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## THE CDO MACHINE

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In the first decade of the 21st century, a previously obscure financial product called the collateralized debt obligation, or CDO, transformed the mortgage market by creating a new source of demand for the lower-rated tranches of mortgage-backed securities.\*

Despite their relatively high returns, tranches rated other than triple-A could be hard to sell. If borrowers were delinquent or defaulted, investors in these tranches were out of luck because of where they sat in the payments waterfall.

Wall Street came up with a solution: in the words of one banker, they “created the investor.”<sup>1</sup> That is, they built new securities that would buy the tranches that had become harder to sell. Bankers would take those low investment-grade tranches, largely rated BBB or A, from many mortgage-backed securities and repackage them into the new securities—CDOs. Approximately 80% of these CDO tranches would be rated triple-A despite the fact that they generally comprised the lower-rated tranches of mortgage-backed securities. CDO securities would be sold with their own waterfalls, with the risk-averse investors, again, paid first and the risk-seeking investors paid last. As they did in the case of mortgage-backed securities, the rating agencies gave their highest, triple-A ratings to the securities at the top (see figure 8.1).

Still, it was not obvious that a pool of mortgage-backed securities rated BBB could be transformed into a new security that is mostly rated triple-A. But math made it so.

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\*Throughout this book, unless otherwise noted, we use the term “CDOs” to refer to cash CDOs backed by asset-backed securities (such as mortgage-backed securities), also known as ABS CDOs.

## Collateralized Debt Obligations

Collateralized debt obligations (CDOs) are structured financial instruments that purchase and pool financial assets such as the riskier tranches of various mortgage-backed securities.

### 1. Purchase

The CDO manager and securities firm select and purchase assets, such as some of the lower-rated tranches of mortgage-backed securities.

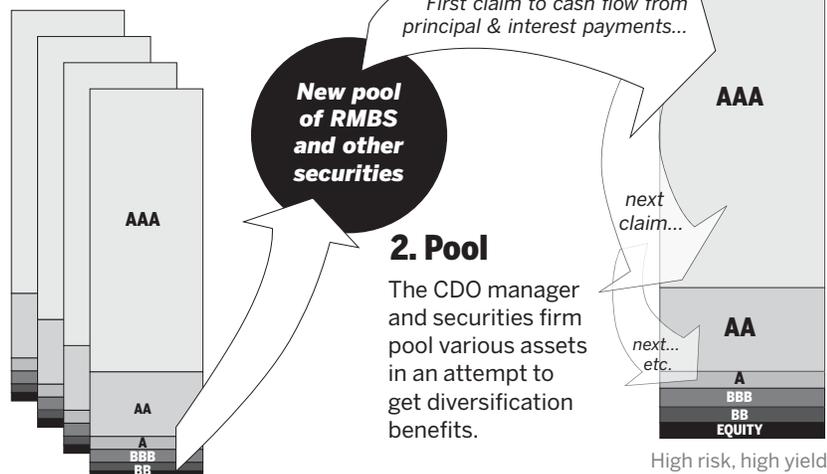


Figure 8.1

The securities firms argued—and the rating agencies agreed—that if they pooled many BBB-rated mortgage-backed securities, they would create additional diversification benefits. The rating agencies believed that those diversification benefits were significant—that if one security went bad, the second had only a very small chance of going bad at the same time. And as long as losses were limited, only those investors at the bottom would lose money. They would absorb the blow, and the other investors would continue to get paid.

Relying on that logic, the CDO machine gobbled up the BBB and other lower-rated

tranches of mortgage-backed securities, growing from a bit player to a multi-hundred-billion-dollar industry. Between 2003 and 2007, as house prices rose 27% nationally and \$4 trillion in mortgage-backed securities were created, Wall Street issued nearly \$700 billion in CDOs that included mortgage-backed securities as collateral.<sup>2</sup> With ready buyers for their own product, mortgage securitizers continued to demand loans for their pools, and hundreds of billions of dollars flooded the mortgage world. In effect, the CDO became the engine that powered the mortgage supply chain. “There is a machine going,” Scott Eichel, a senior managing director at Bear Stearns, told a financial journalist in May 2005. “There is a lot of brain power to keep this going.”<sup>3</sup>

Everyone involved in keeping this machine humming—the CDO managers and underwriters who packaged and sold the securities, the rating agencies that gave most of them sterling ratings, and the guarantors who wrote protection against their defaulting—collected fees based on the dollar volume of securities sold. For the bankers who had put these deals together, as for the executives of their companies, volume equaled fees equaled bonuses. And those fees were in the billions of dollars across the market.

But when the housing market went south, the models on which CDOs were based proved tragically wrong. The mortgage-backed securities turned out to be highly correlated—meaning they performed similarly. Across the country, in regions where subprime and Alt-A mortgages were heavily concentrated, borrowers would default in large numbers. This was not how it was supposed to work. Losses in one region were supposed to be offset by successful loans in another region. In the end, CDOs turned out to be some of the most ill-fated assets in the financial crisis. The greatest losses would be experienced by big CDO arrangers such as Citigroup, Merrill Lynch, and UBS, and by financial guarantors such as AIG, Ambac, and MBIA. These players had believed their own models and retained exposure to what were understood to be the least risky tranches of the CDOs: those rated triple-A or even “super-senior,” which were assumed to be safer than triple-A-rated tranches.

“The whole concept of ABS CDOs had been an abomination,” Patrick Parkinson, currently the head of banking supervision and regulation at the Federal Reserve Board, told the FCIC.<sup>4</sup>

#### CDOs: “WE CREATED THE INVESTOR”

Michael Milken’s Drexel Burnham Lambert assembled the first rated collateralized debt obligation in 1987 out of different companies’ junk bonds. The strategy made sense—pooling many bonds reduced investors’ exposure to the failure of any one bond, and putting the securities into tranches enabled investors to pick their preferred level of risk and return.

For the managers who created CDOs, the key to profitability of the CDO was the fee and the spread—the difference between the interest that the CDO received on the bonds or loans that it held and the interest that the CDO paid to investors. Throughout the 1990s, CDO managers generally purchased corporate and emerging market bonds and bank loans. When the liquidity crisis of 1998 drove up returns on asset-backed

securities, Prudential Securities saw an opportunity and launched a series of CDOs that combined different kinds of asset-backed securities into one CDO. These “multisector” or “ABS” securities were backed by mortgages, mobile home loans, aircraft leases, mutual fund fees, and other asset classes with predictable income streams. The diversity was supposed to provide yet another layer of safety for investors.

Multisector CDOs went through a tough patch when some of the asset-backed securities in which they invested started to perform poorly in 2002—particularly those backed by mobile home loans (after borrowers defaulted in large numbers), aircraft leases (after 9/11), and mutual fund fees (after the dot-com bust).<sup>5</sup> The accepted wisdom among many investment banks, investors, and rating agencies was that the wide range of assets had actually contributed to the problem; according to this view, the asset managers who selected the portfolios could not be experts in sectors as diverse as aircraft leases and mutual funds.

So the CDO industry turned to nonprime mortgage-backed securities, which CDO managers believed they understood, which seemed to have a record of good performance, and which paid relatively high returns for what was considered a safe investment. “Everyone looked at the sector and said, the CDO construct works, but we just need to find more stable collateral,” said Wing Chau, who ran two firms, Maxim Group and Harding Advisory, that managed CDOs mostly underwritten by Merrill Lynch. “And the industry looked at residential mortgage-backed securities, Alt-A, subprime, and non-agency mortgages, and saw the relative stability.”<sup>6</sup>

CDOs quickly became ubiquitous in the mortgage business.<sup>7</sup> Investors liked the combination of apparent safety and strong returns, and investment bankers liked having a new source of demand for the lower tranches of mortgage-backed securities and other asset-backed securities that they created. “We told you these [BBB-rated securities] were a great deal, and priced at great spreads, but nobody stepped up,” the Credit Suisse banker Joe Donovan told a Phoenix conference of securitization bankers in February 2002. “So we created the investor.”<sup>8</sup>

By 2004, creators of CDOs were the dominant buyers of the BBB-rated tranches of mortgage-backed securities, and their bids significantly influenced prices in the market for these securities. By 2005, they were buying “virtually all” of the BBB tranches.<sup>9</sup> Just as mortgage-backed securities provided the cash to originate mortgages, now CDOs would provide the cash to fund mortgage-backed securities. Also by 2004, mortgage-backed securities accounted for more than half of the collateral in CDOs, up from 35% in 2002.<sup>10</sup> Sales of these CDOs more than doubled every year, jumping from \$30 billion in 2003 to \$225 billion in 2006.<sup>11</sup> Filling this pipeline would require hundreds of billions of dollars of subprime and Alt-A mortgages.

### *“It was a lot of effort”*

Five key types of players were involved in the construction of CDOs: securities firms, CDO managers, rating agencies, investors, and financial guarantors. Each took varying degrees of risk and, for a time, profited handsomely.

Securities firms underwrote the CDOs: that is, they approved the selection of col-

lateral, structured the notes into tranches, and were responsible for selling them to investors. Three firms—Merrill Lynch, Goldman Sachs, and the securities arm of Citigroup—accounted for more than 30% of CDOs structured from 2004 to 2007. Deutsche Bank and UBS were also major participants.<sup>12</sup> “We had sales representatives in all those [global] locations, and their jobs were to sell structured products,” Nestor Dominguez, the co-head of Citigroup’s CDO desk, told the FCIC. “We spent a lot of effort to have people in place to educate, to pitch structured products. So, it was a lot of effort, about 100 people. And I presume our competitors did the same.”<sup>13</sup>

The underwriters’ focus was on generating fees and structuring deals that they could sell. Underwriting did entail risks, however. The securities firm had to hold the assets, such as the BBB-rated tranches of mortgage-backed securities, during the ramp-up period—six to nine months when the firm was accumulating the mortgage-backed securities for the CDOs. Typically, during that period, the securities firm took the risk that the assets might lose value. “Our business was to make new issue fees, [and to] make sure that if the market did have a downturn, we were somehow hedged,” Michael Lamont, the former co-head for CDOs at Deutsche Bank, told the FCIC.<sup>14</sup> Chris Ricciardi, formerly head of the CDO desk at Merrill Lynch, likewise told the FCIC that he did not track the performance of CDOs after underwriting them.<sup>15</sup> Moreover, Lamont said it was not his job to decide whether the rating agencies’ models had the correct underlying assumptions. That “was not what we brought to the table,” he said.<sup>16</sup> In many cases, though, underwriters helped CDO managers select collateral, leading to potential conflicts (more on that later).

The role of the CDO manager was to select the collateral, such as mortgage-backed securities, and in some cases manage the portfolio on an ongoing basis. Managers ranged from independent investment firms such as Chau’s to units of large asset management companies such as PIMCO and Blackrock.

CDO managers received periodic fees based on the dollar amount of assets in the CDO and in some cases on performance. On a percentage basis, these may have looked small—sometimes measured in tenths of a percentage point—but the amounts were far from trivial. For CDOs that focused on the relatively senior tranches of mortgage-backed securities, annual manager fees tended to be in the range of \$600,000 to a million dollars per year for a \$1 billion dollar deal. For CDOs that focused on the more junior tranches, which were often smaller, fees would be \$750,000 to \$1.5 million per year for a \$500 million deal.<sup>17</sup> As managers did more deals, they generated more fees without much additional cost. “You’d hear statements like, ‘Everybody and his uncle now wants to be a CDO manager,’” Mark Adelson, then a structured finance analyst at Nomura Securities and currently chief credit officer at S&P, told the FCIC. “That was an observation voiced repeatedly at several of the industry conferences around those times—the enormous proliferation of CDO managers— . . . because it was very lucrative.”<sup>18</sup> CDO managers industry-wide earned at least \$1.5 billion in management fees between 2003 and 2007.<sup>19</sup>

The role of the rating agencies was to provide basic guidelines on the collateral and the structure of the CDOs—that is, the sizes and returns of the various tranches—in close consultation with the underwriters. For many investors, the

triple-A rating made those products appropriate investments. Rating agency fees were typically between \$250,000 and \$500,000 for CDOs.<sup>20</sup> For most deals, at least two rating agencies would provide ratings and receive those fees—although the views tended to be in sync.

The CDO investors, like investors in mortgage-backed securities, focused on different tranches based on their preference for risk and return. CDO underwriters such as Citigroup, Merrill Lynch, and UBS often retained the super-senior triple-A tranches for reasons we will see later. They also sold them to commercial paper programs that invested in CDOs and other highly rated assets. Hedge funds often bought the equity tranches.<sup>21</sup>

Eventually, other CDOs became the most important class of investor for the mezzanine tranches of CDOs. By 2005, CDO underwriters were selling most of the mezzanine tranches—including those rated A—and, especially, those rated BBB, the lowest and riskiest investment-grade rating—to other CDO managers, to be packaged into other CDOs.<sup>22</sup> It was common for CDOs to be structured with 5% or 15% of their cash invested in other CDOs; CDOs with as much as 80% to 100% of their cash invested in other CDOs were typically known as “CDOs squared.”

Finally, the issuers of over-the-counter derivatives called credit default swaps, most notably AIG, played a central role by issuing swaps to investors in CDO tranches, promising to reimburse them for any losses on the tranches in exchange for a stream of premium-like payments. This credit default swap protection made the CDOs much more attractive to potential investors because they appeared to be virtually risk free, but it created huge exposures for the credit default swap issuers if significant losses did occur.

Profit from the creation of CDOs, as is customary on Wall Street, was reflected in employee bonuses. And, as demand for all types of financial products soared during the liquidity boom at the beginning of the 21st century, pretax profit for the five largest investment banks doubled between 2003 and 2006, from \$20 billion to \$43 billion; total compensation at these investment banks for their employees across the world rose from \$34 billion to \$61 billion.<sup>23</sup> A part of the growth could be credited to mortgage-backed securities, CDOs, and various derivatives, and thus employees in those areas could be expected to be compensated accordingly. “Credit derivatives traders as well as mortgage and asset-backed securities salespeople should especially enjoy bonus season,” a firm that compiles compensation figures for investment banks reported in 2005.<sup>24</sup>

To see in more detail how the CDO pipeline worked, we revisit our illustrative Citigroup mortgage-backed security, CMLTI 2006-NC2. Earlier, we described how most of the below-triple-A bonds issued in this deal went into CDOs. One such CDO was Kleros Real Estate Funding III, which was underwritten by UBS, a Swiss bank.<sup>25</sup> The CDO manager was Strategos Capital Management, a subsidiary of Cohen & Company; that investment company was headed by Chris Ricciardi, who had earlier built Merrill’s CDO business.<sup>26</sup> Kleros III, launched in 2006, purchased and held \$9.6 million in securities from the A-rated M5 tranche of Citigroup’s security, along with 187 junior tranches of other mortgage-backed securities. In total, it owned \$975 mil-

lion of mortgage-related securities, of which 45% were rated BBB or lower, 16% A, and the rest higher than A. To fund those purchases, Kleros III issued \$1 billion of bonds to investors. As was typical for this type of CDO at the time, roughly 88% of the Kleros III bonds were triple-A-rated. At least half of the below-triple-A tranches issued by Kleros III went into other CDOs.<sup>27</sup>

*“Mother’s milk to the . . . market”*

The growth of CDOs had important impacts on the mortgage market itself. CDO managers who were eager to expand the assets that they were managing—on which their income was based—were willing to pay high prices to accumulate BBB-rated tranches of mortgage-backed securities. This “CDO bid” pushed up market prices on those tranches, pricing out of the market traditional investors in mortgage-backed securities.

Informed institutional investors such as insurance companies had purchased the private-label mortgage-backed securities issued in the 1990s. These securities were typically protected from losses by bond insurers, who had analyzed the deals as well. Beginning in the late 1990s, mortgage-backed securities that were structured with six or more tranches and other features to protect the triple-A investors became more common, replacing the earlier structures that had relied on bond insurance to protect investors. By 2004, the earlier forms of mortgage-backed securities had essentially vanished, leaving the market increasingly to the multitranche structures and their CDO investors.

This was a critical development, given that the focus of CDO managers differed from that of traditional investors. “The CDO manager and the CDO investor are not the same kind of folks [as the monoline bond insurers], who just backed away,” Adelson said. “They’re mostly not mortgage professionals, not real estate professionals. They are derivatives folks.”<sup>28</sup>

Indeed, Chau, the CDO manager, portrayed his job as creating structures that rating agencies would approve and investors would buy, and making sure the mortgage-backed securities that he bought “met industry standards.” He said that he relied on the rating agencies. “Unfortunately, what lulled a lot of investors, and I’m in that camp as well, what lulled us into that sense of comfort was that the rating stability was so solid and that it was so consistent. I mean, the rating agencies did a very good job of making everything consistent.”<sup>29</sup> CDO production was effectively on autopilot. “Mortgage traders speak lovingly of ‘the CDO bid.’ It is mother’s milk to the . . . market,” James Grant, a market commentator, wrote in 2006. “Without it, fewer asset-backed structures could be built, and those that were would have to meet a much more conservative standard of design. The resulting pangs of credit withdrawal would certainly be felt in the residential real-estate market.”<sup>30</sup>

UBS’s Global CDO Group agreed, noting that CDOs “have now become bullies in their respective collateral markets.” By promoting an increase in both the volume and the price of mortgage-backed securities, bids from CDOs had “an impact on the overall U.S. economy that goes well beyond the CDO market.”<sup>31</sup> Without the demand for mortgage-backed securities from CDOs, lenders would have been able to sell

fewer mortgages, and thus they would have had less reason to push so hard to make the loans in the first place.

*“Leverage is inherent in CDOs”*

The mortgage pipeline also introduced leverage at every step. Most financial institutions thrive on leverage—that is, on investing borrowed money. Leverage increases profits in good times, but also increases losses in bad times. The mortgage itself creates leverage—particularly when the loan is of the low down payment, high loan-to-value ratio variety. Mortgage-backed securities and CDOs created further leverage because they were financed with debt. And the CDOs were often purchased as collateral by those creating other CDOs with yet another round of debt. Synthetic CDOs consisting of credit default swaps, described below, amplified the leverage. The CDO, backed by securities that were themselves backed by mortgages, created leverage on leverage, as Dan Sparks, mortgage department head at Goldman Sachs, explained to the FCIC.<sup>32</sup> “People were looking for other forms of leverage. . . . You could either take leverage individually, as an institution, or you could take leverage within the structure,” Citigroup’s Dominguez told the FCIC.<sup>33</sup>

Even the investor that bought the CDOs could use leverage. Structured investment vehicles—a type of commercial paper program that invested mostly in triple-A-rated securities—were leveraged an average of just under 14-to-1: in other words, these SIVs would hold \$14 in assets for every dollar of capital.<sup>34</sup> The assets would be financed with debt. Hedge funds, which were common purchasers, were also often highly leveraged in the repo market, as we will see. But it would become clear during the crisis that some of the highest leverage was created by companies such as Merrill, Citigroup, and AIG when they retained or purchased the triple-A and super-senior tranches of CDOs with little or no capital backing.

Thus, in 2004, when the homeownership rate was peaking, and when new mortgages were increasingly being driven by serial refinancings, by investors and speculators, and by second home purchases, the value of trillions of dollars of securities rested on just two things: the ability of millions of homeowners to make the payments on their subprime and Alt-A mortgages and the stability of the market value of homes whose mortgages were the basis of the securities. Those dangers were understood all along by some market participants. “Leverage is inherent in [asset-backed securities] CDOs,” Mark Klipsch, a banker with Orix Capital Markets, an asset management firm, told a Boca Raton conference of securitization bankers in October 2004. While it was good for short-term profits, losses could be large later on. Klipsch said, “We’ll see some problems down the road.”<sup>35</sup>

BEAR STEARNS’S HEDGE FUNDS: “IT FUNCTIONED FINE  
UP UNTIL ONE DAY IT JUST DIDN’T FUNCTION”

Bear Stearns, the smallest of the five large investment banks, started its asset management business in 1985 when it established Bear Stearns Asset Management (BSAM).

Asset management brought in steady fee income, allowed banks to offer new products to customers and required little capital.

BSAM played a prominent role in the CDO business as both a CDO manager and a hedge fund that invested in mortgage-backed securities and CDOs. At BSAM, by the end of 2006 Ralph Cioffi was managing 11 CDOs with \$18.3 billion in assets and 2 hedge funds with \$18 billion in assets.<sup>36</sup> Although Bear Stearns owned BSAM, Bear's management exercised little supervision over its business.<sup>37</sup> The eventual failure of Cioffi's two large mortgage-focused hedge funds would be an important event in 2007, early in the financial crisis.

In 2003, Cioffi launched his first fund at BSAM, the High-Grade Structured Credit Strategies Fund, and in 2006 he added the High-Grade Structured Credit Strategies Enhanced Leverage Fund. The funds purchased mostly mortgage-backed securities or CDOs, and used leverage to enhance their returns. The target was for 90% of assets to be rated either AAA or AA. As Cioffi told the FCIC, "The thesis behind the fund was that the structured credit markets offered yield over and above what their ratings suggested they should offer."<sup>38</sup> Cioffi targeted a leverage ratio of 10 to 1 for the first High-Grade fund. For Enhanced Leverage, Cioffi upped the ante, touting the Enhanced Leverage fund as "a levered version of the [High Grade] fund" that targeted leverage of 12 to 1.<sup>39</sup> At the end of 2006, the High-Grade fund contained \$8.6 billion in assets (using \$0.9 billion of his hedge fund investors' money and \$7.7 billion in borrowed money). The Enhanced Leverage Fund had \$9.4 billion (using \$0.9 billion from investors and \$8.5 billion in borrowed money).<sup>40</sup>

BSAM financed these asset purchases by borrowing in the repo markets, which was typical for hedge funds. A survey conducted by the FCIC identified at least \$275 billion of repo borrowing as of June 2008 by the approximately 170 hedge funds that responded. The respondents invested at least \$45 billion in mortgage-backed securities or CDOs as of June 2007.<sup>41</sup> The ability to borrow using the AAA and AA tranches of CDOs as repo collateral facilitated demand for those securities.

But repo borrowing carried risks: it created significant leverage and it had to be renewed frequently. For example, an investor buying a stock on margin—meaning with borrowed money—might have to put up 50 cents on the dollar, with the other 50 cents loaned by his or her stockbroker, for a leverage ratio of 2 to 1. A homeowner buying a house might make a 10% down payment and take out a mortgage for the rest, a leverage ratio of 10 to 1. By contrast, repo lending allowed an investor to buy a security for much less out of pocket—in the case of a Treasury security, an investor may have to put in only 0.25%, borrowing 99.75% from a securities firm (400 to 1). In the case of a mortgage-backed security, an investor might pay 5% (20 to 1).<sup>42</sup>

With this amount of leverage, a 5% change in the value of that mortgage-backed security can double the investor's money—or lose all of the initial investment.

Another inherent fallacy in the structure was the assumption that the underlying collateral could be sold easily. But when it came to selling them in times of distress, private-label mortgage-backed securities would prove to be very different from U.S. Treasuries.

The short-term nature of repo money also makes it inherently risky and unreliable: funding that is offered at certain terms today could be gone tomorrow. Cioffi's funds, for example, took the risk that its repo lenders would decide not to extend, or "roll," the repo lines on any given day. Yet more and more, repo lenders were loaning money to funds like Cioffi's, rolling the debt nightly, and not worrying very much about the real quality of the collateral.

The firms loaning money to Cioffi's hedge funds were often also selling them mortgage-related securities, and the hedge funds pledged those same securities to secure the loans.<sup>43</sup> If the market value of the collateral fell, the repo lenders could and would demand more collateral from the hedge fund to back the repo loan. This dynamic would play a pivotal role in the fate of many hedge funds in 2007—most spectacularly in the case of Cioffi's funds. "The repo market, I mean it functioned fine up until one day it just didn't function," Cioffi told the FCIC. Up to that point, his hedge funds could buy billions of dollars of CDOs on borrowed money because of the market's bullishness about mortgage assets, he said. "It became . . . a more and more acceptable asset class, [with] more traders, more repo lenders, more investors obviously. [It had a] much broader footprint domestically as well as internationally. So the market just really exploded."<sup>44</sup>

BSAM touted its CDO holdings to investors, telling them that CDOs were a market opportunity because they were complex and therefore undervalued in the general marketplace. In 2003, this was a promising market with seemingly manageable risks. Cioffi and his team not only bought CDOs, they also created and managed other CDOs. Cioffi would purchase mortgage-backed securities, CDOs, and other securities for his hedge funds. When he had reached his firm's internal investment limits, he would repackage those securities and sell CDO securities to other customers. With the proceeds, Cioffi would pay off his repo lenders, and at the same time he would acquire the equity tranche of a new CDO.<sup>45</sup>

Because Cioffi managed these newly created CDOs that selected collateral from his own hedge funds,<sup>46</sup> he was positioned on both sides of the transaction. The structure created a conflict of interest between Cioffi's obligation to his hedge fund investors and his obligation to his CDO investors; this was not unique on Wall Street, and BSAM disclosed the structure, and the conflict of interest, to potential investors.<sup>47</sup> For example, a critical question was at what price the CDO should purchase assets from the hedge fund: if the CDO paid above-market prices for a security, that would advantage the hedge fund investors and disadvantage the CDO investors.

BSAM's flagship CDOs—dubbed Klio I, II, and III—were created in rapid succession over 2004 and 2005, with Citigroup as their underwriter. All three deals were mainly composed of mortgage- and asset-backed securities that BSAM already owned, and BSAM retained the equity position in all three; all three were primarily funded with asset-backed commercial paper.<sup>48</sup> Typical for the industry at the time, the expected return for the CDO manager, who was managing assets and holding the equity tranche, was between 15% and 23% annually, assuming no defaults on the underlying collateral.<sup>49</sup> Thanks to the combination of mortgage-backed securities,

CDOs, and leverage, Cioffi's funds earned healthy returns for a time: the High-Grade fund had returns of 17% in 2004, 10% in 2005, and 9% in 2006 after fees.<sup>50</sup> Cioffi and Tannin made millions before the hedge funds collapsed in 2007. Cioffi was rewarded with total compensation worth more than \$41 million from 2005 to 2007. In 2007, the year the two hedge funds filed for bankruptcy, Cioffi made more than \$17.6 million in total compensation. Matt Tannin, his lead manager, was awarded compensation of more than \$5.6 million from 2005 to 2007.<sup>51</sup> Both managers invested some of their own money in the funds, and used this as a selling point when pitching the funds to others.<sup>52</sup>

But when house prices fell and investors started to question the value of mortgage-backed securities in 2007, the same short-term leverage that had inflated Cioffi's returns would amplify losses and quickly put his two hedge funds out of business.

#### CITIGROUP'S LIQUIDITY PUTS: "A POTENTIAL CONFLICT OF INTEREST"

By the middle of the decade, Citigroup was a market leader in selling CDOs, often using its depositor-based commercial bank to provide liquidity support. For much of this period, the company was in various types of trouble with its regulators, and then-CEO Charles Prince told the FCIC that dealing with those troubles took up more than half his time.<sup>53</sup> After paying the \$70 million fine related to subprime mortgage lending, Citigroup again got into trouble, charged with helping Enron—before that company filed for bankruptcy in 2001—use structured finance transactions to manipulate its financial statements. In July 2003, Citigroup agreed to pay the SEC \$120 million to settle these allegations and also agreed, under formal enforcement actions by the Federal Reserve and Office of the Comptroller of the Currency, to overhaul its risk management practices.<sup>54</sup>

By March 2005, the Fed had seen enough: it banned Citigroup from making any more major acquisitions until it improved its governance and legal compliance. According to Prince, he had already decided to turn "the company's focus from an acquisition-driven strategy to more of a balanced strategy involving organic growth."<sup>55</sup> Robert Rubin, a former treasury secretary and former Goldman Sachs co-CEO who was at that time chairman of the Executive Committee of Citigroup's board of directors, recommended that Citigroup increase its risk taking—assuming, he told the FCIC, that the firm managed those risks properly.<sup>56</sup>

Citigroup's investment bank subsidiary was a natural area for growth after the Fed and then Congress had done away with restrictions on activities that could be pursued by investment banks affiliated with commercial banks. One opportunity among many was the CDO business, which was just then taking off amid the booming mortgage market.

In 2003, Citi's CDO desk was a tiny unit in the company's investment banking arm, "eight guys and a Bloomberg" terminal, in the words of Nestor Dominguez, then co-head of the desk.<sup>57</sup> Nevertheless, this tiny operation under the command of

Thomas Maheras, co-CEO of the investment bank, had become a leader in the nascent market for CDOs, creating more than \$18 billion in 2003 and 2004—close to one-fifth of the market in those years.

The eight guys had picked up on a novel structure pioneered by Goldman Sachs and WestLB, a German bank. Instead of issuing the triple-A tranches of the CDOs as long-term debt, Citigroup structured them as short-term asset-backed commercial paper.<sup>58</sup> Of course, using commercial paper introduced liquidity risk (not present when the tranches were sold as long-term debt), because the CDO would have to reissue the paper to investors regularly—usually within days or weeks—for the life of the CDO. But asset-backed commercial paper was a cheap form of funding at the time, and it had a large base of potential investors, particularly among money market mutual funds. To mitigate the liquidity risk and to ensure that the rating agencies would give it their top ratings, Citibank (Citigroup's national bank subsidiary) provided assurances to investors, in the form of liquidity puts. In selling the liquidity put, for an ongoing fee the bank would be on the hook to step in and buy the commercial paper if there were no buyers when it matured or if the cost of funding rose by a predetermined amount.<sup>59</sup>

The CDO team at Citigroup had jumped into the market in July 2003 with a \$1.5 billion CDO named Grenadier Funding that included a \$1.3 billion tranche backed by a liquidity put from Citibank.<sup>60</sup> Over the next three years, Citi would write liquidity puts on \$25 billion of commercial paper issued by CDOs,<sup>61</sup> more than any other company. BSAM's three Klio CDOs, which Citigroup had underwritten, accounted for just over \$10 billion of this total,<sup>62</sup> a large number that would not bode well for the bank. But initially, this "strategic initiative," as Dominguez called it, was very profitable for Citigroup. The CDO desk earned roughly 1% of the total deal value in structuring fees for Citigroup's investment banking arm, or about \$10 million for a \$1 billion deal. In addition, Citigroup would generally charge buyers 0.10% to 0.20% in premiums annually for the liquidity puts.<sup>63</sup> In other words, for a typical \$1 billion deal, Citibank would receive \$1 to \$2 million annually on the liquidity puts alone—practically free money, it seemed, because the trading desk believed that these puts would never be triggered.<sup>64</sup>

In effect, the liquidity put was yet another highly leveraged bet: a contingent liability that would be triggered in some circumstances. Prior to the 2004 change in the capital rules regarding liquidity puts (discussed earlier), Citigroup did not have to hold any capital against such contingencies. Rather, it was permitted to use its own risk models to determine the appropriate capital charge. But Citigroup's financial models estimated only a remote possibility that the puts would be triggered. Following the 2004 rule change, Citibank was required to hold 0.16% in capital against the amount of commercial paper supported by the liquidity put, or \$1.6 million for a \$1 billion liquidity put. Given a \$1 to \$2 million annual fee for the put, the annual return on that capital could still exceed 100%. No doubt about it, Dominguez told the FCIC, the triple-A or similar ratings, the multiple fees, and the low capital requirements made the liquidity puts "a much better trade" for Citi's balance sheet.<sup>65</sup> The events of 2007 would reveal the fallacy of those assumptions and catapult the entire \$25 billion

in commercial paper straight onto the bank's balance sheet, requiring it to come up with \$25 billion in cash as well as more capital to satisfy bank regulators.

The liquidity puts were approved by Citigroup's Capital Markets Approval Committee, which was charged with reviewing all new financial products.<sup>66</sup> Deeming them to be low risk, the company based its opinions on the credit risk of the underlying collateral, but failed to consider the liquidity risk posed by a general market disruption.<sup>67</sup> The OCC, the supervisor of Citigroup's largest commercial bank subsidiary, was aware that the bank had issued the liquidity puts.<sup>68</sup> However, the terms of the OCC's post-Enron enforcement action focused only on whether Citibank had a process in place to review the product, and not on the risks of the puts to Citibank's balance sheet.<sup>69</sup>

Besides Citigroup, only a few large financial institutions, such as AIG Financial Products, BNP, WestLB of Germany, and Société Générale of France, wrote significant amounts of liquidity puts on commercial paper issued by CDOs.<sup>70</sup> Bank of America, the biggest commercial bank in the United States, wrote small deals through 2006 but did \$6 billion worth in 2007, just before the market crashed.<sup>71</sup> When asked why other market participants were not writing liquidity puts, Dominguez stated that Société Générale and BNP were big players in that market. "You needed to be a bank with a strong balance sheet, access to collateral, and existing relationships with collateral managers," he said.<sup>72</sup>

The CDO desk stopped writing liquidity puts in early 2006,<sup>73</sup> when it reached its internal limits. Citibank's treasury function had set a \$23 billion cap on liquidity puts;<sup>74</sup> it granted one final exception, bringing the total to \$25 billion.<sup>75</sup> Risk management had also set a \$25 billion risk limit on top-rated asset-backed securities, which included the liquidity puts. Later, in an October 2006 memo, Citigroup's Financial Control Group criticized the firm's pricing of the puts, which failed to consider the risk that investors would not buy the commercial paper protected by the liquidity puts when it came due, thereby creating a \$25 billion cash demand on Citibank.<sup>76</sup> An undated and unattributed internal document (believed to have been drafted in 2006) also questioned one of the practices of Citigroup's investment bank, which paid traders on its CDO desk for generating the deals without regard to later losses: "There is a potential conflict of interest in pricing the liquidity put cheap [*sic*] so that more CDO equities can be sold and more structuring fee to be generated."<sup>77</sup> The result would be losses so severe that they would help bring the huge financial conglomerate to the brink of failure, as we will see.

#### AIG: "GOLDEN GOOSE FOR THE ENTIRE STREET"

In 2004, American International Group was the largest insurance company in the world as measured by stock market value: a massive conglomerate with \$850 billion in assets, 116,000 employees in 130 countries, and 223 subsidiaries.

But to Wall Street, AIG's most valuable asset was its credit rating: that it was awarded the highest possible rating—Aaa by Moody's since 1986, AAA by S&P since

1983—was crucial, because these sterling ratings let it borrow cheaply and deploy the money in lucrative investments. Only six private-sector companies in the United States in early 2010 carried those ratings.<sup>78</sup>

Starting in 1998, AIG Financial Products, a Connecticut-based unit with major operations in London, figured out a new way to make money from those ratings. Relying on the guarantee of its parent, AIG, AIG Financial Products became a major over-the-counter derivatives dealer, eventually having a portfolio of \$2.7 trillion in notional amount. Among other derivatives activities, the unit issued credit default swaps guaranteeing debt obligations held by financial institutions and other investors. In exchange for a stream of premium-like payments, AIG Financial Products agreed to reimburse the investor in such a debt obligation in the event of any default. The credit default swap (CDS) is often compared to insurance, but when an insurance company sells a policy, regulations require that it set aside a reserve in case of a loss. Because credit default swaps were not regulated insurance contracts, no such requirement was applicable. In this case, the unit predicted with 99.85% confidence that there would be no realized economic loss on the supposedly safest portions of the CDOs on which they wrote CDS protection, and failed to make any provisions whatsoever for declines in value—or unrealized losses—a decision that would prove fatal to AIG in 2008.<sup>79</sup>

AIG Financial Products had a huge business selling CDS to European banks on a variety of financial assets, including bonds, mortgage-backed securities, CDOs, and other debt securities. For AIG, the fee for selling protection via the swap appeared well worth the risk. For the banks purchasing protection, the swap enabled them to neutralize the credit risk and thereby hold less capital against its assets. Purchasing credit default swaps from AIG could reduce the amount of regulatory capital that the bank needed to hold against an asset from 8% to 1.6%.<sup>80</sup> By 2005, AIG had written \$107 billion in CDS for such regulatory capital benefits; most were with European banks for a variety of asset types. That total would rise to \$379 billion by 2007.<sup>81</sup>

The same advantages could be enjoyed by banks in the United States, where regulators had introduced similar capital standards for banks' holdings of mortgage-backed securities and other investments under the Recourse Rule in 2001. So a credit default swap with AIG could also lower American banks' capital requirements.

In 2004 and 2005, AIG sold protection on super-senior CDO tranches valued at \$54 billion, up from just \$2 billion in 2003.<sup>82</sup> In an interview with the FCIC, one AIG executive described AIG Financial Products' principal swap salesman, Alan Frost, as "the golden goose for the entire Street."<sup>83</sup>

AIG's biggest customer in this business was always Goldman Sachs, consistently a leading CDO underwriter. AIG also wrote billions of dollars of protection for Merrill Lynch, Société Générale, and other firms. AIG "looked like the perfect customer for this," Craig Broderick, Goldman's chief risk officer, told the FCIC. "They really ticked all the boxes. They were among the highest-rated [corporations] around. They had what appeared to be unquestioned expertise. They had tremendous financial strength. They had huge, appropriate interest in this space, backed by a long history of trading in it."<sup>84</sup>

AIG also bestowed the imprimatur of its pristine credit rating on commercial paper programs by providing liquidity puts, similar to the ones that Citigroup's bank wrote for many of its own deals, guaranteeing it would buy commercial paper if no one else wanted it. It entered this business in 2002; by 2005, it had written more than \$6 billion of liquidity puts on commercial paper issued by CDOs. AIG also wrote more than \$7 billion in CDS to protect Société Générale against the risks on liquidity puts that the French bank itself wrote on commercial paper issued by CDOs.<sup>85</sup> "What we would always try to do is to structure a transaction where the transaction was virtually riskless, and get paid a small premium," Gene Park, who was a managing director at AIG Financial Products, told the FCIC. "And we're one of the few guys who can do that. Because if you think about it, no one wants to buy disaster protection from someone who is not going to be around. . . . That was AIGFP's sales pitch to the Street or to banks."<sup>86</sup>

AIG's business of offering credit protection on assets of many sorts, including mortgage-backed securities and CDOs, grew from \$20 billion in 2002 to \$211 billion in 2005 and \$533 billion in 2007.<sup>87</sup> This business was a small part of the AIG Financial Services business unit, which included AIG Financial Products; AIG Financial Services generated operating income of \$4.4 billion in 2005, or 29% of AIG's total.

AIG did not post any collateral when it wrote these contracts; but unlike monoline insurers, AIG Financial Products agreed to post collateral if the value of the underlying securities dropped, or if the rating agencies downgraded AIG's long-term debt ratings. Its competitors, the monoline financial guarantors—insurance companies such as MBIA and Ambac that focused on guaranteeing financial contracts—were forbidden under insurance regulations from paying out until actual losses occurred. The collateral posting terms in AIG's credit default swap contracts would have an enormous impact on the crisis about to unfold.

But during the boom, these terms didn't matter. The investors got their triple-A-rated protection, AIG got its fees for providing that insurance—about 0.12% of the notional amount of the swap per year<sup>88</sup>—and the managers got their bonuses. In the case of the London subsidiary that ran the operation, the bonus pool was 30% of new earnings.<sup>89</sup> Financial Products CEO Joseph J. Cassano made the allocations at the end of the year.<sup>90</sup> Between 2002 and 2007, the least amount Cassano paid himself in a year was \$38 million. In the later years, his compensation was sometimes double that of the parent company's CEO.<sup>91</sup>

In the spring of 2005, disaster struck: AIG lost its triple-A rating when auditors discovered that it had manipulated earnings. By November 2005, the company had reduced its reported earnings over the five-year period by \$3.9 billion.<sup>92</sup> The board forced out Maurice "Hank" Greenberg, who had been CEO for 38 years. New York Attorney General Eliot Spitzer prepared to bring fraud charges against him.

Greenberg told the FCIC, "When the AAA credit rating disappeared in spring 2005, it would have been logical for AIG to have exited or reduced its business of writing credit default swaps."<sup>93</sup> But that didn't happen. Instead, AIG Financial Products wrote another \$36 billion in credit default swaps on super-senior tranches of

CDOs in 2005.<sup>94</sup> The company wouldn't make the decision to stop writing these contracts until 2006.<sup>95</sup>

#### GOLDMAN SACHS: "MULTIPLIED THE EFFECTS OF THE COLLAPSE IN SUBPRIME"

Henry Paulson, the CEO of Goldman Sachs from 1999 until he became secretary of the Treasury in 2006, testified to the FCIC that by the time he became secretary many bad loans already had been issued—"most of the toothpaste was out of the tube"—and that "there really wasn't the proper regulatory apparatus to deal with it."<sup>96</sup> Paulson provided examples: "Subprime mortgages went from accounting for 5 percent of total mortgages in 1994 to 20 percent by 2006. . . . Securitization separated originators from the risk of the products they originated." The result, Paulson observed, "was a housing bubble that eventually burst in far more spectacular fashion than most previous bubbles."<sup>97</sup>

Under Paulson's leadership, Goldman Sachs had played a central role in the creation and sale of mortgage securities. From 2004 through 2006, the company provided billions of dollars in loans to mortgage lenders; most went to the subprime lenders Ameriquest, Long Beach, Fremont, New Century, and Countrywide through warehouse lines of credit, often in the form of repos.<sup>98</sup> During the same period, Goldman acquired \$53 billion of loans from these and other subprime loan originators, which it securitized and sold to investors.<sup>99</sup> From 2004 to 2006, Goldman issued 318 mortgage securitizations totaling \$184 billion (about a quarter were subprime), and 63 CDOs totaling \$32 billion; Goldman also issued 22 synthetic or hybrid CDOs with a face value of \$35 billion between 2004 and June 2006.<sup>100</sup>

Synthetic CDOs were complex paper transactions involving credit default swaps. Unlike the traditional cash CDO, synthetic CDOs contained no actual tranches of mortgage-backed securities, or even tranches of other CDOs. Instead, they simply referenced these mortgage securities and thus were bets on whether borrowers would pay their mortgages. In the place of real mortgage assets, these CDOs contained credit default swaps and did not finance a single home purchase. Investors in these CDOs included "funded" long investors, who paid cash to purchase actual securities issued by the CDO; "unfunded" long investors, who entered into swaps with the CDO, making money if the reference securities performed; and "short" investors, who bought credit default swaps on the reference securities, making money if the securities failed. While funded investors received interest if the reference securities performed, they could lose all of their investment if the reference securities defaulted. Unfunded investors, which were highest in the payment waterfall, received premium-like payments from the CDO as long as the reference securities performed but would have to pay if the reference securities deteriorated beyond a certain point and if the CDO did not have sufficient funds to pay the short investors. Short investors, often hedge funds, bought the credit default swaps from the CDOs and paid those premiums. Hybrid CDOs were a combination of traditional and synthetic CDOs.

Firms like Goldman found synthetic CDOs cheaper and easier to create than tra-

ditional CDOs at the same time as the supply of mortgages was beginning to dry up. Because there were no mortgage assets to collect and finance, creating synthetic CDOs took a fraction of the time. They also were easier to customize, because CDO managers and underwriters could reference any mortgage-backed security—they were not limited to the universe of securities available for them to buy. Figure 8.2 provides an example of how such a deal worked.

In 2004, Goldman launched its first major synthetic CDO, Abacus 2004-1—a deal worth \$2 billion. About one-third of the swaps referenced residential mortgage-backed securities, another third referenced existing CDOs, and the rest, commercial mortgage-backed securities (made up of bundled commercial real estate loans) and other securities.

Goldman was the short investor for the entire \$2 billion deal: it purchased credit default swap protection on these reference securities from the CDO. The funded investors—IKB (a German bank), the TCW Group, and Wachovia—put up a total of \$195 million to purchase mezzanine tranches of the deal.<sup>101</sup> These investors would receive scheduled principal and interest payments if the referenced assets performed. If the referenced assets did not perform, Goldman, as the short investor, would receive the \$195 million.<sup>102</sup> In this sense, IKB, TCW, and Wachovia were “long” investors, betting that the referenced assets would perform well, and Goldman was a “short” investor, betting that they would fail.

The unfunded investors—TCW and GSC Partners (asset management firms that managed both hedge funds and CDOs)—did not put up any money up front; they received annual premiums from the CDO in return for the promise that they would pay the CDO if the reference securities failed and the CDO did not have enough funds to pay the short investors.<sup>103</sup>

Goldman was the largest unfunded investor at the time that the deal was originated, retaining the \$1.8 billion super-senior tranche. Goldman’s \$2 billion short position more than offset that exposure; about one year later, it transferred the unfunded long position by buying credit protection from AIG, in return for an annual payment of \$2.2 million.<sup>104</sup> As a result, by 2005, AIG was effectively the largest unfunded investor in the super-senior tranches of the Abacus deal.

All told, long investors in Abacus 2004-1 stood to receive millions of dollars if the reference securities performed (just as a bond investor makes money when a bond performs). On the other hand, Goldman stood to gain nearly \$2 billion if the assets failed.

In the end, Goldman, the short investor in the Abacus 2004-1 CDO, has received about \$930 million while the long investors have lost just about all of their investments. In April 2008, GSC paid Goldman \$7.3 million as a result of CDS protection sold by GSC to Goldman on the first and second loss tranches. In June 2009, Goldman received \$806 million from AIG Financial Products as a result of the CDS protection it had purchased against the super-senior tranche. The same month it received \$23 million from TCW as a result of the CDS purchased against the junior mezzanine tranches, and \$30 million from IKB because of the CDS it purchased against the C tranche. In April 2010, IKB paid Goldman another \$40 million as a result of the CDS against the B tranche.

### Synthetic CDO

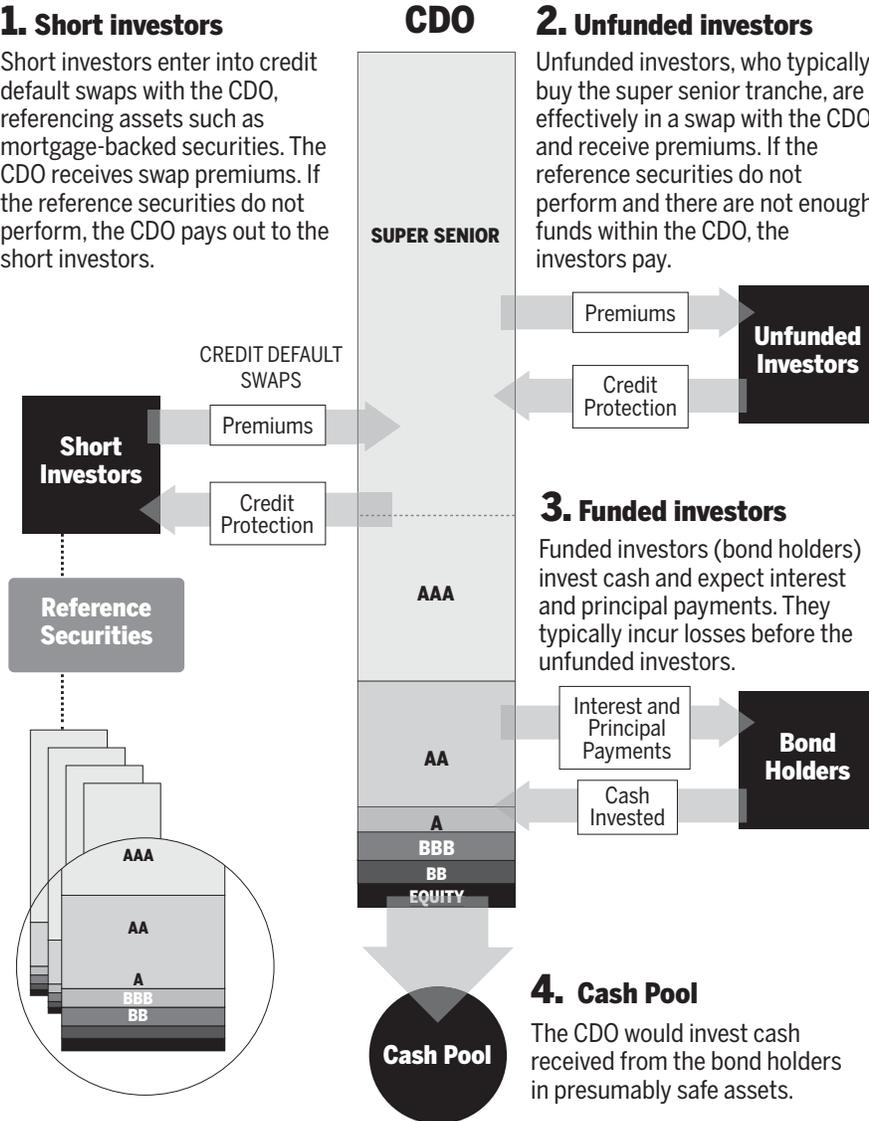
Synthetic CDOs, such as Goldman Sachs’s Abacus 2004-1 deal, were complex paper transactions involving credit default swaps.

#### 1. Short investors

Short investors enter into credit default swaps with the CDO, referencing assets such as mortgage-backed securities. The CDO receives swap premiums. If the reference securities do not perform, the CDO pays out to the short investors.

#### 2. Unfunded investors

Unfunded investors, who typically buy the super senior tranche, are effectively in a swap with the CDO and receive premiums. If the reference securities do not perform and there are not enough funds within the CDO, the investors pay.



#### 3. Funded investors

Funded investors (bond holders) invest cash and expect interest and principal payments. They typically incur losses before the unfunded investors.

#### 4. Cash Pool

The CDO would invest cash received from the bond holders in presumably safe assets.

Figure 8.2

Through May 2010, Goldman received \$24 million from IKB, Wachovia, and TCW as a result of the credit default swaps against the A tranche. As was common, some of the tranches of Abacus 2004-1 found their way into other funds and CDOs; for example, TCW put tranches of Abacus 2004-1 into three of its own CDOs.

In total, between July 1, 2004, and May 31, 2007, Goldman packaged and sold 47 synthetic CDOs, with an aggregate face value of \$66 billion.<sup>105</sup> Its underwriting fee was 0.50% to 1.50% of the deal totals, Dan Sparks, the former head of Goldman's mortgage desk, told the FCIC.<sup>106</sup> Goldman would earn profits from shorting many of these deals; on others, it would profit by facilitating the transaction between the buyer and the seller of credit default swap protection.

As we will see, these new instruments would yield substantial profits for investors that held a short position in the synthetic CDOs—that is, investors betting that the housing boom was a bubble about to burst. They also would multiply losses when housing prices collapsed. When borrowers defaulted on their mortgages, the investors expecting cash from the mortgage payments lost. And investors betting on these mortgage-backed securities via synthetic CDOs also lost (while those betting against the mortgages would gain).<sup>107</sup> As a result, the losses from the housing collapse were multiplied exponentially.

To see this play out, we can return to our illustrative Citigroup mortgage-backed securities deal, CMLTI 2006-NC2. Credit default swaps made it possible for new market participants to bet for or against the performance of these securities. Synthetic CDOs significantly increased the demand for such bets. For example, there were about \$12 million worth of bonds in the M9 (BBB-rated) tranche—one of the mezzanine tranches of the security. Synthetic CDOs such as Auriga, Volans, and Neptune CDO IV all contained credit default swaps in which the M9 tranche was referenced. As long as the M9 bonds performed, investors betting that the tranche would fail (short investors) would make regular payments into the CDO, which would be paid out to other investors banking on it to succeed (long investors). If the M9 bonds defaulted, then the long investors would make large payments to the short investors. That is the bet—and there were more than \$50 million in such bets in early 2007 on the M9 tranche of this deal. Thus, on the basis of the performance of \$12 million in bonds, more than \$60 million could potentially change hands. Goldman's Sparks put it succinctly to the FCIC: if there's a problem with a product, synthetics increase the impact.<sup>108</sup>

The amplification of the M9 tranche was not unique. A \$15 million tranche of the Glacier Funding CDO 2006-4A, rated A, was referenced in \$85 million worth of synthetic CDOs. A \$28 million tranche of the Soundview Home Equity Loan Trust 2006-EQ1, also rated A, was referenced in \$79 million worth of synthetic CDOs. A \$13 million tranche of the Soundview Home Equity Loan Trust 2006-EQ1, rated BBB, was referenced in \$49 million worth of synthetic CDOs.<sup>109</sup>

In total, synthetic CDOs created by Goldman referenced 3,408 mortgage securities, some of them multiple times. For example, 610 securities were referenced twice. Indeed, one single mortgage-backed security was referenced in nine different synthetic

CDOs created by Goldman Sachs.<sup>110</sup> Because of such deals, when the housing bubble burst, billions of dollars changed hands.

Although Goldman executives agreed that synthetic CDOs were “bets” that magnified overall risk, they also maintained that their creation had “social utility” because it added liquidity to the market and enabled investors to customize the exposures they wanted in their portfolios.<sup>111</sup> In testimony before the Commission, Goldman’s President and Chief Operating Officer Gary Cohn argued: “This is no different than the tens of thousands of swaps written every day on the U.S. dollar versus another currency. Or, more importantly, on U.S. Treasuries . . . This is the way that the financial markets work.”<sup>112</sup>

Others, however, criticized these deals. Patrick Parkinson, the current director of the Division of Banking Supervision and Regulation at the Federal Reserve Board, noted that synthetic CDOs “multiplied the effects of the collapse in subprime.”<sup>113</sup> Other observers were even harsher in their assessment. “I don’t think they have social value,” Michael Greenberger, a professor at the University of Maryland School of Law and former director of the Division of Trading and Markets at the Commodity Futures Trading Commission, told the FCIC. He characterized the credit default swap market as a “casino.” And he testified that “the concept of lawful betting of billions of dollars on the question of whether a homeowner would default on a mortgage that was not owned by either party, has had a profound effect on the American public and taxpayers.”<sup>114</sup>

#### MOODY’S: “ACHIEVED THROUGH SOME ALCHEMY”

The machine churning out CDOs would not have worked without the stamp of approval given to these deals by the three leading rating agencies: Moody’s, S&P, and Fitch. Investors often relied on the rating agencies’ views rather than conduct their own credit analysis. Moody’s was paid according to the size of each deal, with caps set at a half-million dollars for a “standard” CDO in 2006 and 2007 and as much as \$850,000 for a “complex” CDO.<sup>115</sup>

In rating both synthetic and cash CDOs, Moody’s faced two key challenges: first, estimating the probability of default for the mortgage-backed securities purchased by the CDO (or its synthetic equivalent) and, second, gauging the correlation between those defaults—that is, the likelihood that the securities would default at the same time.<sup>116</sup> Imagine flipping a coin to see how many times it comes up heads. Each flip is unrelated to the others; that is, the flips are uncorrelated. Now, imagine a loaf of sliced bread. When there is one moldy slice, there are likely other moldy slices. The freshness of each slice is highly correlated with that of the other slices. As investors now understand, the mortgage-backed securities in CDOs were less like coins than like slices of bread.

To estimate the probability of default, Moody’s relied almost exclusively on its own ratings of the mortgage-backed securities purchased by the CDOs.<sup>117</sup> At no time did the agencies “look through” the securities to the underlying subprime mortgages. “We took the rating that had already been assigned by the [mortgage-backed securi-

ties] group,” Gary Witt, formerly one of Moody’s team managing directors for the CDO unit, told the FCIC. This approach would lead to problems for Moody’s—and for investors. Witt testified that the underlying collateral “just completely disintegrated below us and we didn’t react and we should have. . . . We had to be looking for a problem. And we weren’t looking.”<sup>118</sup>

To determine the likelihood that any given security in the CDO would default, Moody’s plugged in assumptions based on those original ratings. This was no simple task. Meanwhile, if the initial ratings turned out—owing to poor underwriting, fraud, or any other cause—to poorly reflect the quality of the mortgages in the bonds, the error was blindly compounded when mortgage-backed securities were packaged into CDOs.

Even more difficult was the estimation of the default correlation between the securities in the portfolio—always tricky, but particularly so in the case of CDOs consisting of subprime and Alt-A mortgage-backed securities that had only a short performance history. So the firm explicitly relied on the judgment of its analysts. “In the absence of meaningful default data, it is impossible to develop empirical default correlation measures based on actual observations of defaults,” Moody’s acknowledged in one early explanation of its process.<sup>119</sup>

In plainer English, Witt said, Moody’s didn’t have a good model on which to estimate correlations between mortgage-backed securities—so they “made them up.” He recalled, “They went to the analyst in each of the groups and they said, ‘Well, you know, how related do you think these types of [mortgage-backed securities] are?’”<sup>120</sup> This problem would become more serious with the rise of CDOs in the middle of the decade. Witt felt strongly that Moody’s needed to update its CDO rating model to explicitly address the increasing concentration of risky mortgage-related securities in the collateral underlying CDOs.<sup>121</sup> He undertook two initiatives to address this issue. First, in mid-2004, he developed a new rating methodology that directly incorporated correlation into the model. However, the technique he devised was not applied to CDO ratings for another year.<sup>122</sup> Second, he proposed a research initiative in early 2005 to “look through” a few CDO deals at the level of the underlying mortgage-backed securities and to see if “the assumptions that we’re making for AAA CDOs are consistent . . . with the correlation assumptions that we’re making for AAA [mortgage-backed securities].” Although Witt received approval from his superiors for this investigation, contractual disagreements prevented him from buying the software he needed to conduct the look-through analysis.<sup>123</sup>

In June 2005, Moody’s updated its approach for estimating default correlation, but it based the new model on trends from the previous 20 years, a period when housing prices were rising and mortgage delinquencies were very low—and a period in which nontraditional mortgage products had been a very small niche. Then, Moody’s modified this optimistic set of “empirical” assumptions with ad hoc adjustments based on factors such as region, year of origination, and servicer. For example, if two mortgage-backed securities were issued in the same region—say, Southern California—Moody’s boosted the correlation; if they shared a common mortgage servicer, Moody’s boosted it further. But at the same time, it would make other technical

choices that lowered the estimated correlation of default, which would improve the ratings for these securities. Using these methods, Moody's estimated that two mortgage-backed securities would be less closely correlated than two securities backed by other consumer credit assets, such as credit card or auto loans.<sup>124</sup>

The other major rating agencies followed a similar approach.<sup>125</sup> Academics, including some who worked at regulatory agencies, cautioned investors that assumption-heavy CDO credit ratings could be dangerous. "The complexity of structured finance transactions may lead to situations where investors tend to rely more heavily on ratings than for other types of rated securities. On this basis, the transformation of risk involved in structured finance gives rise to a number of questions with important potential implications. One such question is whether tranching instruments might result in unanticipated concentrations of risk in institutions' portfolios," a report from the Bank for International Settlements, an international financial organization sponsored by the world's regulators and central banks, warned in June 2005.<sup>126</sup>

CDO managers and underwriters relied on the ratings to promote the bonds. For each new CDO, they created marketing material, including a pitch book that investors used to decide whether to subscribe to a new CDO. Each book described the types of assets that would make up the portfolio without providing details.<sup>127</sup> Without exception, every pitch book examined by the FCIC staff cited an analysis from either Moody's or S&P that contrasted the historical "stability" of these new products' ratings with the stability of corporate bonds. Statistics that made this case included the fact that between 1983 and 2006, 92% of these new products did not experience any rating changes over a twelve-month period while only 78% of corporate bonds maintained their ratings. Over a longer time period, however, structured finance ratings were not so stable. Between 1983 and 2006, only 56% of triple-A-rated structured finance securities retained their original rating after five years.<sup>128</sup> Underwriters continued to sell CDOs using these statistics in their pitch books during 2006 and 2007, after mortgage defaults had started to rise but before the rating agencies had downgraded large numbers of mortgage-backed securities. Of course, each pitch book did include the disclaimer that "past performance is not a guarantee of future performance" and encouraged investors to perform their own due diligence.

As Kyle Bass of Dallas-based Hayman Capital Advisors testified before the House Financial Services Committee, CDOs that purchased lower-rated tranches of mortgage-backed securities "are arcane structured finance products that were designed specifically to make dangerous, lowly rated tranches of subprime debt deceptively attractive to investors. This was achieved through some alchemy and some negligence in adapting unrealistic correlation assumptions on behalf of the ratings agencies. They convinced investors that 80% of a collection of toxic subprime tranches were the ratings equivalent of U.S. Government bonds."<sup>129</sup>

When housing prices started to fall nationwide and defaults increased, it turned out that the mortgage-backed securities were in fact much more highly correlated than the rating agencies had estimated—that is, they stopped performing at roughly the same time. These losses led to massive downgrades in the ratings of the CDOs. In 2007, 20% of U.S. CDO securities would be downgraded. In 2008, 91% would.<sup>130</sup>

In late 2008, Moody's would throw out its key CDO assumptions and replace them with an asset correlation assumption two to three times higher than used before the crisis.<sup>131</sup>

In retrospect, it is clear that the agencies' CDO models made two key mistakes. First, they assumed that securitizers could create safer financial products by diversifying among many mortgage-backed securities, when in fact these securities weren't that different to begin with. "There were a lot of things [the credit rating agencies] did wrong," Federal Reserve Chairman Ben Bernanke told the FCIC. "They did not take into account the appropriate correlation between [and] across the categories of mortgages."<sup>132</sup>

Second, the agencies based their CDO ratings on ratings they themselves had assigned on the underlying collateral. "The danger with CDOs is when they are based on structured finance ratings," Ann Rutledge, a structured finance expert, told the FCIC. "Ratings are not predictive of future defaults; they only describe a ratings management process, and a mean and static expectation of security loss."<sup>133</sup>

Of course, rating CDOs was a profitable business for the rating agencies. Including all types of CDOs—not just those that were mortgage-related—Moody's rated 220 deals in 2004, 363 in 2005, 749 in 2006, and 717 in 2007; the value of those deals rose from \$90 billion in 2004 to \$162 billion in 2005, \$337 billion in 2006, and \$326 billion in 2007.<sup>134</sup> The reported revenues of Moody's Investors Service from structured products—which included mortgage-backed securities and CDOs—grew from \$199 million in 2000, or 33% of Moody's Corporation's revenues, to \$887 million in 2006 or 44% of overall corporate revenue. The rating of asset-backed CDOs alone contributed more than 10% of the revenue from structured finance.<sup>135</sup> The boom years of structured finance coincided with a company-wide surge in revenue and profits. From 2000 to 2006, the corporation's revenues surged from \$602 million to \$2 billion and its profit margin climbed from 26% to 37%.

Yet the increase in the CDO group's workload and revenue was not paralleled by a staffing increase. "We were under-resourced, you know, we were always playing catch-up," Witt said.<sup>136</sup> Moody's "penny-pinching" and "stingy" management was reluctant to pay up for experienced employees. "The problem of recruiting and retaining good staff was insoluble. Investment banks often hired away our best people. As far as I can remember, we were never allocated funds to make counter offers," Witt said. "We had almost no ability to do meaningful research."<sup>137</sup> Eric Kolchinsky, a former team managing director at Moody's, told the FCIC that from 2004 to 2006, the increase in the number of deals rated was "huge . . . but our personnel did not go up accordingly." By 2006, Kolchinsky recalled, "My role as a team leader was crisis management. Each deal was a crisis."<sup>138</sup> When personnel worked to create a new methodology, Witt said, "We had to kind of do it in our spare time."<sup>139</sup>

The agencies worked closely with CDO underwriters and managers as each new CDO was devised. And the rating agencies now relied for a substantial amount of their revenues on a small number of players. Citigroup and Merrill alone accounted for more than \$140 billion of CDO deals between 2005 and 2007.<sup>140</sup>

The ratings agencies' correlation assumptions had a direct and critical impact on

how CDOs were structured: assumptions of a lower correlation made possible larger easy-to-sell triple-A tranches and smaller harder-to-sell BBB tranches. Thus, as is discussed later, underwriters crafted the structure to earn more favorable ratings from the agencies—for example, by increasing the size of the senior tranches. Moreover, because issuers could choose which rating agencies to do business with, and because the agencies depended on the issuers for their revenues, rating agencies felt pressured to give favorable ratings so that they might remain competitive.

The pressure on rating agency employees was also intense as a result of the high turnover—a revolving door that often left raters dealing with their old colleagues, this time as clients. In her interview with FCIC staff, Yuri Yoshizawa, a Moody's team managing director for U.S. derivatives in 2005, was presented with an organization chart from July 2005. She identified 13 out of 51 analysts—about 25% of the staff—who had left Moody's to work for investment or commercial banks.<sup>141</sup>

Brian Clarkson, who oversaw the structured finance group before becoming the president of Moody's Investors Service, explained to FCIC investigators that retaining employees was always a challenge, for the simple reason that the banks paid more. As a precaution, Moody's employees were prohibited from rating deals by a bank or issuer while they were interviewing for a job with that particular institution, but the responsibility for notifying management of the interview rested on the employee. After leaving Moody's, former employees were barred from interacting with Moody's on the same series of deals they had rated while in its employ, but there were no bans against working on other deals with Moody's.<sup>142</sup>

#### SEC: "IT'S GOING TO BE AN AWFULLY BIG MESS"

The five major U.S. investment banks expanded their involvement in the mortgage and mortgage securities industries in the early 21st century with little formal government regulation beyond their broker-dealer subsidiaries. In 2002, the European Union told U.S. financial firms that to continue to do business in Europe, they would need a "consolidated" supervisor by 2004—that is, one regulator that had responsibility for the holding company. The U.S. commercial banks already met that criterion—their consolidated supervisor was the Federal Reserve—and the Office of Thrift Supervision's oversight of AIG would later also satisfy the Europeans. The five investment banks, however, did not meet the standard: the SEC was supervising their securities arms, but no one supervisor kept track of these companies on a consolidated basis. Thus all five faced an important decision: what agency would they prefer as their regulator?

By 2004, the combined assets at the five firms totaled \$2.5 trillion, more than half of the \$4.7 trillion of assets held by the five largest U.S. bank holding companies. In the next three years the investment banks' assets would grow to \$4.3 trillion. Goldman Sachs was the largest, followed by Morgan Stanley and Merrill, then Lehman and Bear. These large, diverse international firms had transformed their business models over the years. For their revenues they relied increasingly on trading and OTC derivatives

dealing, investments, securitization, and similar activities on top of their traditional investment banking functions. Recall that at Bear Stearns, trading and investments accounted for more than 100% of pretax earnings in some years after 2002.

The investment banks also owned depository institutions through which they could provide FDIC-insured accounts to their brokerage customers; the deposits provided cheap but limited funding. These depositories took the form of a thrift (supervised by the OTS) or an industrial loan company (supervised by the Federal Deposit Insurance Corporation and a state supervisor). Merrill and Lehman, which had among the largest of these subsidiaries, used them to finance their mortgage origination activities.

The investment banks' possession of depository subsidiaries suggested two obvious choices when they found themselves in need of a consolidated supervisor. If a firm chartered its depository as a commercial bank, the Fed would be its holding company supervisor; if as a thrift, the OTS would do the job. But the investment banks came up with a third option. They lobbied the SEC to devise a system of regulation that would satisfy the terms of the European directive and keep them from European oversight<sup>143</sup>—and the SEC was willing to step in, although its historical focus was on investor protection.

In November 2003, almost a year after the Europeans made their announcement, the SEC suggested the creation of the Consolidated Supervised Entity (CSE) program to oversee the holding companies of investment banks and all their subsidiaries. The CSE program was open only to investment banks that had large U.S. broker-dealer subsidiaries already subject to SEC regulation. However, this was the SEC's first foray into supervising firms for safety and soundness. The SEC did not have express legislative authority to require the investment banks to submit to consolidated regulation, so it proposed that the CSE program be voluntary; the SEC crafted the new program out of its authority to make rules for the broker-dealer subsidiaries of investment banks. The program would apply to broker-dealers that volunteered to be subject to consolidated supervision under the CSE program, or those that already were subject to supervision by the Fed at the holding company level, such as JP Morgan and Citigroup. The CSE program would introduce a limited form of supervision by SEC examiners. CSE firms were allowed to use a new methodology to calculate the regulatory capital that they were holding against their securities portfolios—a methodology based on the volatility of market prices. This methodology, referred to as the "alternative net capital rule," would be similar to the standards—based on the 1996 Market Risk Amendment to the Basel rules—that large commercial banks and bank holding companies used for their securities portfolios.

The traditional net capital rule that had governed broker-dealers since 1975 had required straightforward calculations based on asset classes and credit ratings, a bright-line approach that gave firms little discretion in calculating their capital. The new rules would allow the investment banks to create their own proprietary Value at Risk (VaR) models to calculate their regulatory capital—that is, the capital each firm would have to hold to protect its customers' assets should it experience losses on its

securities and derivatives. All in all, the SEC estimated that the proposed new reliance on proprietary VaR models would allow broker-dealers to reduce average capital charges by 40%. The firms would be required to give the SEC an early-warning notice if their tentative net capital (net capital minus hard-to-sell assets) fell below \$5 billion at any time.

Meanwhile, the OTS was already supervising the thrifts owned by several securities firms and argued that it therefore was the natural supervisor of their holding companies. In a letter to the SEC, the OTS was harshly critical of the agency's proposal, which it said had "the potential to duplicate or conflict with OTS's supervisory responsibilities" over savings and loan holding companies that would also be CSEs. The OTS argued that the SEC was interfering with the intentions of Congress, which, in the Gramm-Leach-Bliley Act, "carefully kept the responsibility for supervision of the holding company itself with the OTS or the Federal Reserve Board, depending upon whether the holding company was a [thrift holding company] or a bank holding company. This was in recognition of the expertise developed over the years by these regulators in evaluating the risks posed to depository institutions and the federal deposit insurance funds by depository institution holding companies and their affiliates." The OTS declared: "We believe that the SEC's proposed assertion of authority over [savings and loan holding companies] is unfounded and could pose significant risks to these entities, their insured deposit institution subsidiaries and the federal deposit insurance funds."<sup>144</sup>

In contrast, the response from the financial services industry to the SEC proposal was overwhelmingly positive, particularly with regard to the alternative net capital computation. Lehman Brothers, for example, wrote that it "applauds and supports the Commission." JP Morgan was supportive of what it saw as an improvement over the old net capital rule that still governed securities subsidiaries of the commercial banks: "The existing capital rule overstates the amount of capital a broker-dealer needs," the company wrote. Deutsche Bank found it to be "a great stride towards consistency with modern comprehensive risk management practices."<sup>145</sup> In FCIC interviews, SEC officials and executives at the investment banks stated that the firms preferred the SEC because it was more familiar with their core securities-related businesses.

In an April 2004 meeting, SEC commissioners voted to adopt the CSE program and the new net capital calculations that went along with it. Over the following year and a half, the five largest investment banks volunteered for this supervision, although Merrill's and Lehman's thrifts continued to be supervised by the OTS. Several firms delayed entry to the program in order to develop systems that could measure their exposures to market price movements.

Harvey Goldschmid, SEC commissioner from 2002 to 2005, told FCIC staff that before the CSE program was created, SEC staff members were concerned about how little authority they had over the Wall Street firms, including their hedge funds and overseas subsidiaries. Once the CSE program was in place, the SEC had "the authority to look at everything."<sup>146</sup> SEC commissioners discussed at the time the risks they were taking by allowing firms to reduce their capital. "If anything goes wrong it's go-

ing to be an awfully big mess,” Goldschmid said at a 2004 meeting. “Do we feel secure if these drops in capital and other things [occur] we really will have investor protection?” In response, Annette Nazareth, the SEC official who would be in charge of the program, assured the commissioners that her division was up to the challenge.<sup>147</sup>

The new program was housed primarily in the SEC’s Office of Prudential Supervision and Risk Analysis, an office with a staff of 10 to 12 within the Division of Market Regulation.<sup>148</sup> In the beginning, it was supported by the SEC’s much larger examination staff; by 2008 the staff dedicated to the CSE program had grown to 24.<sup>149</sup> Still, only 10 “monitors” were responsible for the five investment banks; 3 monitors were assigned to each firm, with some overlap.<sup>150</sup>

The CSE program was based on the bank supervision model, but the SEC did not try to do exactly what bank examiners did.<sup>151</sup> For one thing, unlike supervisors of large banks, the SEC never assigned on-site examiners under the CSE program; by comparison, the OCC alone assigned more than 60 examiners full-time at Citibank. According to Erik Sirri, the SEC’s former director of trading and markets, the CSE program was intended to focus mainly on liquidity because, unlike a commercial bank, a securities firm traditionally had no access to a lender of last resort.<sup>152</sup> (Of course, that would change during the crisis.) The investment banks were subject to annual examinations, during which staff reviewed the firms’ systems and records and verified that the firms had instituted control processes.

The CSE program was troubled from the start. The SEC conducted an exam for each investment bank when it entered the program. The result of Bear Stearns’s entrance exam, in 2005, showed several deficiencies. For example, examiners were concerned that there were no firmwide VaR limits and that contingency funding plans relied on overly optimistic stress scenarios.<sup>153</sup> In addition, the SEC was aware of the firm’s concentration of mortgage securities and its high leverage. Nonetheless, the SEC did not ask Bear to change its asset balance, decrease its leverage, or increase its cash liquidity pool—all actions well within its prerogative, according to SEC officials.<sup>154</sup> Then, because the CSE program was preoccupied with its own staff reorganization, Bear did not have its next annual exam, during which the SEC was supposed to be on-site. The SEC did meet monthly with all CSE firms, including Bear,<sup>155</sup> and it did conduct occasional targeted examinations across firms. In 2006, the SEC worried that Bear was too reliant on unsecured commercial paper funding, and Bear reduced its exposure to unsecured commercial paper and increased its reliance on secured repo lending.<sup>156</sup> Unfortunately, tens of billions of dollars of that repo lending was overnight funding that could disappear with no warning. Ironically, in the second week of March 2008, when the firm went into its four-day death spiral, the SEC was on-site conducting its first CSE exam since Bear’s entrance exam more than two years earlier.<sup>157</sup>

Leverage at the investment banks increased from 2004 to 2007, growth that some critics have blamed on the SEC’s change in the net capital rules. Goldschmid told the FCIC that the increase was owed to “a wild capital time and the firms being irresponsible.”<sup>158</sup> In fact, leverage had been higher at the five investment banks in the late 1990s, then dropped before increasing over the life of the CSE program—a history

that suggests that the program was not solely responsible for the changes.<sup>159</sup> In 2009, Sirri noted that under the CSE program the investment banks' net capital levels "remained relatively stable . . . and, in some cases, increased significantly" over the program.<sup>160</sup> Still, Goldschmid, who left the SEC in 2005, argued that the SEC had the power to do more to rein in the investment banks. He insisted, "There was much more than enough moral suasion and kind of practical power that was involved. . . . The SEC has the practical ability to do a lot if it uses its power."<sup>161</sup>

Overall, the CSE program was widely viewed as a failure. From 2004 until the financial crisis, all five investment banks continued their spectacular growth, relying heavily on short-term funding. Former SEC chairman Christopher Cox called the CSE supervisory program "fundamentally flawed from the beginning."<sup>162</sup> Mary Schapiro, the current SEC chairman, concluded that the program "was not successful in providing prudential supervision."<sup>163</sup> And, as we will see in the chapters ahead, the SEC's inspector general would be quite critical, too. In September 2008, in the midst of the financial crisis, the CSE program was discontinued after all five of the largest independent investment banks had either closed down (Lehman Brothers), merged into other entities (Bear Stearns and Merrill Lynch), or converted to bank holding companies to be supervised by the Federal Reserve (Goldman Sachs and Morgan Stanley).

For the Fed, there would be a certain irony in that last development concerning Goldman and Morgan Stanley. Fed officials had seen their agency's regulatory purview shrinking over the course of the decade, as JP Morgan switched the charter of its banking subsidiary to the OCC<sup>164</sup> and as the OTS and SEC promoted their alternatives for consolidated supervision. "The OTS and SEC were very aggressive in trying to promote themselves as a regulator in that environment and wanted to be the consolidated supervisor . . . to meet the requirements in Europe for a consolidated supervisor," said Mark Olson, a Fed governor from 2001 to 2006. "There was a lot of competitiveness among the regulators."<sup>165</sup> In January 2008, Fed staff had prepared an internal study to find out why none of the investment banks had chosen the Fed as its consolidated supervisor. The staff interviewed five firms that already were supervised by the Fed and four that had chosen the SEC. According to the report, the biggest reason firms opted not to be supervised by the Fed was the "comprehensiveness" of the Fed's supervisory approach, "particularly when compared to alternatives such as Office of Thrift Supervision (OTS) or Securities & Exchange Commission (SEC) holding company supervision."<sup>166</sup>

**COMMISSION CONCLUSIONS ON CHAPTER 8**

The Commission concludes declining demand for riskier portions (or tranches) of mortgage-related securities led to the creation of an enormous volume of collateralized debt obligations (CDOs). These CDOs—composed of the riskier tranches—fueled demand for nonprime mortgage securitization and contributed to the housing bubble. Certain products also played an important role in doing so, including CDOs squared, credit default swaps, synthetic CDOs, and asset-backed commercial paper programs that invested in mortgage-backed securities and CDOs. Many of these risky assets ended up on the balance sheets of systemically important institutions and contributed to their failure or near failure in the financial crisis.

Credit default swaps, sold to provide protection against default to purchasers of the top-rated tranches of CDOs, facilitated the sale of those tranches by convincing investors of their low risk, but greatly increased the exposure of the sellers of the credit default swap protection to the housing bubble's collapse.

Synthetic CDOs, which consisted in whole or in part of credit default swaps, enabled securitization to continue and expand even as the mortgage market dried up and provided speculators with a means of betting on the housing market. By layering on correlated risk, they spread and amplified exposure to losses when the housing market collapsed.

The high ratings erroneously given CDOs by credit rating agencies encouraged investors and financial institutions to purchase them and enabled the continuing securitization of nonprime mortgages. There was a clear failure of corporate governance at Moody's, which did not ensure the quality of its ratings on tens of thousands of mortgage-backed securities and CDOs.

The Securities and Exchange Commission's poor oversight of the five largest investment banks failed to restrict their risky activities and did not require them to hold adequate capital and liquidity for their activities, contributing to the failure or need for government bailouts of all five of the supervised investment banks during the financial crisis.