirements was also zero.
New Century	A large subprime mortgage origination company. It was the first significant company of this kind to file for bankruptcy, in April 2007, an event that is considered one of the primary turning points for the subprime market.
Notional (value)	A number referenced in swap agreements to be used as the basis for calculations of the payments to be made under the swap. For example, in the case of a credit default swap, if the notional is \$5 million, and the premium is 2%, then the protection buyer will pay \$100,000 per year to the protection seller (\$5 million x 2%). If a loss event occurs on the underlying reference security, then the protection buyer will receive payments equal to the losses that would have been realized had they owned \$5 million of that reference security.

NRSRO	Nationally recognized statistical rating organization. The 2006 Credit Rating Agency Reform Act formalized US Securities and Exchange Commission (SEC) oversight of the industry in an effort to ensure that only qualified firms that had been approved by the agency as NRSROs were issuing ratings for financial instruments and entities that were being relied on by investors. The 2010 Dodd-Frank Act expanded the SEC's oversight authority and pushed regulators, which had also relied on ratings in judging a bank's risk level, to develop alternative measures of creditworthiness, introducing the "investment-grade" label. Institutional investors remain a key end-user of the NRSRO ratings. Currently, nine firms are registered as NRSROs; however, Standard & Poor's and Moody's have dominated the industry, responsible for more than 80% of ratings across all asset classes in 2018.
OTM	Out of the money. A term used to describe an option in which the underlying security is less or more than the strike price, in the case of a call or put, respectively. The owner of an out of the money option will not elect to exercise that option. The opposite would be "ITM," or in the money, in which case the option would be exercised profitably by the owner. When the underlying security is trading at the strike price, the option is "ATM," or at the money.
OWIC	Offers wanted in "comp" (competition). Similar to a BWIC. When used in the context of the CDS market, "offers" means offers of protection. Offering protection, or selling protection, is comparable to buying a bond, as both are a long risk position. In the years prior to the GFC, hedge funds that wanted to short specific subprime tranches conducted OWICs. CDO managers often used these OWICs to ramp up synthetic CDOs. In this case, the winning offer would be the one at the lowest CDS premium.
Pool strats	Pool stratifications. Tables commonly found in the marketing materials for RMBS and other asset-backed securities. These tables show how various important characteristics of the underlying mortgages are distributed within the pool. For example, an RMBS may have thousands of loans, each with a different LTV; the pool strats might include a table showing the distribution of LTVs within the pool.

Repo	Repurchase agreement. A short-term financing arrangement for liquid securities. The security owner sells the security to the counterparty and simultaneously agrees to repurchase it on a specific day and at a specific price (based on an implied interest rate, the “repo rate”). Most repos mature the next day and roll over day to day until terminated by one party.
RMBS	Residential Mortgage-backed securities. Mortgage-backed securities backed by residential mortgages, e.g., mortgages secured by a first lien on single-family houses. Some RMBS pools entirely comprised prime quality mortgages, and this remains true today. Before the GFC, separate RMBS pools were created that used only subprime mortgages.
RTC	Resolution Trust Corp. A quasi-governmental entity established by the US federal government in 1989 to help resolve the savings and loan crisis by managing failed banks, S&Ls, and thrifts, and disposing of loans on their balance sheets. One of the most efficient tools was to securitize commercial mortgages; this process helped spur the development of the then-nascent CMBS industry.
SIV	Structured investment vehicle. SIVs were entities used by large banks to move highly rated, lower yielding assets off of their balance sheets. This made the banks appear to be less leveraged than they were. Although the SIVs were legally separate entities from the sponsoring banks, they were funded with short-term commercial paper (CP). If the SIV was unable to roll the CP at a low enough interest rate, the sponsoring bank was legally obligated, via a “liquidity put,” to purchase the CP themselves. This occurred at some banks in 2008.
SPAC	Special purpose acquisition company. A company with no commercial operations formed to raise capital for acquiring or merging with an existing company [Julie Young, “Special Purpose Acquisition Company (SPAC),” Investopedia, updated March 14, 2022, https://www.investopedia.com/terms/s/spac.asp].

SPV	Special purpose vehicle. An SPV is the legal entity that issues an RMBS (or a CDO or other type of asset-backed security). It is a corporation or trust that is created at the time of issuance. It will own the underlying pool of mortgages or other assets, and it will issue the tranches that are backed by the cash flows from those assets. The entity will be legally limited to that sole purpose, and it may not conduct other business, acquire other assets, or issue additional debt or equity.
“Super seniors”	In some CDOs (and other types of ABS), there would be two AAA tranches, one of which was senior to the other. They would be referred to as the “super senior” and the “junior AAA.” Super seniors were deemed to be extremely low risk, and most buyers essentially treated them as risk-free.
TABX index	Tranched ABX. Each ABX index represents the risk of a portfolio of subprime RMBS tranches, whereas TABX represented slices of the risk of that subprime RMBS portfolio. For example, a “10–20” TABX tranche bore losses only after the ABX index sustained a 10% loss and lost its entire value when the ABX index had sustained a 20% loss. So, a TABX tranche had a risk profile similar to a tranche of a subprime CDO.
Tranche	A security issued by any type of ABS. Most ABS structures have many tranches. Each tranche of an ABS will have a different level of seniority. When losses occur within the ABS asset pool, the most junior tranche will absorb those losses first, while more senior tranches will be paid off in full. The varying levels of risk and seniority allow more senior tranches to be rated at higher levels (with the most senior tranche often rated AAA). Conversely, the yield promised to more senior tranches will be lower.

Yale Program on Financial Stability

Lessons Learned

Steven H. Kasoff

By Matthew A. Lieber

Steve Kasoff was employed at Elliott Management Corporation from 2003 until 2020. His responsibilities centered on developing the structured products and real estate groups at Elliott. He was made senior portfolio manager, a member of the firm's management committee, and equity partner. Kasoff has extensive experience in the origination, trading, and management of structured products such as collateralized debt obligations (CDOs) and mortgage-backed securities, including earlier posts at Deutsche Bank, Merrill Lynch, and Lehman Brothers. He earned his BA in economics from Yale College and his MBA in finance from the Wharton School of the University of Pennsylvania.

In 2016, Kasoff joined the advisory board of the International Center for Finance at the Yale School of Management. After retiring from Elliott in 2020, he began to work with the Yale Program on Financial Stability (YPFS). This Lessons Learned summary is based on two interviews of Kasoff by YPFS and is part of an investigation he spearheaded into the subprime securitization boom before the financial crisis—the Inside the CDO Machine project—which includes interviews with financial industry practitioners. The complete Inside the CDO Machine project materials can be accessed on the YPFS Lessons Learned website: <https://som.yale.edu/centers/program-on-financial-stability/lessons-learned-oral-history-project>.

Kasoff started his career during a decade of innovation in credit derivatives.

Across the three decades of Steve Kasoff's highly successful Wall Street career, a defining period came when he was one of the first short sellers of subprime CDOs from 2004–07. The shrewd trading strategy that he led at Elliott Management earned outsized returns for the hedge fund. Paving the way for this success was Kasoff's earlier career experience structuring debt securities for top sell-side firms. His involvement in these earlier innovations in structured finance also shows the transformation of fixed-income markets.

Kasoff's first job on Wall Street put him at “the birth of the market” of securities made from defaulted mortgage loans. In the aftermath of the savings and loan (S&L) crisis, the US created the Resolution Trust Corporation to take defaulted mortgage loans off the books of the banks and S&Ls and securitize them to maximize the government's recovery. For two years at Lehman Brothers, Kasoff helped structure mortgage-backed securities from the defaulted commercial mortgage assets. In 1995–97, Kasoff went to business school, interning at Merrill Lynch in summer 1996 and keeping close tabs on industry trends.

There was this new product that people were working on called CDOs, collateralized debt obligations.¹ It was sort of like mortgage-backed securities, except you're putting high-yield bonds or loans into the pools instead of mortgages.

The CDO model first emerged as a fixed-income subsegment in the 1990s in the form of CLOs (collateralized loan obligations) and CBOs (collateralized bond obligations), which owned high-yield corporate debt. CDOs took off in popularity in the 2000s when they integrated subprime residential mortgage-backed securities (RMBS). The RMBS owned by this type of CDO were typically rated BBB or better. As a result, CDOs were more levered than CLOs or CBOs.

In 1997, Kasoff was hired by Merrill to structure and evaluate the new CDO products. In 1999, Deutsche Bank poached Kasoff and others in his group from Merrill and tasked him to build out the German bank's CDO business. While at Deutsche, Kasoff led the development of CBOs and CLOs backed by European debt, an innovation made possible by the newly created common currency, the euro.

The 2001–02 recession resulted in business failures that generated new waves of distressed corporate assets. CLOs and CBOs that owned these bonds and loans began to trade at distressed levels; however, that market was very illiquid. Increasingly, investors wanted to buy and sell these assets. Around this time, activist investor Paul Singer's hedge fund was getting sales calls offering distressed CDOs; Elliott Management sensed an opportunity to move beyond its core equity focus. In 2003, Elliott hired Kasoff to build a group to invest in these structured products. "That was right at the beginning of a huge proliferation in new products in the credit markets," Kasoff said.

Derivative indexes backed by pools of credit default swaps (CDS) that referenced corporate bonds were trading with increased liquidity, and in 2003, tradable tranches of these indexes were created. These tranches enabled investors to buy or short a different slice of the risk, at a more junior or senior level, with a higher or lower return accordingly.

That made it really interesting because now you could actually trade this product in a relative value way by matching up CDOs with things that you could trade from the short side, to isolate value and do creative things.

At the same time, opportunities were developing to trade CDOs backed by debt other than corporate bonds. A large volume of "multisector CDOs" had been created in the late 1990s through 2000, which owned investment-grade corporate bonds (including many that later defaulted, such as Enron and WorldCom), aircraft equipment trust certificates, credit card ABS (asset-backed securities), auto loan ABS, and both residential and commercial

¹ A collateralized debt obligation (CDO) is an asset-backed security issued by a special purpose vehicle, a business entity formed specifically to issue that CDO. See Michael Schmidt, "CMO vs CDO: Same Outside, Different Inside," Investopedia, updated January 31, 2022, <https://www.investopedia.com/articles/investing/111213/cmo-vs-cdo-same-outside-different-inside.asp>.

mortgage-backed securities. These CDOs also became distressed as a result of defaults in parts of their underlying portfolios.

[The aircraft leases] also performed horribly after 9/11 for obvious reasons. And so that became a part of the distressed trading opportunity. What was left in these CDOs was mortgage-backed securities. And most of that was subprime. It got me focused on looking at the opportunity in subprime.

And there would be lots to look at. By 2004, the excitement around creating new derivatives in the corporate world had spilled over onto the mortgage side. The subprime RMBS tranches in those multisector CDOs had performed well, it turned out, while other parts of the portfolio had underperformed. From this discovery, market participants realized, it would be attractive to create CDOs backed entirely by subprime RMBS tranches.

Product and machine: Kasoff described the structure of a subprime CDO and the main players.

Kasoff described in detail the roles played by the five main players making up the mortgage-backed “CDO machine” (FCIC 2011, 130)—the securities firms (or “dealers”), CDO managers, rating agencies, investors, and financial guarantors. Investment banks and CDO managers worked closely together in the initial production and distribution phases.

If you’re a Merrill or Deutsche, for example, and you have a group of people that structure CDOs, what you’re doing as that banker is, you’re going into a CDO manager and pitching the idea of “Hey, why don’t you do a CDO? And we’ll work on it for you. And we’ll charge a little bit to structure it, and you’ll earn your 30 or 50 basis points running management fee on that portfolio.”

The CDO manager selected the subprime bonds and worked with the dealer to market it to investors. The dealer warehoused the assets purchased by the CDO manager on behalf of the CDO. During this “ramp-up,” the dealer structured the CDO. The CDO managers were not risk-takers; rather, their fee-based business incentivized them to increase assets under management. Kasoff outlined the capital structure of a typical subprime CDO.

- The first 0% to 5% of risk (the “first loss” tranche) would be unrated;
- The next 5% to 10% would be BBB;
- 10% to 15% would be A;
- 15% to 20% would be AA;
- And then about 20% to 100% would be rated AAA.

Regulatory frameworks made subprime CDOs very appealing for institutional investors.

Investors in CDOs, or “long-side buyers,” came from the largest set of fixed-income investors, namely banks and insurance companies. These institutional buyers were drawn to CDOs for their relatively high yields at each rating level. For example, an A-rated tranche of a subprime CDO might have had a credit spread of 150–200 basis points (bps), whereas the spread for a similarly rated subprime RMBS tranche was only 50 bps, and corporate bonds were even lower. Driven by regulatory frameworks, CDO investors optimized their portfolios based on each asset’s yield and the amount of capital required to be held against it, which in turn was based on the rating. For insurers, the investment sweet spot was a combination of A-rated and BBB tranches. Large money center banks tended to prefer more senior tranches. One big bank would often buy the entire \$400 million–\$500 million AAA tranche. The more speculative tiers of BBB and equity of the CDO—often a \$40 million–\$50 million slice each—were harder to move and mainly went to hedge funds or high-net-worth investors.

Key to CDOs’ appeal was a rating transformation: BBB subprime bonds were securitized into a structure composed mainly of a AAA tranche.

Crucially, CDO deals needed credit ratings to happen, Kasoff explained. Rating agencies Standard & Poor’s and Moody’s provided the ratings that institutional investors relied on.

Nobody was going to buy 85, 90% of the capital structure without ratings, even if you could show somebody that you had a ton of subordination and that it was bulletproof for credit risk. Without a rating, it didn’t make sense because they would have to hold too much capital against it.

A rating transformation occurred when BBB subprime bonds were securitized into a structure composed predominantly of a AAA CDO tranche.

Rating agencies used ill-fitting models to provide favorable ratings—and disregarded feedback from the markets.

This transformation rested on quantitative models that the rating agencies had developed for corporate credit. Their analytic framework assumed that “the portfolio of assets could be modeled as a quantifiable number of independent default probabilities.” In other words, that *the risk on any one bond was independent of, or at least not well correlated to, another*. The framework’s model then mathematically calculated the default probability distribution of the aggregate portfolio. However, Kasoff said, “when you started going into portfolios that were entirely mortgage risk, you didn’t have diversity.”

Much criticized, the agencies typically responded that their role was “to assess credit risk, not market risk.” But the agencies should have heeded market prices more, Kasoff contended, noting that they overlooked market signals and continued to issue inflated ratings. He sensed “a certain amount of hubris” among rating analysts when they rebuffed questions about the adequacy of their models. He described a practitioner roundtable in 2006–07 hosted by a senior member of S&P’s structured group for 50 analysts to hear from

a panel of market insiders, ostensibly to better understand the thinking of those using their ratings.

I was invited to [speak at] one of these roundtable meetings. I told [the host] beforehand, “I might say some things that you won’t be happy with.” And he said, “Yeah, it’s OK, come on in.” So I said it, right in front of that whole group: “The high correlation, or lack of diversity, meant that *the ratings were wrong*” [italics added]. I remember this well—his boss had coincidentally walked out of the room before I made the comment. When I talked to him afterwards, he said, “I’m glad you made the comment for the analysts to hear, but I’m also glad she had left the room before that.”

Whatever unease there may have been at the agencies did not matter, for an obvious reason. By 2005, Kasoff pointed out, structured credit securities had become the largest segment of the rating agencies’ business, approaching 50% of revenues, up from 0% in 1995.²

Synthetic CDOs enabled Wall Street firms to cater to massive demand.

Hedge funds that specialized in structured credit were buying CDOs of distressed assets and eager for ways to lock in gains. The natural question was, “I’m effectively buying indirectly a portfolio of subprime bonds. How can I short something that looks similar?”

Very quickly, Wall Street developed a standardized pay-as-you-go credit default swap. This product replicated the risk profile of any specific subprime RMBS bond and removed the need to find someone who owned it and was willing to sell it. Similarly, for someone who wanted to short the bond, the CDS eliminated the need to find a bond that could be borrowed (the normal process for shorting securities). The pay-as-you-go CDS gave rise to the synthetic CDO, a subprime CDO in which the subprime bonds “owned” by the CDO were actually held through CDS contracts; the synthetic CDO did not own actual bonds.

In some cases, the AAA tranche issued by the CDO could be structured as a CDS instead of as a bond. AIG and other insurance companies were principal writers of CDS on the AAA tranches of these CDOs; by selling protection, they were effectively getting exposure to a AAA CDO tranche and earning premia on the contract. AIG, as well as large monoline insurance companies, sold protection on AAA tranches very cheaply. Notably, regulators did *not* require these insurers to hold *any* capital against the risks they were insuring.

The effects of synthetic CDOs were threefold. First, they expanded the market, removing the constraint of a limited number of mortgage assets. The pay-as-you-go CDS, Kasoff said, “was one of the ways that the market started to pay attention to subprime, which up until that point had been the relatively esoteric corner.” Synthetic CDOs and their component contracts enabled more investors to join the boom in CDO investing. In 2005 and 2006, CDOs issuance

² For 2006, revenues from structured credit made up 45% of Moody’s credit ratings business, and S&P was doing more business than Moody’s (FCIC 2011, 149; Moody’s Corporation 2007, 19–21; McGraw Hill Companies 2007, 38–42).

volume increased dramatically, due to growing global demand from clients in Europe and Asia for the higher yields offered by these securities.

Second, synthetic CDOs accelerated the speed and ease of taking a position, removing the months-long wait and warehouse risk of the “ramp-up” process. “Synthetics allowed you to bypass accumulation, to snap your fingers and be done,” explained Kasoff. Third, synthetic CDOs enabled unlimited leverage, since financial regulators did not require capital to be held against them. For example, “at Morgan Stanley, you had a prop desk that was buying these synthetic AAAs because they didn’t have to hold any capital against it.”

Crucially, the growth in synthetic CDOs was integrally tied not only to investors wanting yield but also—just as much—to the “shorts,” the investors looking to hedge some prior exposure or to take more speculative positions against the housing market.

In 2004, a small number of contrarian investors began shorting subprime CDOs.

For a number of investors, the impetus to short subprime CDOs originated not as a bet against subprime but to reduce risk from CDOs already owned. “It was just a hedge against the CDOs,” Kasoff said. But the move to lock in some gains got Kasoff and others thinking.

The more you started looking at what was going on in subprime, you saw something was going very wrong. We all know the history, but as we looked at it then, we thought more and more about having the ability to short it.

The standardization of the pay-as-you-go CDS enabled large investors to establish a short position. Kasoff identified an evolution among investors in the thought process about shorting subprime CDOs. What had begun as a tactic to lock in gains from arbitrage had other uses. It occurred to many that they could do more with the shorts, that “this is a good core hedge against a recession.” By the end of 2005 and early in 2006, after digging into their research on the housing situation, “we were starting to feel like, wow, this is an ‘alpha short’—the short that wasn’t just for hedging.”

Shorting subprime CDOs was a lonely game.

Magnificently right in hindsight, the short investors confronted a prevailing mindset with a powerful grip, Kasoff elaborated. “People on the long side would smirk at us. CDO managers were getting rich off of our stupidity.” There was no community among shorts, nor much interaction between them. In any conversations with other hedge funds, “you’d still be very close to the vest.”

“On the short side, you never really knew if you were right,” said Kasoff. There were costly premia to be paid. Real moments of fear sparked short cover rallies. Through 2006, the bullish mentality of the housing boom prevailed, up until the bankruptcy of a small mortgage originator, MLN. In February 2007, the launch of the TABX index of CDO tranches bombed, leaving CDO investors exposed. But what at first appeared to be a big win only generated further qualms. Wall Street firms dodged calls from shorts to mark their CDS positions accurately. Kasoff recalled, “there were big fights around marks.” Dealers, who enjoyed a

measure of control over short-term prices in the illiquid market for CDOs and subprime CDS, were awoken to the need to adjust their books—and to shed subprime and CDO exposure ASAP.

Strategies for shorting CDOs varied by firm type. One type, utilized by the hedge fund Magnetar Capital, was the unconstrained structured deal. John Paulson (of the hedge fund Paulson & Co.) eventually set up an entire fund dedicated to one trade. Barclays' ABS correlation desk ran a hedged book that attempted to mark its positions to market as well as it possibly could. Multisector hedge funds such as Elliott would dedicate a limit to a subprime shorting strategy for a given period.

Let's say I'm a \$10 billion fund and I'm comfortable with this trade being a 1% drag on my performance. Without this trade and in a good year, I expect to earn 10%. So now with the trade that'll be 9% instead. So that means I can spend \$100 million a year in premium. And then you work backwards to optimize how you're going to spend that money.

One tactic common across different short sellers was to short subprime BBB tranches and buy the equity of a CDO that owned those or similar bonds. "CDO equity was popular," Kasoff explained, "because it mitigated the cost of shorting stuff because you had all of these other cash flows coming in." As interest in shorts grew in late 2006 and 2007, the cost of shorting the BBB increased. So hedge funds moved up the capital structure, shorting the A and AA tranches. Higher-rated tranches cost less to short, allowing sellers to amplify their bet. However, greater losses would be needed for those shorts to pay off.

The bigger picture: short sellers win; system fails.

Market events of 2006–07 reassured the short sellers "that this was a great trade." At worst, if they were wrong, their losses would be minimal. Most expected "that subprime would be a slow-moving train wreck because the bulk of the mortgage defaults would be concentrated around the reset dates on 2/28 ARMs or 3/27 ARMs."

But even the short sellers had been conservative in their 2006 assessments—and overly optimistic about housing markets. Subprime mortgage defaults spiked well *before* the resets were due to start in 2009. As markets digested news of losses in 2008, fights over marks grew heated, particularly when the counterparty was Lehman or Merrill. "A lot of people lost money because they weren't able to fully get the proper amount of margin when Lehman went under." The subprime losses came sooner than expected, revealing a greater vulnerability and triggering a global financial crisis.

The broader housing market collapse that ensued was more massive and more resounding than almost anyone had imagined.

What very few recognized at the time was how this little corner of the US mortgage market was turning into a systemic risk for the overall global markets. And that was not at all clear to anybody [then].

Kasoff connected trading strategies and market instability to system failure. The outstanding balance of all subprime loans around that time was \$700 billion in an overall US mortgage market of \$10 trillion. The subprime problem was not a systemic risk, the Federal Reserve had emphasized publicly as late as May 2007. But the damage would in fact extend beyond the reckless and the greedy. Financial dysfunction took down one great institution after another, threatened a global meltdown, and induced a Great Recession like none other.

References

Financial Crisis Inquiry Commission (FCIC). 2011. *The Financial Crisis Inquiry Report*. Washington, DC: US Government Printing Office [URL: <https://ypfs.som.yale.edu/financial-crisis-inquiry-commission-0>, accessed March 8, 2022].

McGraw-Hill Companies. 2007. 2006 Annual Report.

Moody's Corporation. 2007. Form 10-K 2006.

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Yale Program on Financial Stability

Lessons Learned

Eric Kolchinsky

By Steven H. Kasoff and Matthew A. Lieber

Eric Kolchinsky served as managing director of ratings for ABS CDOs (asset-backed security collateralized debt obligations) at Moody's Investor Services from 2005 to 2007. Kolchinsky started his career in structured finance with stints at Goldman Sachs and Merrill Lynch. He joined Moody's in 2000 as vice president for credit. In 2007, after Kolchinsky raised questions concerning the ratings of new deals in light of subprime downgrades, Moody's removed him from his client-facing position. Kolchinsky supervised methodology for structured finance valuations at Moody's Analytics for two years, before Moody's suspended him altogether in 2009. Separated from Moody's, Kolchinsky testified before Congress about fraudulent rating agency practices and conflicts of interests. Since 2009, Kolchinsky has served at the National Association of Insurance Commissioners (NAIC), where he is presently director of structured securities and capital markets. This Lessons Learned summary is based on an interview with Kolchinsky.

In the decade before the financial crisis, rating agencies became more profit-oriented while confronting more complex products than ever.

The rating agencies played an important and widely documented role in the subprime securitization bubble of 2005–07 that triggered the Global Financial Crisis. Investors relied on the ratings to judge the risk of the securities and satisfy regulatory requirements. Eric Kolchinsky received a brief but intense media spotlight as an industry whistleblower in 2009 for signaling the contradictions between rating agencies' practices and their public role as a market referee. In our interview, Kolchinsky described in frank detail the practices of the agencies as they handled a wave of complex structured products during the boom years.

Rating agencies serve market participants, as Kolchinsky explained in a 2011 presentation,¹ by providing a reliable estimate of a security's likelihood of failure. Private companies, rating agencies originally earned revenue from investor subscriptions but increasingly began earning revenues from issuer fees in the 1970s.²

¹ Eric Kolchinsky, "The Rating Agencies: Regulatory Perspectives," presentation to Georgetown University Law School, Washington, DC, November 2, 2011.

² US securities law authorizes the Securities and Exchange Commission to designate nationally recognized statistical rating organization (NRSRO) status, qualifying an agency to rate financial institutions, broker-dealers, insurance companies, and corporate issuers of securities. Federal and state regulators have relied on NRSRO ratings to determine minimum capital levels in their supervision of banks and other financial institutions. At the direction of the 2010 Dodd-Frank Act, however, US bank regulators have adopted alternative standards of creditworthiness, introducing the "investment-grade" label. Institutional investors remain a key end-user of the NRSRO ratings. Standard & Poor's and Moody's have dominated the NRSROs, responsible for more than 80% of ratings across all asset classes in 2018.

Using a particular statistical methodology, the agency ratings provide a reasoned assessment of credit risk, based on particular estimates of the probabilities of loss or default. The agencies' ratings of all securities are, however, simply the result of a model applied to a particular security, controlling for other factors and with large, simplifying assumptions and omitted variables.

For decades, Kolchinsky said, the agencies had operated as private partnerships and functioned as a market utility, providing reliable credit analysis along professional lines. This model broke down in the 2000s, according to Kolchinsky, when the agencies became publicly held companies and when the focus of their business shifted to structured finance.

The complexity of structured products meant that there was not a single recognized methodology for evaluating them, nor a clearly optimal one. The rating agencies were ill-equipped—and improperly motivated—to rate CDOs.

Structured credit products challenged rating agencies, Kolchinsky said, to adapt from modeling the probability distribution of default for an individual company to modeling the aggregate default or loss distribution of a portfolio of bonds that have correlations among themselves. Specifically, characteristics of CDOs that he cited as increasing their complexity and opacity that proved challenging to the rating agencies included:

- Securitization multiplied the number of agents separating borrowers from risk bearers, as mortgages or other assets passed from originator to a residential mortgage-backed security (RMBS) and then to a CDO; and
- Each agent in the chain of production was less incentivized to act in the interest of the risk bearer and more incentivized to act for his own short-term profit. Compensation for the agents shifted from a long-term object (partnership interest) to short-term salary and annual bonus.

Furthermore, across the credit rating industry, there were fewer people qualified to analyze and rate structured products, according to Kolchinsky, than for other market segments. Conventional fixed-income securities, by contrast, had been scrutinized by ranks of professionals using methodologies developed over decades. This made CDO ratings less transparent, Kolchinsky said.

The staff in Kolchinsky's CDO group came from corporate bonds. They "lacked knowledge of how the underlying RMBS bonds worked," and they did not talk with the RMBS group. They used the methodology they knew well.

Faced with the challenge of the new complex products, Kolchinsky continued, the rating agencies employed existing models and a trial-and-error practice to determine the best methodologies. At first, he said, Moody's applied its conventional corporate bond ratings models and tools to analyze ABS CDOs and establish its foothold in structured finance products. One such model was the binomial method, an important original methodology used for rating collateralized loan obligations (CLOs). "The binomial was a heuristic that worked quite well" to generate accurate ratings on CLOs using strong assumptions,

Kolchinsky explained, but “the binomial model had zero statistical basis” when applied to RMBS CDOs.

Revenue streams from the new CDO business generated a methodological Wild West. The best model for a CDO, it turned out, was the one that was plausible and generated the most favorable rating.

Around 2004, with subprime CDO issuance starting to take off, Kolchinsky recalled that Moody’s had a problem.

The binomial method wasn’t working very well for Moody’s. When I say it wasn’t working well, Moody’s was losing business. That was in the ABS [segment], so RMBS-backed CDOs.

This was, Kolchinsky continued, due to a crucial output that would drive the ultimate rating of the security, namely the diversity score that the model generated. The diversity score of a CDO was a measure of the independence (or noncorrelation) of the underlying securities from one another. More diversity meant less correlation, and this resulted in a better rating, since the underlying securities were less likely to default simultaneously. As Kolchinsky explained it, the problem for him and for the Moody’s structured finance group that he led, however, was the output that the binomial method was producing.

The diversity score that came out was in the low teens. At low teens, basically you had a lot of cliff effects. If you have basically 12 scenarios that you’re running, because the diversity score was 12, you could have a lot of cliffs. And when you probability-weighted those, you started getting much lower ratings. Especially at the top where you needed the AAA to finance and lower the cost of funding for the deal.

However, Kolchinsky explained, the analytic challenges in rating a CDO opened up the possibility of using different models. As that market took off and shifted into ABS CDOs and RMBS, Kolchinsky described a methodological Wild West across the broader market for credit ratings. Monte Carlo simulation models, S&P’s black box simulation model, a two-moment method, and CDO-ROM were some of the methodologies being applied by the industry.

It turned out, Kolchinsky said, that the Monte Carlo simulation models were generating more favorable ratings of subprime real estate CDOs:

Eventually, the consideration was to take [the Monte Carlo simulation model] and to apply it to an area where the binomial wasn’t working well. [From then on,] we had tremendous market share, and we usually didn’t miss deals.

In the decade before the financial crisis, the rating agencies became public companies. The move incentivized rating agency directors to prioritize market share over sound methodology.

For decades, the standard revenue model at the top three rating agencies had been issuer-pay, meaning that the underwriter of the security paid a fee to the agency for completing and publishing a rating. However, important structural changes had occurred in the industry during the period immediately before the crisis. Kolchinsky emphasized two changes in particular and described the ways that these changes influenced agency ratings of CDOs:

- Moody's went public in 2000, increasing its focus on revenue growth; and
- Rating agencies shifted compensation of their staff from a long-term focus to short-term financial incentives.

When the CDO boom began a few years later, Kolchinsky explained, it introduced a stream of new business that saw more competition between the different rating agencies for profits. The surge in synthetic CDOs would accentuate these dynamics.

Kolchinsky also confirmed that management at Moody's directed ratings managers to prioritize market share over sound methodology. When asked if the CDO ratings methodology at Moody's was designed to try to more closely match S&P and Fitch ratings at the time, Kolchinsky responded, "Yeah. Of course, absolutely." Moody's was losing business because it was generating ratings that were too low relative to other rating agencies, he explained. Ratings shopping—when an issuer seeks the agency with the lowest standards to return the highest rating—was happening, and the pressure was on Kolchinsky to pursue market share.

The bottom line, Kolchinsky made clear, was that a good model for rating CDOs in this environment was one that generated a better rating.

That's how things work at rating agencies. Even if people don't say it out loud, you've got to look at the incentives. If you don't have the market share, you're going to get fired.

Around this time, Kolchinsky confirmed, rating agencies had shifted compensation of their staff from a long-term focus to short-term financial incentives. The rating agency business model has very high fixed costs, Kolchinsky explained, but also enormously high profit margins once you can add business. The pressures were obvious, Kolchinsky remembered.

If you're not keeping the lights on and you're a publicly traded company, you have a group that's sucking down a lot of money without generating that kind of marginal revenue—you're going to get fired. Nobody has to tell you, "You have to get in business." You're looking at what you're producing, you're looking at your salary and going, "How long are they going to keep me around?" It doesn't have to be said.

When these profits were threatened, recalled Kolchinsky, in 2004–07, directors at Moody’s pressured ratings managers to get more business. In addition, he said, they failed to adjust their methodologies to address mounting evidence of large-scale losses in the real estate markets. They should have refused to rate products that they could not analyze. Yet, in the pursuit of shareholder value, the directors repeatedly emphasized market share strategies, Kolchinsky explained:

These are smart people . . . And they told you what your market share was. That was the market share emails that I started receiving when I was managing the group. “Here’s your market share, here’s how you’re doing. Here are the deals you missed. Why did you miss those deals?” Nobody said directly, “Make these deals work,” but you knew where it was going. Managers were fired periodically.

Before 2000, directors at Moody’s worked for a private company that did not answer to shareholders and that, in Kolchinsky’s opinion, was significantly less beholden to investment bank clients. The issuer-pay revenue model had previously coexisted with a less profit-driven, and more reliable, rating agency industry. According to Kolchinsky, the transformation of Moody’s into a more aggressively capitalistic shareholder value–driven firm combined with the issuer-pay model and the new challenges of structured finance to cause management to chase market share and profits at the expense of their ratings and credibility.

After the financial crisis, the rating agencies received much criticism from various reviewing bodies including the Financial Crisis Inquiry Commission (FCIC), which specifically looked at Moody’s. Along with plain evidence of rating agency failures, the commission gathered significant evidence that confirmed Kolchinsky’s descriptions regarding the design of appropriate methodologies and the shift in corporate culture to a short-term revenue focus and their impacts on ratings.³ The FCIC also specifically concluded that that the division rating CDOs at Moody’s was under-resourced. But its criticisms were not limited to Moody’s. “The three credit rating agencies were key enablers of the financial meltdown . . . This crisis could not have happened without [them]. Their ratings helped the market soar and their downgrades through 2007 and 2008 wreaked havoc across markets and firms.”⁴

Kolchinsky called for a quasi-public rating agency modeled after the insurance industry.

Practitioners interviewed by the Yale Program on Financial Stability from a wide range of institutional settings have concurred in criticizing the rating agencies’ performance prior to and during the crisis. Like Kolchinsky, many pointed to the problematic incentives in the issuer-pay model, which may have influenced the use of models that delivered a majority of AAA ratings. It *is* strange that the main business of Moody’s *Investor Services* (italics added)

³ See Financial Crisis Inquiry Commission (FCIC), *The Financial Crisis Inquiry Report* (Washington, DC: US Government Printing Office, 2011), 146–50, 207–12. (Note: Kolchinsky provided evidence to the commission, which also interviewed a number of other former and then–Moody’s employees.)

⁴ FCIC, xxv.

and other major rating agencies lies in earnings from fees for services to *underwriters*—who are *not investors*.

The 2006 Credit Rating Agency Reform Act formalized US Securities and Exchange Commission (SEC) oversight of the industry in an effort to ensure that only qualified firms that had been approved by the agency as nationally recognized statistical rating organizations (NRSROs) were issuing ratings for financial instruments and entities that were being relied on by investors. The 2010 Dodd-Frank Act enhanced the SEC's oversight and pushed regulators, which had also relied on ratings in judging a bank's risk level, to develop alternative measures of creditworthiness,⁵ introducing the "investment-grade" label. Institutional investors remain a key end-user of the NRSRO ratings. Currently, nine firms are registered as NRSROs;⁶ however, Standard & Poor's and Moody's have dominated the industry, responsible for more than 80% of ratings across all asset classes in 2018.

Rating agency reforms have been piecemeal, however, and the system remains largely similar to its pre-crisis state. In 2010–11, Kolchinsky actively promoted an overhaul of the system. Asked about rating agency reform, he explained his support for a "quasi-public rating agency model," which he would base on the insurance industry, given his experience there. Kolchinsky explained that the National Association of Insurance Commissioners is a nonprofit organization of state regulators funded by industry filing fees and dedicated to supporting regulators. The NAIC's Securities Valuation Office oversees a hybrid system integrating at least three kinds of ratings by government regulators and private rating agencies:

- In-house ratings of insurance industry products for regulators,
- Fully outsourced ratings of industry products by private financial institution specialists for market participants, and
- Contracted ratings provided by private institutions with closer oversight.

In a public rating agency model such as this one, said Kolchinsky, ratings managers are salaried employees of the NAIC. As regulators, they bring that perspective to the work and are not incentivized to grow the market. While moving to such a system as it relates to NRSROs would take significant effort, Kolchinsky also stressed that the other extreme, more competition among private agencies, is not the answer.

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⁵ SEC.gov, "Learn More About NRSROs," accessed April 30, 2021, <https://www.sec.gov/ocr/ocr-learn-nrsros.html>.

⁶ SEC.gov, "Current NRSROs," accessed January 11, 2022, <https://www.sec.gov/ocr/ocr-current-nrsros.html>.

Yale Program on Financial Stability

Lessons Learned

Sohail Khan

By Matthew A. Lieber and Steven H. Kasoff

Sohail Khan was managing director of fixed-income sales at Citigroup from 2005–09. Khan started his finance career in 1996, after completing his MBA at Lahore University of Management Sciences (LUMS). Khan gained broad experience in product structuring and sales of credit derivatives at Citigroup. As managing director during the subprime securitization boom and bust, he was involved with institutional sales of asset-backed securities (ABS) including collateralized debt obligations (CDOs); his clients were hedge funds, structured vehicles, and institutional buyers. In 2009, Khan left Citigroup to co-found StormHarbour Securities, a boutique investment bank he has headed since as managing principal. This Lessons Learned summary is based on an interview with Khan.

Three “fundamental truths” defined the bullish mindset of the mortgage-backed credit industry in the years before the financial crisis.

When Sohail Khan started his career at Citigroup in the mid-1990s, the structured credit area he entered was in a nascent growth phase. At the start, Khan said, Citigroup was doing just two trades a month, frequently involving credit default swaps or total return swaps. Residential mortgage-backed securities (RMBS), including those backed by subprime loans, had existed since the 1980s. But CDOs made up of subprime RMBS tranches did not exist and would not be introduced until the early 2000s.

A decade later as a managing director, Khan managed institutional sales of structured credit products including CDOs for hedge funds, banks, and insurance companies. Because of his early experience structuring credit derivatives deals, he was assigned an uncommonly wide-ranging set of clients. Khan was able to soak up a broad sense of the mindset driving investors’ enthusiasm for subprime CDOs, which we asked him about.

According to Khan, participants in the CDO bull market shared a common set of assumptions. In particular, Khan highlighted “three fundamental truths” that he said defined the environment:

1. Housing prices nationally will never go down;
2. Losses will be normally distributed, to the extent losses do occur; and
3. Silos don’t really matter much—you can break products up.

Everyone participating in the market, according to Khan, had either formally signed off on “these three bits of received wisdom or just took them to be the state of the world.”

To illustrate the powerful hold of the shared mindset, Khan recounted a telling exchange from a 2006 internal meeting. Citigroup’s research group presented an extensive briefing on

mortgage-backed securities to his institutional sales team, in which the head of research extolled the robustness of the securities. Curious about a graph from the presentation on home price appreciation (HPA), Khan queried the research director.

Khan: What happens if HPA is negative?

Research director: That doesn't happen.

Khan: But if it were to go down, what would happen to those tranches?

Research director: [No response]

"It became slightly awkward in the room," Khan told us. One of Khan's colleagues joined in, pushing the research director a few times on the question. *But there was no answer.* It was not that the presenter was trying to skirt the issue or be insincere, Khan explained; rather, the possibility of the scenario "just hadn't crossed his mind":

He hadn't done the math on what would happen if that happened. It was just such an unseen sort of a situation: It just couldn't happen.

Rating agencies incorporated "fundamental truths" to create flawed models of CDOs.

Belief in the "fundamental truths" was widespread, according to Khan. The rating agencies fully incorporated these three assumptions into the models that they used to rate CDOs. The key assumption of the models, said Khan, was that losses in the underlying securities would be normally distributed.

The whole thesis behind it was, "How do I change something correlated into something uncorrelated?" Because that's when I run the math on it and make it into a normal distribution and then truncate the risk.

To use their desired model and assume that losses on a portfolio of assets were normally distributed, the credit risk on the underlying securities had to be uncorrelated. The rating agencies' approach to residential mortgage-backed CDOs followed directly from their approach to rating CLOs (collateralized loan obligations). The risks on the corporate loans that went into the CLOs showed relatively low levels of historical correlation with each other. But with CDOs composed of residential mortgage-backed bonds, Khan recognized and advised his clients, "there's a single point of correlation there, which is housing."

CDO groups were springing up in the investment banks—in different places.

In 2005, as the market for subprime CDOs emerged, investment banks were formally building out their CDO structuring groups. Khan discussed this growth, characterizing it as organic and somewhat haphazard, since the development of the CDO division varied from firm to firm. At each institution, Khan pointed out, the location and the business strategy of the CDO group varied depending on circumstances unique to its creation.

Organizational structure mattered. The provenance of the CDO group—where it was situated in the organization—shaped the firm’s approach to risk management and how the CDO group operated.

What Khan called the historical “provenance” of each group—where it sat within the institutional hierarchy—shaped in particular its approach to risk management.

A lot of what happened [was] a function of where you came from . . . The reason that Goldman did better than others in the crisis is because they had a much more intensive mark-to-market approach and much more intensive risk management approach in the part of the business where their CDO business sat compared to some other firms.

Khan said that the worst malpractice occurred at certain firms when they made risk management separate and distant from the CDO groups.

A lot of firms had a culture where risk management was risk management and not [a driver] of business. And so, I think that’s the other big difference in Goldman and a lot of other firms. I think Goldman risk management was really empowered. And at other firms, they weren’t as empowered.

When risk management was not as empowered, Khan said, “people were not marking to market.” CDOs were not being marked to market based upon where the TABX index was trading. The lack of discipline allowed the losses in certain well-known instances to grow through 2007.

The CDO manager industry was a creation of the subprime CDO machine. With no history or common practice, the most influential factor was a business model that stressed rapid growth of assets under management.

In 2004, a new kind of firm—a CDO manager—emerged as a short-lived cottage industry, rising with the subprime boom and falling in 2007. “The whole industry was only around two or three years,” Khan told us. “Most ABS CDOs went into some form of default by 2009,” he added. Larger managers were part of insurance companies, and then there were smaller independent firms.

CDO managers stood between the sell-side investment bank that structured the CDO and the institutional investors on the buy side. A key factor in a CDO manager’s ability to win business was its ability to bring equity investment to the table. Equity buyers came in the form of ultra-high-net-worth individuals, hedge funds, and offshore accounts.

The economics of the CDO management business revolved around a strong incentive to boost assets under management (AUM), as Khan explained in detail.

The basic math was that a high-grade CDO would make 8 to 12 basis points in fees. The typical deal size was about \$1 billion. So, that meant your fees were a million a year on a high-grade CDO. On a mezzanine CDO, the fees were anywhere from 25 to 35, maybe 45, basis points. But the deal size was more like \$300 [million] until

synthetics started to happen. Initially it was about \$300 [million] up to \$500 million. The teams: For an independent shop, you needed about five to seven people in the team. So, leaving out the senior guy, the total cost structure was probably about \$3 [million] to \$4 million.

The fixed cost structure and fee basis meant that CDO managing—while it lasted—was a business of accumulation of assets, with a strong incentive to grow.

The industry manufactured derivatives across silos that passed the product along—increasing risk while stripping away information.

As Khan explained, CDOs added a further level of securitization beyond the RMBS level, one more step of separation between the initial home buyer/borrower and true economic owner of the mortgage risk. The extensive securitization, Khan explained, reduced understanding of the underlying housing assets on the part of investors and sellers at every step in the process. Khan called this “a problem of silos.”

As someone who was marketing CDOs and the derivatives related to them, Khan said he never talked to anyone who actually originated a mortgage: “I didn’t ever talk to a mortgage-backed security banker. I had no idea what was going on at that level. And yet, I’m selling the third and fourth derivative of that risk.”

The industry was found to be populated by such troubling conventions. Another instance Kahn described was the development of synthetic CDOs during the late phase of the boom, enabled by the standardization of the subprime credit default swap in 2005. Synthetic CDOs, he explained, allowed managers to assemble a CDO very quickly, escaping the months-long process of ramp-up. With a standard RMBS CDO, the investment bank structuring the deal would obtain the different securities, warehouse the contents on its trading book, and market the CDO to investors until the whole thing was ready to go, a process that often took several months. But with synthetics, the banks combined tranches of CDOs that it already owned, a process that could be done in only days. The industry created a new product, Kahn reflected, but it also inserted another layer between the original home buyer and the synthetic CDO investor.

Between 2005 and 2007, the perverse logic of a full-fledged asset bubble took effect, transforming what began as financial innovation into rationalization of reckless risk-taking. Khan shared a recollection of an interaction with a CDO industry insider that is characteristic of the attending exuberance:

One thing that I found in one of the deal pitch books out of the blue was something called “mid-prime.” So, I go to the person structuring the CDO—somebody who should know this stuff really, really well, who was not a salesman—and I said, “What’s ‘mid-prime’?” And he had no idea.

“Mid-prime,” Khan explained, was a nonsensical term invented out of nowhere one day because it implied more diversification.

The cycle is repeating itself.

Asked to assess the reforms and safeguards instituted after the financial crisis, Khan said, “I don’t think there are any lessons learned” from the financial crisis. Referring to the growth of unsecured debt, the SPAC (special purpose acquisition company) trend, and surging public sector debt, he expressed fear that “a very fat tail is going to come from sovereigns.”

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Yale Program on Financial Stability

Lessons Learned

Brian Stoker

By Steven H. Kasoff and Matthew A. Lieber

Brian Stoker served in Merrill Lynch's structured credit division for seven years, producing and trading asset-backed securities (ABS). In 2005, Stoker moved to Citigroup as a director of ABS CDO (collateralized debt obligation) and CLO (collateralized loan obligation) structuring. After the financial crisis, Stoker was an analyst at Carlson Capital for three years. In 2011, he joined StormHarbour Securities, serving as a managing director until 2018. From 2019 to 2021, he was director of securitization at Korth Direct Mortgage. Presently, Stoker is a licensed real estate agent in Miami. This Lessons Learned summary is based on an interview with Stoker.

Block and tackle: To produce a CDO profitably, investment banks had structuring units that did the heavy lifting: analyzing prospective deals, obtaining rating agency approval, engineering the security, and marketing the tranches to investors.

Producing a CDO frequently began in response to an incoming call from a portfolio manager or from Merrill's sales desk, related Stoker. Sometimes, the structuring unit was more proactive, reaching out to CDO managers to propose a deal. Then, crucially, the structuring group would "figure out whether the economics of the deal work[ed]," evaluating its expected liability spreads to determine if it would be profitable.

Interacting with the rating agencies during the process "was mostly about following their rules." Stoker pushed back somewhat against accounts of ratings shopping, pointing out that "both sides had veto rights on the deal."

We needed Moody's and S&P on our deals, and if they gave us a bad rating, we were in a world of hurt. We needed to work with them. And they wanted to work with us because they get paid a big fee.

"I don't think we played off Moody's versus S&P," Stoker said. Fitch was trying to get into the CDO ratings market, so "we [w]ould start including them as long as they came up with ratings that matched up with the other rating agencies." Most deals that he worked on had both large agencies involved: "Moody's would rate all the capital structure because they might have been a little easier than Standard & Poor's down the capital structure."

The dealers were strategic, Stoker allowed, but in his account, the interactions with rating agencies were far more subtle than in other reports of ratings shopping. Crucially, the agency had leverage over the dealer too, and any differences between the ratings of one agency and another tended to be marginal.

The dealers marketed the CDO tranches based on established investor preferences, Stoker explained. Banks were happy to hold the AAA tranche, often with monoline insurers providing additional protection (known as the negative basis trade). Insurance companies favored the single-A tranche, which National Association of Insurance Commissioners

(NAIC) rules allowed them to treat as they would a AAA security. Hedge funds pursuing higher returns would take the BBB tranche and equity.

Seeking high profits, dealers migrated from just structuring CDOs for a fee to acquiring CDO tranches, accumulating risk that would come back to bite them.

Stoker described a key incremental step that led dealers to take on risk as they grew their lucrative CDO structuring business. In the early days of CDO structuring at Merrill, he said, “we would sell the AAA to [five or 10] banks *But then it became a competitive advantage for the dealer to buy some of the AAA [italics added].*”

Dealers viewed the move to hold on to AAA tranches as a way to increase the profitability of their CDO business. Because dealers did not need to hold much capital against these AAA tranches, the inherent leverage was very high, resulting in a compelling return on capital. The risk was considered to be minimal, so many dealers accumulated massive quantities within one to two years.

If it looks too good to be true, it probably is: Citigroup used its commercial paper business to create the appearance of “risk-free profits.”

In the case of Citigroup, where Stoker moved in 2005, the firm used its commercial paper (CP) facilities to accumulate AAA CDO tranches.

Citigroup could issue commercial paper . . . CP investors would put up all the money to buy that tranche, to buy the AAAs, but Citigroup essentially insured it. But that insurance did not show up on our balance sheet at all.

Citigroup’s CP-funded asset warehousing “made an infinite percentage return as a percent of capital because there was no capital [usage].” Internal accounting procedures permitted the business unit to immediately book the next five years’ worth of expected profits, providing an even stronger incentive for the individual bankers in those groups. “We’d get paid in full for five years,” Stoker said.

To grow the CP-funded asset accumulation, Citigroup created structured investment vehicles (SIVs), also known as asset-backed commercial paper (ABCP) conduits, Stoker explained. “Citigroup had humongous SIVs that Citigroup effectively backstopped also.” The boom-fueled accumulation of assets was considered a low-risk or risk-free business. It spiked until it was noticed, and then Citigroup’s managers put on limits.

When we got to \$40 billion or \$35 billion, somebody at the bank finally noticed and said, “Hey, that’s a lot.” They started to impose rules.

The SIVs had not been consolidated as part of Citigroup’s balance sheet, Stoker said, but that changed in late 2007 or 2008. “I don’t think they were trying to hide it. I’m sure they were following the rules, but the rules allowed them to book it that way.”

In 2006, Stoker recalled, investors' debates about housing prices were intensifying. "I didn't have to debate it," he said, "because I was not buying or selling anything. I was just processing spreadsheets and papers." By the end of the year, reports indicating a bad end to the housing boom were resonating on Wall Street.

I came into the office after New Year's in January 2007. I got sat down by the head of our trading desk and his boss, and they said, "Get all these deals done tomorrow, all of them." We pushed real hard to get them done as fast as we could. We tried to do the riskiest ones first, but the losses were piling up fast.

Throughout 2007, Stoker's group at Citigroup struggled desperately to reduce the firm's massive subprime exposure in its CDO warehouse. In March, Stoker recalled, his group marked one warehouse down \$100 million—"and we hadn't even marked down the whole portfolio." Stunned by the losses, they complained to the trading desk. "What's going on here? But it got real bad."

He recalled his alarm on hearing the firm's then-CEO, Chuck Prince, say later in the year about leveraged buyouts—"As long as the music is playing, you've got to get up and dance."

My reaction was, "I need to slip a note under his door and say, 'You got to pay attention, dude. This is a big freaking problem.'"

Stoker's astonishment reflected his reality as a midlevel employee in one of the world's largest banks. For seven months, he and his group had been aware of Citi's exposure to massive subprime losses and had been striving desperately to clean it up. "In July, he was still dancing," said Stoker. "And I was thinking, 'Man, this is bad. We got \$40 billion of the stuff with a commercial paper exposure.'" He was struck by the CEO's seeming ignorance:

These banks are so big. I was disappointed that the information didn't travel up to senior executives very well, nor was it connected. Nobody told the CDO desk or told Chuck Prince that, "Hey, by the way, these things are starting to go bad. You're retaining a lot of the 'super senior.' You have a lot of exposure there. You have humongous warehouses."

Within giant financial organizations, circumstances can look very different from different perspectives.

It is well accepted that the crisis tarnished Wall Street's image in the public's eye. The legacy is raft with stories of greedy bankers devising complex and faulty products that they then foisted on their clients. Stoker took issue with this sullied image, noting that there was logic to the appeal of securitization. He also defended employees like himself. In his perspective, from the midlevel working ranks, transparency and diligent compliance efforts were what stood out.

In general, Wall Street has a bad name, but I thought everybody was up front. I didn't see fraud or stealing going on. Everybody was first class, trying their best, and banks [were] spending billions to comply with every rule. There were no tricks, and nothing

hidden . . . I thought the securitization market was transparent and a first-class place, actually.

Stoker's emphasis on transparency and rule-driven behavior in the structured credit world—seemingly idealized at first glance—comes from his firsthand experience. When asked to address the troubling facts of mismanagement at leading Wall Street firms during the period, Stoker expressed disappointment at the lack of communication between different units and levels of the giant organizations and reflected on how his reality did not square with the CEO's contemporaneous comments.

"Cognitive dissonance," he said, is a concept that he thinks describes the crisis period well. Stoker saw cognitive dissonance in the incongruence of his experience with the widespread sense of a Wall Street driven by greed. "You hear something so many times in the press about how terrible Wall Street is," Stoker explained. The stories make people think "that there was terrible stuff going on, but it was not true. I don't think it was true at all."

But cognitive dissonance could just as well describe the rejection by senior executives and the CEOs of urgent new information from midlevel managers until it was too late.

Stoker's takeaways may be out of step with much of the post-crisis common lore and a good deal of the evidence on the record. It is also true that not much of that record comes from midlevel employees like him. Further, it is useful to remember that behind every nefarious story, there are often thousands of employees going about their jobs the best that they can and, even in the midst of a crisis, doing their best to follow the rules.

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Yale Program on Financial Stability

Lessons Learned

Chris Ricciardi

By Matthew A. Lieber and Steven H. Kasoff

Chris Ricciardi was a CDO pioneer who built the structured products units at CS First Boston and Merrill Lynch before moving to the asset management side. Ricciardi began his career structuring novel fixed-income securities at Prudential. At CS First Boston and Merrill, he catapulted each investment bank's lagging unit into the top of the league tables for CDO (collateralized debt obligation) issuance. He was CEO of Cohen & Co. from 2006 to 2011, when he left to co-found investment management firm Mead Park Management. A graduate of the University of Richmond with an MBA from the Wharton School of the University of Pennsylvania, Ricciardi presently serves as CEO and co-founder of Edly ISA marketplace, an income-sharing initiative for financing college tuition. This Lessons Learned summary is based on an interview with Ricciardi.

Field general on the move: Merrill's CDO unit, initially hampered by funding limitations, grew rapidly from 2003 to 2006 under Ricciardi.

Two things that stand out about Chris Ricciardi's career are his command of timing and his command of teams. Having developed cutting-edge skills in the intricacies of credit securitization at Prudential, he moved to CS First Boston to develop its asset-backed structuring business—which he did in three years. He then replicated the feat for Merrill Lynch, positioning the investment bank to become a structured credit leader.

Ricciardi described the limitations facing Merrill when he started there. Merrill “didn’t have nearly the opportunity because they didn’t have any good access to funding.” They had to line up the pieces like a broker. Ricciardi developed Merrill’s capabilities to underwrite CDOs, working with managers to pick a portfolio. Merrill’s trading desk managed the warehouse risk while a deal was in ramp-up phase being structured and marketed.

At the start of 2006, seeking to move beyond CDO underwriting, Ricciardi went to run asset management firm Cohen & Co. Ricciardi described his executive management style, which he had honed in dramatically building out the sell-side units.¹ “I had teams of people who were expert in each of these areas,” he explained. “I relied on those people to make the decisions about how best to put together the portfolios and to manage them.” These “were seasoned, experienced people who knew exactly what to do.” His interaction was “not much more extensive than at the investment bank.” Rather, his focus was on “planning and issues relating to giving them the right resources, hiring people, technology.”

¹ See “The Next Generation of Dealmakers,” *Asset Securitization Report*, December 4, 2006; and Serena Ng and Carrick Mollenkamp, “Pioneer Helped Merrill Move into CDOs,” *Wall Street Journal*, October 25, 2007.

Ricciardi downplayed the differences in perspective in moving to the buy side. Building up Cohen & Co.'s CDO management business, Ricciardi noted that he now had one client as opposed to 40 but that the move did not bring eye-opening changes.

An appealing innovation: CDOs offered investors a long-term leveraged exposure to an illiquid asset class.

Asked why the different tranches of the CDO appealed to different kinds of investors, Ricciardi shared a high-level view on what he called the crucial reason for CDOs.

The reason that CDOs exist is that they're attempting to provide leverage on an asset class without the risks of using short-term borrowing. They are seeking long-term leverage on an asset class.

The leverage afforded by a CDO was different from the short-term leverage using repo (repurchase agreement) funds or posting margin: long-term leverage.

Instead, you can use a CDO structure and lock in your leverage. That's what's in it for the equity guys of every CDO. They want to get a long-leveraged exposure without short-term refinancing risk.

In 2006–07, issuance of subprime CDO derivatives was peaking as short-selling volumes shot up. But it was hard for market participants to identify large trends and what was behind the short selling, Ricciardi explained.

In the middle of it, actually, it wasn't that clear that there's a growing interest in shorting them. Obviously, for the derivative to exist, someone has entered into the short side of the trade. But in derivatives, it's much more common [that it's] someone hedging than someone shorting. Because it was not the greatest way to short something. It's a really messy way to short something. Because the transaction costs are so high, it wouldn't generally make sense unless there's a very big payoff.

Ricciardi criticized the media coverage of short-driven CDO deals such as Magnetar's correlation trade, as well as the emphasis on subprime CDO securitization in much of the public discussion of the Global Financial Crisis (GFC). The volume of shorts exerted a force as a short-term disruption of financial markets, he said, but they were not the cause of the financial crisis. Similarly, he did not find fault with the rating agencies for getting home price levels wrong when mortgage lenders and appraisals had been inflating values. There was excessive home price appreciation in 2007, but no one knew by how much or for how long. It was far from inevitable that home prices would correct within just two years, he noted.

The “funding mismatch” factor: long-term risk was in the wrong hands.

In Ricciardi's analysis, the main cause of the financial crisis was what he called the “funding mismatch” in large institutions taking long-term credit risk.

There's over-leverage in the institutions that were taking this risk. They were basically buying long-term assets and funding them with very short-term liabilities.

Ricciardi saw the funding mismatch as a recurring cause of US financial crises, historically. In the subprime securitization case, the investment banks taking long-term exposure to subprime CDOs were reliant on repo funding and unprecedented levels of leverage. They were "putting together a long-term transaction saying, 'over the life of this transaction or 10 years . . . ' But they didn't have a way to fund it through the natural life." The funding mismatch made the large investment banks unable to survive the housing market shock.

It was not that the fundamentals of the assets were that far off, Ricciardi said. Peak-to-trough, home prices dropped 25%, an amount that in the equity markets would mean a bear market but not a systemic collapse. The home price index *did* recover fully, Ricciardi noted, and has since added another 25% gain. But in 2007, the risk had become "concentrated in the hands of some investment banks, in particular, that were super high over-leveraged." The result: "They can't handle the down decline. It's not the right place for that risk."

The size of the total issuance of subprime CDOs did not cause the GFC . . . Rather, highly leveraged positions of a handful of megafirms forced all investors to unload assets for cash—at the market nadir—all at once.

Ricciardi held that the amount of asset-backed securities (ABS) and mezzanine CDO debt issued was "rather small," too small to have caused the financial crisis. On reflection, he noted that the CDO write-downs "did seem to have a somewhat outsized impact on some financial institutions" and wondered openly how they "could have caused such disruption."

In the time leading up to the GFC, Ricciardi said, there were basically no rules preventing the creation of unlimited amounts of shorts for ABS. And, in fact, it seemed like many multiples more shorts were created relative to the existing cash bonds.

If the owners of the assets could just hold on for the long term—as the assets were designed to be held—then the values would have recovered as house prices eventually recovered and the major losses could have been avoided.

Instead, the highly leveraged position of the investors with the greatest CDO exposure—banks such as Merrill Lynch, Citigroup, and UBS—forced them to unload the assets at the worst time and take substantial write-downs, revelations of which spurred a credit crunch.

Limiting some derivative exposures makes sense as a market-stabilizing policy.

From a policy standpoint, Ricciardi concluded, it makes sense to examine limiting the volume of shorts that can be created by derivatives to the value of the assets they reference. Such a rule, had it existed in 2007, might well have led to a different outcome

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Lessons Learned

James Finkel

By Steven H. Kasoff and Matthew A. Lieber

A Wall Street veteran specializing in structured credit transactions, Jim Finkel was co-founder and director of the structured credit asset management firm Dynamic Credit Partners (DCP) from 2003 to 2009. Finkel started his career as a securities lawyer for the international law firm Cadwalader, Wickersham & Taft LLP, before moving over to the banking side in 1992. He specialized in mortgage-backed securities and collateralized loan obligations (CLOs) for several firms, including Bear Stearns and Deutsche Bank, where he headed the London-based CLO group. In 2003, Finkel returned to New York to launch and run DCP. In 2010, he joined financial consulting firm Duff and Phelps, where he advises clients on dispute practices, expert testimony, regulatory issues, and liquidations. This Lessons Learned summary is based on an interview with Finkel.

Into the fray: Wall Street lawyer dives deep into structured credit deal-making.

Jim Finkel enjoys solving three-dimensional puzzles of byzantine technical rules, complex organizations, and the humans who run them. He started his career in 1986 as a lawyer for a firm servicing Wall Street banks. The client banks were putting together early mortgage-backed security issuances. Finkel found the details and the action of investment deal-making fascinating, so he moved over to the bank side for Myerberg & Company. He described the various facets of the credit underwriting process: “These securitizations have a lot of moving parts between the rating agencies, the trustees, the accountants, the lawyers, and then inside the bank—the structurers, the traders, the salesforce.”

Finkel described his role as transaction manager in the investment bank—to coordinate with different players the production and marketing of complex structured credit deals. At Myerberg and then at Nomura, he managed a variety of projects, “providing financing to mortgage originators, creating warehouse facilities for their own lending activities, acquiring distressed portfolios of mortgages, and restructuring them both on the residential and commercial side, and placing the loan pools we financed through to private-label RMBS [residential mortgage-backed securities] and agency CMOs [collateralized mortgage obligations].” At Bear Stearns and Deutsche Bank, where he later worked, he was involved in securitized products including perpetual bank debt, emerging market debt, and high-yield bonds. Ready to “take a stab at the buy side,” he joined with a longtime associate to form Dynamic Credit Partners, a collateralized debt obligation (CDO) management firm, in 2003.

Finkel described the nuts and bolts of the CDO management business from his firm’s point of view.

The CDO manager is purely on the buy side, Finkel said, responsible for making the investment decisions for the portfolio of assets within a CDO. Dynamic Credit Partners, during its four years of full operations, did a total of 10 CDOs; it also ran two credit funds and grew to \$5 billion in total assets under management. Revenues came from asset management

fees at 20 basis points. Annual revenues were typically around \$10 million, peaking at \$13 million to \$14 million, with about 30 employees and overhead of \$8 million to \$9 million. DCP invested some of its profits in one of its two proprietary funds.

Most independent asset-backed securities (ABS) CDO managers had a similar cost structure and profit margin. It was more profitable to keep growing. Had DCP doubled or tripled its assets under management (AUM), said Finkel, “our marginal cost would have stayed about the same.” While start-ups and smaller CDO managers struggled to break even, once they achieved scale, they became extremely profitable.

According to Finkel, DCP differentiated itself from its competitors in its measured stance: “We were considered to be slower, more analytical . . . [in contrast to] some of the other managers described as ‘just backing up the truck’ [who bought whatever was coming through the market] . . . We were in a sector which was caught up in a frenzy, but we were trying to hold a line on quality.”

Pressures on CDO managers to grow AUM fast—regardless of quality—were strong, which meant CDOs were marketed without scrutiny and loaded up with risk.

According to Finkel, there was pressure on the CDO managers from the dealers to buy whatever the dealers would produce. “The dealers saw a CDO as a vehicle to sell paper,” Finkel said. These Wall Street firms, he explained, were looking to unload warehouse risk on assets acquired during ramp-up, and they made fees on each securitization.

One person in the market said to me, “Jim, why aren’t you doing \$10 billion instead of \$5 billion, because when it all falls apart, everybody’s going to look the same, and you might as well just swing for the fences now.” And we just wouldn’t do that.

One bank, Finkel recalled, was pressuring DCP to do a CDO with securities that did not match its standards. “We almost canceled a CDO because we were being pressured to acquire collateral . . . we put the deal on ice for a few months.” The bank was trying “to shoehorn [us] into buying their production now.” Finkel doubted that other CDO investment managers stood up to such pressure.

A second source of pressure, Finkel said, came from the finite quantity of underlying MBS assets available. “In pure mortgage-backed securities offerings, a deal would be announced on Wednesday afternoon, and if you didn’t have an order in by Friday morning, you wouldn’t get an allocation.” DCP developed a model that could stress test the assets in a prospective portfolio within 36 hours—to determine if the firm would ask for an allocation or not. Most firms just said yes, buying the tranches without testing them.

In the context of the expansion of mortgage credit during the bubble years, the factor of limited MBS offerings may seem surprising. But it speaks to the powerful global demand for yield on dollar-denominated credit assets in 2005–07.

Not only were the investment banks servicing that demand for yield very profitably, Finkel pointed out, they joined the rush and paid bonuses based on paper profits.

Dealers made good fees arranging RMBS and CDOs, marking up the product on the turn into a new securitization. But beyond that, the structurers and traders were able to convince their banks that they would have “riskless arbitrage” by taking the “super senior” tranche on balance sheet (and financing it at a much lower spread), and then purchasing AAA-rated bond insurance on the position. There would still be a net running “positive carry”—I knew a salesman who gave his boat that name!—on, say, \$900 million of a \$1 billion deal. Some people were able to convince their banks that the present value of that future positive carry could be included in the current year’s bonus pool!

Unfortunately, the absence of risk management would soon force some of these same dealer firms into panic selling.

Initially wary, European and Asian investors moved to get in the game, drawn by the high yields, favorable ratings, and surging volumes of subprime CDOs.

In the years leading up to the subprime CDO boom, institutional investors in Europe and Asia were reluctant to dive into the new market and hesitated to buy the novel CDOs backed by US subprime mortgage-backed securities.

Finkel told how DCP in fact completed a number of CDO deals with European investment bank groups as structurers. The European orientation built off of DCP’s personal relationships as well as its relatively tempered approach to the growing exuberance of US markets. In these CDOs, the dealer firm, such as Dresdner Bank and Calyon (of France’s Crédit Agricole), bought the senior tranche onto its own balance sheet.

These European relationships, Finkel said, enabled DCP to market extensively its CDOs to European and Asian investors. Earlier in the decade, foreign investors had viewed the US mortgage-backed debt markets with some trepidation. But their demand for yield, together with the favorable ratings, made subprime CDOs too attractive for them to pass up.

Also, Finkel noted, the confidence of European and Asian investors grew as they saw the increasing volumes of securitization occurring. Furthermore, Finkel added, the CDO boom suggested to them the prospect—if they gained experience and came to know the market well—of a future fee business as a CDO asset manager.

“The growth was feeding on itself in different directions,” said Finkel. Asian investors, Finkel continued, tended to be more skeptical and concerned with liquidity risk. But certain Asian accounts that had to buy long-dated assets for pension and insurance funds were the ones that stepped in.

Finkel noted one investor concern that would prove prescient, namely downgrade risk:

In retrospect, those investors were partially right. What everybody was missing was the sensitivity of these asset-backed CDOs to ratings downgrades being deemed defaults and the extreme downgrades that the rating agencies engaged from late ’07 into ’08, which made the deals unwind.

DCP stayed away from synthetic CDOs and subprime shorts because they harbored greater credit risk.

Regarding short selling of subprime RMBS and the short-driven CDOs, Finkel reiterated that his main concern was credit quality, not ulterior motives or conflicts of interest. DCP avoided buying tranches of other mezzanine CDOs, said Finkel, “not because [they] were concerned about groups like [hedge funds] Paulson and Magnetar [Capital], but rather because [they] were concerned about the fundamental nature of the RMBS tranches [within those CDOs].” Finkel described on incident:

One dealer said, “We’ll do 50% of the equity tranche, as well, at the underwriter level.” We couldn’t make any sense of those transactions and only much later realized they were largely dumping grounds for short sellers. But really, for us, those deals were all being done with riskier collateral, the BBB collateral, and we just weren’t comfortable with putting BBB credits into a CDO.

To the extent DCP was aware of investors taking short positions, Finkel said, they thought that those were market-spread plays.

The CDO juggernaut was based on a “flawed process,” which tainted many participants in ways that still haven’t all been addressed.

Rewards from DCP’s more cautious approach as a CDO investor were largely, but not entirely, lost to forced wind-downs in 2008. Two of its 10 CDOs still exist, and its credit opportunities funds survived a 30% loss. Most of its CDOs would have paid off, Finkel said, “but [the CDOs] were forced into unwinds in the worst possible market, by the super senior holders, by the investment banks themselves.” Scrambling for cash and safety, the dealers’ risk managers and senior executives were forced to make panic sales.

“It’s a flawed process,” Finkel reflected, “to create a credit product where the pace, velocity, and the volume of it is so high that diligent credit investors don’t have a chance to do their work.” Earlier regulatory interventions might have had a stabilizing effect, he thought, recognizing, however, that in the midst of the boom, “it was just in nobody’s interest to slow it down.”

It is widely recognized that the CDO juggernaut could not have taken off without the participation of credit rating agencies such as Moody’s and Standard & Poor’s, which provided the ratings that investors relied on.

In Finkel’s opinion, the rating agencies should have been taken more to task. Their special status created a perverse incentive for them to sign off on CDO tranches with AAA approvals. US regulators, as Finkel explained, feared that punishing S&P and Moody’s would erode the broader rating function and substantially damage US fixed-income markets across all sectors.

The major dealer firms altered their business models as they chased the CDO boom. They were “riven”—split internally between a CDO unit making wild profits and risk managers

and senior executives who failed to exert appropriate controls. These investment bank dealers were “out of control,” Finkel said, profiting from the short business more than they were manipulated by it. “The left hand didn’t know what the right hand was doing inside the banks.”

The banks went from the storage business (where they used to hold loans on the balance sheet) to being just in the moving business—they were just moving risk for a fee. And they had insidious ways of profiting. They built what they believed were arbitrage risk-free trades, and present valued them and paid themselves huge bonuses.

According to Finkel, the shorts were not arbitraging the banks, rather the banks were in cahoots with the shorts to a large extent. They were making money in many ways with the short sellers, Finkel said. He thinks that reforms have corrected much of the dysfunction at the investment banks. But it is an episode that has passed, a pattern that may to some degree persist, that people still don’t entirely understand.

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Lessons Learned

Stephen King

By Matthew A. Lieber and Steven H. Kasoff

Stephen King started his career in finance at Bankers Trust in 1997 as a computer scientist with a business degree. He worked on structured credit transactions when credit derivatives were just being invented. In 2005, King joined Barclays' structured credit group, where he managed a CDO (collateralized debt obligation) correlation desk that was different from standard dealer CDO units. In 2009, he launched C12 Capital Management to relieve Barclays of distressed subprime positions. Presently, King finances and builds luxury hotels as founder and CEO of Sardis Developments. This Lessons Learned summary is based on an interview with King.

The dawn of structured finance was a promising time for financial wizards like King and the institutions that employed them.

King brought computer engineering training, high-end quantitative skills, and a creative mindset to Bankers Trust (BT). The 1998 Long-Term Capital Management crisis interrupted his initial assignment to emerging markets. BT reassigned King to its structured credit unit. "It was right at the dawn of structured asset-backed derivatives."

Deutsche Bank acquired BT in 1999 and moved King to its derivatives group in New York. One deal King recalled was Rhombus, "which involved selling protection on a portfolio of asset-backed securities owned by Bayerische Landesbank, buying protection from insurance companies and other counterparties around the world." Another named Descartes involved a similar approach. "We would go and buy a portfolio of securities, fund them in their conduit, buy protection, and find a way to take out the carry as an arbitrage."

For Deutsche and then for Barclays from 2005 through 2008, King's groups engineered complex credit deals that offered profitability across a range of different scenarios. These transactions commonly had many sides. In one deal, they might exchange risk for cash flows, buy swaps to mitigate risk, and use leverage to exploit the difference.

We [had] various ways of generating profit for the bank, whether in structured client transactions, proprietary trading, trading book profits, anything and everything that [was] associated with asset-backed securities [ABS].

King's ABS correlation desk at Barclays went by many names—and brought many ways to profit.

There were many names for King's group, and it had many ways to make money. "It was called a principal mortgage trading desk in one caucus of people. It was a structured synthetic ABS desk in another, it was a synthetic CDO in another, it was [an ABS] correlation desk in another." What made it unique beyond the complexity of its transactions was the way the group combined unorthodox, creative deal-making and disciplined attention to risk. Whereas a more conventional CDO structuring group would accumulate risk, structure it,

then sell it, King's desk "would accumulate risk in one or a number of markets, then create instruments that referenced those risks and place those into another market." From there, opportunities followed to "take a mixture of profits from basis, carry, or directional positions," depending on different market scenarios and volatilities.

The name "ABS correlation desk" referred to a strategy distinct from standard dealer CDO structuring groups. Similar to corporate correlation desks, King's group at Barclays was accumulating risk, then creating derivatives linked to that risk in the form of protection from other investors. Customizing these new derivatives to fit investor appetites and acquiring ratings on them permitted King and Barclays to charge a premium price. However, these trades provided only a partial and imperfect hedge, which then had to be risk-managed and further hedged. This approach is often referred to as delta hedging.¹

Correlation had at least two aspects, spurring King's group to assess risk based on (1) industry standards and (2) "market-implied numbers" derived from a multiplicity of factors.

Delta hedging forced King's group to think seriously about correlation, which took on at least two meanings in the case of the Barclays group: the correlation of risk (of loss or default) among mortgages within a mortgage-backed security and the correlation of risk between different CDO tranches or mortgage-backed securities. In a typical transaction, an investor approached them seeking to acquire \$100 million of exposure to a AAA-rated tranche that referenced a portfolio of subprime mortgage-backed securities. King's group identified the particular subprime bonds (but did not need to actually acquire them), get the AAA rating on the tranche, and make an offer to the investor. Offer accepted, they had a synthetic short risk position in the mortgage bonds; "we needed to hedge" by buying the ABX Index or other derivatives linked to a similar portfolio of mortgage bonds. They had to make sense of two different probability distributions, King said: the rating agency modeling based on historical asset value and defaults versus market-implied numbers.

You carried two separate views of the world: (1) a real-world view affecting how we're putting portfolios together for investors and rating agencies; and (2) what models are we using to extract that same info from the market?

Deriving market-implied distributions for CDO tranches was challenging given the illiquidity and complexity of the security. In the corporate market, King explained, "specific names were quoted at specific maturities on homogeneous contracts. The ABS world wasn't like that." Valuations of single names were not informative. King's group had to assess the likelihood and correlation of losses within and between the tranches.

¹ James Chen, "Delta Hedging," Investopedia, updated January 28, 2021, <https://www.investopedia.com/terms/d/deltahedging.asp>.

King's strategy meant that running the desk was a high-maintenance affair with multiple keys required for success: hedging to limit risk, constantly updating the assumptions, stress-testing pre-crisis.

King recognized a proliferation of models, each with its own assumption and flaws, and favored an internally developed tool called Matrix Price. "It took in every bit of information we could gather every day on every bond." King worked at length with statistician David Li but said that their math exercises were ultimately not elucidating. Rather, determining the correlation values required making assumptions and constantly updating them whenever prices moved.

Delta hedging forced King's group to approximate a marked-to-market position when market prices were not available.

In early 2007, after receiving kudos for his profits in 2006, King stress-tested his portfolio using high correlation values of 60% to 70%. The results were alarming enough for him to act early in 2007 to increase his hedging across the portfolio.

If I'd have sat and just taken price testing, or just said, "Don't worry, it's in a non-mark-to-market book"—just wait for the steam roller to ride over me. That's why we're here today. We wired ourselves up to those Matrix Prices and had marked-to-market "super senior." We had to react because we were marked to market. And if we weren't marked to market, it was tough.

With sufficient vision, technical expertise, and discipline, you could profit and survive in subprime CDOs—though such a combination was uncommon.

Noteworthy in this case, delta hedging was effective in its market acuity and its execution. King's group deployed a combination of computer skills and engineering, independent-mindedness, and discipline. They questioned market wisdom without dismissing it, aware of the Barclays mandate that allowed somewhat freewheeling methods within clear limits.

The institutional investors who bought subprime CDOs were not stupid; rather, they reacted to market pressures and went after what they saw was working.

As the housing market turned bad and mortgage lenders failed in 2006–07, spreads on CDO tranches were slow to respond. "They did not widen as they should have," King explained, "because of tremendous amounts of demand from investment banks and structured investment vehicles [SIVs]." His counterparties were non-US banks and SIVs attracted to the CDOs' substantial yields. The buyers were not naive or stupid, he said, but driven to operate in a very competitive setting. The higher yields helped subsidize their core lending businesses, which were far less profitable. He described a herd effect as the CDO bubble expanded:

A little portfolio emerges in one or more of the more aggressive corporate banks. And then the other corporate banks that are near the corporate banks say, "Hold on. How

are they managing to price their middle-market lending 2 basis points inside what we're doing?"

The credit investors followed each other as they were trying to maintain a commercially viable and competitive bank lending business amidst low rates. They realized, "I can get 350 to 400 [basis point spread] on this synthetic tranche. Well, I don't even need to do much of that now to offset a huge amount. So, let's allocate some more capital to that. Well, now we're even more successful." The bullish sentiment favoring CDOs persisted into 2007, even with housing prices deteriorating, limiting any short positions in King's hedged book.

Many CDO investors anticipated having to ride out a housing slump—the distressed assets would recover—but the dash for cash forced them to sell at huge losses.

The fire sale came in 2008 and escalated with a vengeance. Thanks to disciplined hedging, King's group survived with profits, but it was tough going. For many CDO investors, the thinking had been, "We are golden, as long as we don't have to mark to market." Then came the realization that, "Oh, ----. If the borrowers can't refinance, then those historic numbers are garbage." Next, a tap on the shoulder: "Can you get rid of that portfolio?" Now, the loss is crystallized. King had long been bearish, but "I'm not even sure we considered quite the way it would have gone from the mortgage market to the banking to the sovereigns."

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