

ZDNet Undercover: Goldman Sachs Group

The gold-plated investment firm did not escape from the credit crisis of 2007 and 2008 unscathed. But, with help from sophisticated analytic software and a willingness to adjust quickly to market conditions, Goldman Sachs navigated the financial meltdown better than its peers. And even profited at it – at first.

By Tom Steinert-Threlkeld

February 2009



Goldman Sachs Group

Business: Formerly an investment bank, now a bank holding company. Primarily invests money on behalf of large organizations and wealthy individuals. Firm also puts its own capital at risk.

Problem: Properly assessing the risks of investing in complex financial instruments.

Total Capital: \$232.6 billion. Includes \$64.4 billion of shareholder investment and \$168.2 billion in unsecured debt.

Founded: 1869

Publicly Traded Since: 1999

Headquarters: New York, N.Y.

Financial Results (Fiscal periods covering:)

Twelve months, 2007

Total Revenue: \$46.0 billion

Net Income: \$17.6 billion

Net Revenue from Trading and Principal Investments: \$31.2 billion

Twelve months, 2008

Total Revenue: \$22.2 billion

Net Income: \$2.3 billion

Net Revenue from Trading and Principal Investments: \$9.1 billion

Final three months, 2008

Total Revenue: \$3.7 billion

Net Income: -\$2.1 billion

Net Revenue from Trading and Principal Investments: -\$4.5 billion

Key players:

Lloyd Blankfein, Chairman and CEO

Has been the top executive since June 2006 – two months before housing prices peaked. Became chief operating officer at the start of 2004. Regarded as both whipsmart and affable, he was one of few survivors from Goldman's acquisition of commodities trading firm J. Aron & Co. In December, he announced Goldman's first quarterly loss, as a public company.

David Viniar, CFO

Has served nearly a decade as chief financial officer. Decided in late 2006 that Goldman was "too long" on investments derived from home mortgages. Engineered pullback that helped the company record a billion-dollar profit in 2007. However, Goldman did not escape 2008 unscathed: Trading activities generated negative net revenues by the end of the year.

E. Gerald Corrigan, Co-chair of the Risk Committee and the Global Compliance and Controls Committee

Joined Goldman Sachs after long career in the Federal Reserve System. At age 43, became chief executive officer of the New York Fed and vice chairman of the Federal Open Market Committee. Warned Congress of the "systemic risk" in the financial markets in March 2007.

Henry Paulson, U.S. Secretary of Treasury

Preceded Blankfein as chief executive of Goldman Sachs. Led September \$150 billion bailout of insurance firm AIG, which faced huge exposure from contracts called 'credit default swaps.' These instruments were designed to protect companies such as Goldman from risks of surging mortgage defaults. Goldman said its exposure was "immaterial."

Robert A. Berry, Partner, head of Market Risk Management

Craig Broderick, Head of Credit Risk Management

Key Technologies:

Risk Analysis and Stress Testing: SecDB, an enterprisewide database and pricing system created by Goldman Sachs.

Load Balancing: GridServer 4.0, Data Synapse. Manages risk calculations over server farm.

Relational Databases:

- **Product Master:** Keeps details on characteristics of all products available for investment.
- **Account Master:** Tracks identities and investment history of all customers.
- **Entity Master:** Traces ownership and voting control of all "entities" behind accounts.
- **Legal Master:** Holds contracts, terms and copies of all agreements with accounts.

Sources: Goldman Sachs financial reports (including Jan. 27, 2009 10-K filing with SEC; Dec. 16, 2008 earnings release), ZDNet Research.

Calculated risk: How Goldman Sachs stepped back when others didn't

By Tom Steinert-Threlkeld

Sales of collateralized debt obligations were red-hot in February 2007.

The outstanding amount of these mortgage-backed securities—called CDOs—had doubled in two years, standing at \$2.6 trillion when 2006 ended. A record \$769 billion had been sold that year, [according to Bloomberg.com](#).

Precisely at that point, Goldman Sachs began betting against such derivatives, at the time, the fastest-growing business on Wall Street.

How Goldman Sachs managed to swim against the tide as rivals forged ahead with CDOs is a tale of the willingness to act and think independently. It used computer models of its own creation and built sophisticated databases to follow the money at risk and the organizations behind the entities they did business with. It invested in the human capital to analyze the data, communicate the risks, and act accordingly. And when applying extreme scenarios to analyze risks that might face its investments in housing-related securities, Goldman showed a willingness to step back and reassess its position, before willing buyers recognized the change.

Indeed, the firm's chief financial officer, David Viniar, turned bearish on subprime mortgage securities in December 2006, when the market was still hot. Two young traders in Goldman's structured products trading group, Michael Swenson and Josh Birnbaum, began buying short positions—bets that an investment will decline—in a series of market indices that tracked the value of contracts known as credit default swaps. Credit default swaps insure holders of derivatives against a rise in defaults on risky—or subprime—mortgages.

By February 2007, Swenson and Birnbaum had accumulated a large enough short position to allow

Goldman Sachs to profit from the meltdown in subprime mortgages. By April, their boss, Dan Sparks, wanted Goldman Sachs to stop underwriting new CDO issues and sell what the firm held. Meanwhile, Goldman kept betting against indices linked to the housing market. By the end of August 2007, the investment firm delivered a \$1 billion profit in its fiscal third quarter.

Meanwhile, two hedge funds belonging to Bear Stearns self-destructed, Merrill Lynch CEO Stanley O'Neal said he would “retire” after an \$8.4 billion writedown left it with a **\$2.2 billion loss**, compared to Goldman's profit. Citigroup **wrote off** \$5.9 billion, then another \$8 billion to \$11 billion, from subprime mortgage investments. And nearly a year later, new Merrill Lynch chief executive John Thain **announced a plan to sell** \$30.6 billion of CDOs for \$6.7 billion, leading to \$4.4 billion in pretax losses.

White Stones

That aforementioned example illustrates how human capital matters more than technical, political, or financial capital, said Charles D. Ellis, the founder of Greenwich Associates, a strategy consulting firm, and author of *The Partnership*, which chronicles the rise of Goldman Sachs.

The 139-year-old company makes a practice of recruiting the best and brightest minds on Wall Street. The goal: Find the “white stones” on the beach, as Ellis puts it, instead of the gray ones other firms hire.

With the talent on board, Goldman backs them up with in-house computing systems that examine the low-



Financial Glossary

Collateralized Debt Obligations: These are securities which hold interests in pools of mortgages, loans or other debts.

Collateralizing: The act of delivering or pledging additional collateral to back up a loan which is losing value.

Counterparties: The other party that signs for a financial transaction. The buyer is the seller's counterparty and vice versa.

Credit default swaps: An instrument that a holder of a security buys to transfer the risk of holding that security to the seller of the swap.

Hedging: Making one or more other investments to reduce the risks of holding a particular asset or kind of asset.

Leverage: The amount of money that has been borrowed from lenders, compared to the amount of money invested in a company by its shareholders.

Monte Carlo simulation: A mathematical technique that uses randomly generated numbers and probabilities to solve problems. The name is derived from games of chance.

Mortgage-backed securities: Securities which derive their values from collections of housing loans.

Subprime mortgage securities: Securities backed by mortgages sold to borrowers with a heightened risk of not paying off their loans.

Tranches: Term of art for "slices."

Value at Risk: A measure of how much value in a portfolio of financial assets is at risk of being lost in one day. The amount can be expected to be lost one day out of every 20.

probability market events that could have huge impact on an investment firm's bottom line—and even existence—if not understood.

These information systems occupy a field known broadly as risk analytics, and for banks of all stripes, they serve as a crystal ball for risk. The problem: The next threat is the one that no one has conceived of.

"The fact is, [Goldman Sachs'] guys rise because their guys are very good and coherent," said Robert Arvanitis, chief executive officer of Risk Finance Advisors in Westport, CT. "They have both the intellect and the modesty to know when not to trust themselves" and back off when something looks too good to be true.

In risk analytics, the ultimate challenge is to find events that hold the most potential for undermining a portfolio of securities. Typically, this process involves looking for a "Black Swan," a term that refers to a low probability event. The term "Black Swan" was popularized by author Nassim Nicholas Taleb, who published *The Black Swan: The Impact of the Highly Improbable*, in April 2007, just as Swenson and Birnbaum were shorting housing derivatives and accumulating credit default swaps.

The problem: Black Swan events aren't easily identified, much less understood. Indeed, Lloyd Blankfein told

Fortune in 2004 that "the biggest risk is what you can't see today."

Typically, the models of [assessing financial risk](#) take one of four forms—historical, predictive, valuation, or parameter analysis—according to Jason Mirsky, director of wealth management at RiskMetrics Group, a 10-year-old company which grew out of a model developed at JP Morgan.

Risk models incorporate the following:

→ **History.** The effects of past events are directed against new forms of securities. In this case, default rates in mortgage-backed securities would be "tested" against events such as the October 1987 stock market crash, the 1997 Asian financial crisis, the 1998 Russian currency default, or the economic malaise that followed the 9/11 terrorist attacks.

→ **Predictions.** Here, specialists build in potential events into their stress testing. What if the value of the British pound were to drop in half? The dollar? What if real GDP fell four quarters in a row?

→ **Values.** Analysts look at what happens if values of different stocks, bonds, or other instruments fall. If equities drop 20 percent, what happens to the values of stock options? In one Goldman scenario,

“The question we had was: ‘Why didn’t the banks see this coming?’”

the firm analyzed how individual stocks such as IBM would fare if the S&P 500 dropped 50 percent.

- **Parameters.** What happens if reality doesn't meet expectations? How is a security impacted? What happens if asset prices suddenly drop?

It is this last question that looks like it was the unpredicted, if not unpredictable, Black Swan in the subprime mortgage crisis that took down Bear Stearns and Lehman Brothers, crippled Merrill Lynch, and almost mortally wounded AIG and Citigroup.

Housing prices fell—once borrowers were maxed out even with teaser rates and low or no down payments. But lenders and outfits packaged mortgages into securities and didn't account for falling home values.

“The problem was falling house prices,” said Paul Willen, Senior Economist and Policy Advisor at the Federal Reserve Bank of Boston and co-author of *Making Sense of the Subprime Crisis*, an attempt to quantify what went wrong with mortgage securities. “The question we had was: ‘Why didn’t the banks see this coming?’”

Part of the problem was the data analyzed by firms. **Government statistics** for the last 60 years of the twentieth century only showed one direction for housing values: Up.

The possibility that housing prices would decline just wasn't on Wall Street's radar. Lehman Brothers, which did not survive, ironically did look at a “meltdown scenario,” Willen noted. Lehman's scenario looked at the reverberations of an annual 5 percent drop in housing

prices. But even if that data translated to 20 percent of all loans failing, it didn't sink in.

“They understood the performance, they understood how the loans worked, they had a very accurate understanding of the borrower,” Willen said. “They just didn't expect it to happen.”

“A lot of people engaged in wishful thinking, that home prices never fall,” said David Rowe, executive vice president of risk management for software supplier Sungard in Wayne, PA. “I had two personal experiences where home prices had fallen (in different parts of the country). It just doesn't strike me as that strange a periodic phenomenon.”

Signs before the times

Indeed, it's not like there weren't signs that housing was about to unravel. For instance, the widely watched S&P/Case-Shiller Home Price Indices for major metropolitan markets peaked in August 2006 and declined for almost a year before the Bear Stearns rescue, said Rowe.

TIAA-CREF, which provides retirement plans to more than 15,000 colleges, universities, schools, research centers, medical organizations, and other nonprofit institutions, **got leery and ditched subprime investments** by the end of 2006.

Yet former Salmon Brothers bond salesman and best-selling author Michael Lewis, for instance, reported this

Calculator: The cost of a stress test

In the wake of constant economic and market turmoil, not just financial firms are trying to set up systems to assess the risks their enterprises face. To calculate how much it will cost your firm to set up a “stress-testing” system, go to:

<http://whitepapers.zdnet.com/abstract.aspx?docid=917509>

Fall at Conde Nast's [Portfolio.com](#) that the forecasting models at Standard & Poor's, the ratings agency, could not predict the effect of housing price declines. The models could only accept numbers for housing prices that rose over time.

"This is where the game was on," said Rami Entin, a consultant with FRS Global, a Belgium-based provider of risk management and regulatory compliance software. "The ratings did not reflect reality. Garbage in, garbage out."

In fact, as the *New York Times* would later point out, firms such as Merrill Lynch or Lehman Brothers would look primarily at a measure that RiskMetrics turned into an industry standard known as Value at Risk. This is the amount of money or "value" in an individual, corporate, or collection of portfolios that a company can "worst case" expect to lose on "a bad day," as RiskMetrics' Mirsky puts it. The model judges such risk with either 95 percent or 99 percent confidence. However, it does not really scrutinize what should happen in an extreme case where that one percent or five percent probability event comes into play.

The result: The "value at risk" model does not assess what happens if a perfect storm—mortgagees with loans they can't afford, lax lending requirements, greedy banks, and ratings agencies asleep at the wheel—hits. "There really is

no rigor" on Wall Street in analyzing potentially paralyzing risk factors, argued Christopher Whalen, managing director of Institutional Risk Analysis, a consulting firm.

If a fundamental input—like the movement of housing prices—is wrong or missing, then ratings, lending practices, and subsequent investments are wrong. "Everything is wrong," Entin said.

Here's how a risk analysis system should (see infographic, "Testing for stress," on page 13 of this document) be able to predict default risks and assess the likelihood that different strips of collateralized debt obligations would falter.

In CDOs, hundreds or thousands of mortgages are pooled together and then assigned to different strips or "tranches" with different characteristics that institutions or investors can buy. Each tranche is rated on the likelihood of default, by ratings agencies such as Moody's or Standard & Poor's.

The job of the risk analysis system is to probe for vulnerabilities by applying "stresses" to the statistics that define each tranche. For instance, if there's a recession, borrowers could lose their jobs and default on mortgages. If economic times are good, mortgages could be paid off earlier than lenders expect. In either case, the risk analysis system should recalibrate default rates based on the variables.



The outcomes are often captured by algorithms that rely on random numbers to generate a picture of likely outcomes. So-called Monte Carlo simulations try to predict the roll of the die and assign probability to events. A single simulation could be run 10,000 times. Then summary statistics can predict the most and least likely outcomes and foreshadow the fallout.

But even such stress testing has limits: You don't test for the extreme event and the cascading events that follow. Why? It hasn't happened before. "You can stress test in Monte Carlo, all day

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Checks, balances and building lines of defense

By Tom Steinert-Threlkeld

At Goldman Sachs, no financial instrument goes unsupervised or escapes scrutiny.

Teams of people, such as those in Goldman's Structured Products Group, are assigned to every type of financial instrument the firm invests in on behalf of its clients and itself.

These teams' primary task in each case is to develop a "clear understanding of the risks" involved for an investment, according to Robert Arvanitis, a former managing director of Global New Derivatives at Merrill Lynch, an idea echoed by a top executive at a global supplier of risk analysis software.

These teams are crucial particularly if an investment firm is structuring products that are based on or "derived from," for instance, housing values and mortgages. Simply put, the teams are designed to see risks, identify them, and prevent Goldman from putting its reputation—or its clients—at risk.

Positions—and their limits—pass through a series of committees, acting as a system of checks and balances.

Trading desk managers are the first line of defense, responsible for acting within prescribed limits set by the committees in the Securities and Investment Management Divisions. These limits are set by committees after using various risk analysis techniques.

These techniques include stress tests and scenario analyses that try to assess up front what could go wrong with any significant position – such as putting billions of dollars into housing stock derivatives. The divisional committees also set limits on how much "value" the company can put at risk each trading day.

"You have to have that direct link," said David Rogers, global product marketing manager for risk at SAS, between the placing of bets and the technology that identifies risks and informs decision-making. "Without the right policy methodology elements in place, the technology is not going to work. If there is no mechanism to deliver that information to the rest of the organization, the information is lost," adds Rogers.

Here's a look at the various committees set up to defend Goldman against risk:

- ➔ A Firmwide Risk Committee reviews activities of trading businesses, sets overall risk limits and approves the entry into new businesses. This committee reviews scenario analyses that are based on abnormal or "catastrophic" market movements much like what happened in 2008 as the housing-related credit markets imploded.
- ➔ Divisional committees review trading at a more detailed level and set sublimits, subject to firmwide oversight.
- ➔ Credit risks are monitored by Goldman Sachs' Risk Department which sits within the Finance Division.
- ➔ Underwriting of bonds and bank loans is overseen by a Capital Committee.
- ➔ Underwriting of stock issues is overseen by a Commitments Committee.
- ➔ But information itself is not enough. Action, such as hedging risks with counter bets or softening them with demands for more collateral—more real estate—from "counterparties" is also essential.
- ➔ Decisions to unwind big positions are made by chief financial officer David Viniar and chief executive officer Lloyd Blankfein. ♦

“You have to look at the cross effects. If this (thing) fails, what is the domino effect?”

long. It's a lot of fun,” said Whalen. But, “risk is not about frequency (of events). It's about magnitude.”

This means that a scenario where one failure leads to another eludes risk analysis systems. “You have to look at the cross effects. If this (thing) fails, what is the domino effect?” said David Rogers, global product marketing manager for risk at SAS. The Cary, NC company is a supplier of software that helps financial companies evaluate and manage market risks.

One big problem in the current credit crisis is that there wasn't enough data collected on borrowers, loans, and their derivatives. “The truth is (the CDO's) weren't understood,” Rogers said.

Nor were the risks that could take them down.

The trick is to throw variables at the system that aren't highly likely, but could have devastating impact if they occur—and do it before your competition does.

Too long on housing

At the end of 2006, Goldman Sachs' top brass, such as Viniar, kept looking at the numbers generated by their stress testing and other models to recognize the impacts of falling housing prices.

They came to believe the company “was too long on the housing market” and began looking for ways to get a “less long position,” through hedging, according to media relations vice president Michael DuVally. Meanwhile, Bear Stearns and Citibank, throughout the first half of 2007,

were hell-bent on originating more subprime business, Rowe said.

Why Goldman was able to spot this was a combination of commitment to its mathematics and information systems and judgment. “Goldman guessed that housing prices were going to turn,” said the Fed's Willen. Other models clearly “yielded an error,” said Dennis Santiago, managing director with Institutional Risk Analytics.

The heart and brain of Goldman's risk identification and evaluation technology is SecDB, an enterprise-wide database and pricing system built in-house. Using SecDB, Goldman can and did model the effects of different extreme economic circumstances on an estimated \$10 billion worth of CDOs it held as well as other investments. This helped the company calculate what its exposure to bad tranches with higher-than-expected default rates might be, according to parties who watch how the company manages its investment positions.

The scenario-spinning can be stunning, in the aggregate. SecDB “enables us to take virtually every position we have in the firm and revalue them thousands of times every night under all sorts of different extreme scenarios to work out what sorts of risk we have,” Robert A. Berry, a partner and head of Goldman's Market Risk Management told *Risk* magazine.

Identifying “risk buckets”

But figuring that mortgage-based securities might crater is not just a matter of calculating the probabilities of default. Most systems are “set up to ignore the catastrophic possibilities,” said Santiago.

SecDB , which is used to evaluate risks in everything from currency and commodities trading to stocks and bonds, does not ignore potential catastrophes nor is it the only tool Goldman uses. The company also has built up relational databases that help it assess who it is doing business with and allow it to act on dangers quickly. The company also maintains systematic sets of checks and balances in its own organizational structure to limit risks (see “Checks, balances and building lines of defense,” page 7). “Other companies don’t have the same level of commitment,” said Ellis, the author of a history of Goldman Sachs.

Decisions to unwind big positions end up in the hands of CFO Viniar and now-CEO Blankfein. And the trick is to get product teams to sell without arousing suspicion of trading parties, experts such as Arvanitis said.

If, for instance, you knew in the spring of 2007 that Goldman Sachs was getting out of CDOs and you were still buying, or dancing, as soon-to-be-ousted Citigroup chief Charles Prince, put it—you might think twice. **Merrill Lynch made the mistake of buying when Goldman was selling**, and its chief executive at the time, Stanley O’Neal, was ousted, Arvanitis noted.

Goldman Sachs monitors and controls what Santiago calls its “risk buckets” through a variety of financial, credit, operational, compliance and legal reporting systems.

Executives rely on three databases to help identify where risks might lie with its counterparties. The Product Master database keeps track of every security sold; the Account Master keeps track of each individual or corporate customer served; and an Entity Master database ties the two together in a search for potentially hidden risks.

You don’t want to get involved with parties whose strength you can’t judge, Sungard’s Rowe asserts.



The Entity Master, developed in the 1990s, was designed to keep track of who owns what. Goldman Sachs, in a bid to break into United Kingdom markets, had picked up, as a breakthrough client, of sorts, the British newspaper mogul, Robert Maxwell.

But Maxwell was famous for moving money around scores of “entities” he controlled, trying to keep one step ahead of regulators and business partners, such as Goldman. By moving money around, Maxwell could use collateral more than once.

On the brink of being forced to pay back a large debt to Goldman Sachs, racking up \$2.8 billion in bank loans he couldn’t afford, and plundering a couple of public companies he managed, Maxwell was found lifeless and nude off the Canary Islands in late 1991, according to an account in *The Partnership*, by Ellis. Maxwell’s empire quickly dissolved.

As a result of the kinds of risks embodied by the Maxwell saga, Goldman Sachs created its Entity Master database.

You have to rate the creditworthiness of the parties you do business with in order to rate your own exposures,

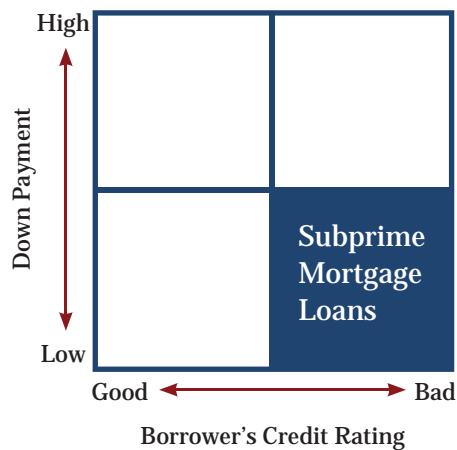
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Testing for stress

Here's how you look at the effects of extreme events on the securities you hold on behalf of clients or on your own account, if you're an investment firm such as Goldman Sachs. The abnormal effects of "stressful" events such as the 9/11 terror attacks or four quarters of decline in the United States' domestic output are run against key indicators of the performance of the securities. In this case, that is the default rate on different levels of securities derived from the payouts on home mortgages. This model was constructed with the supervision and input of Dr. Robert M. Mark, executive director of the master's program in financial engineering at the University of California at Los Angeles, chief executive officer of the financial consultancy Black Diamond Risk and co-author of "Essentials of Risk Management."

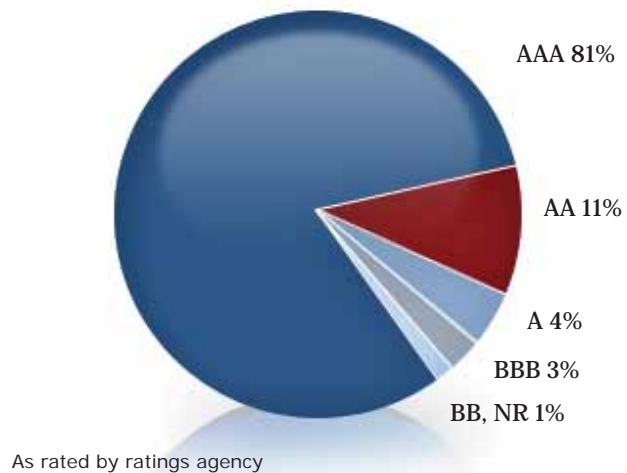
1. Into the Pool

Creditors who have low credit ratings and put little or nothing down on their mortgages constitute the "subprime" mortgagee pool.



2. Getting Rated

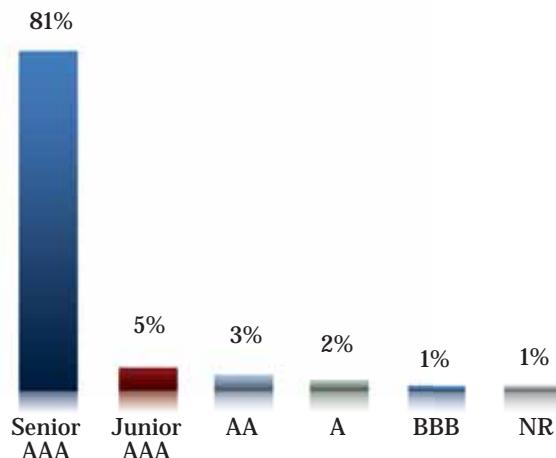
Their mortgages get rated.



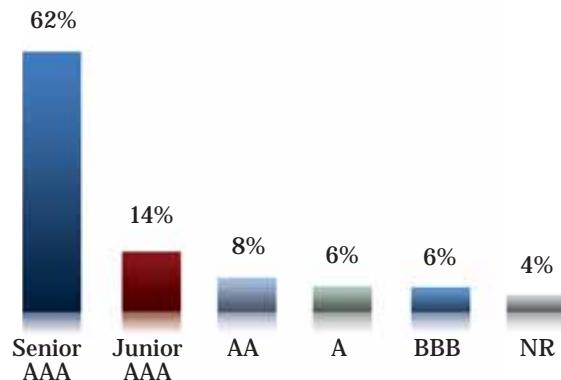
3. Splitting Up

Then split into small pools, aka "tranches," of "collateralized debt obligations."

High Grade CDO



Mid Grade CDO

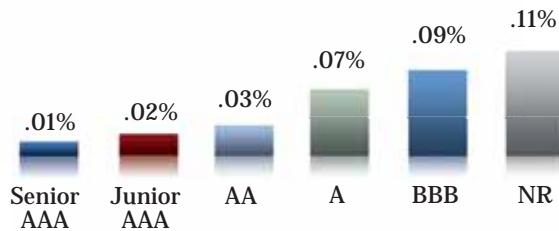


4. Profiling

Which, under normal circumstances, have a particular “default” profile.

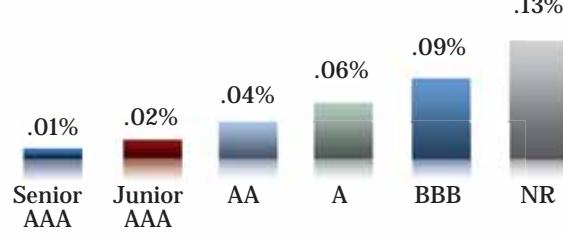
High Grade CDO:

Expected Rate of Default



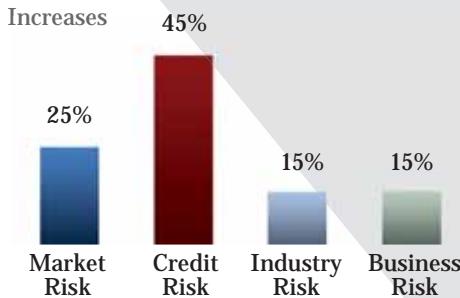
Mid Grade CDO

Expected Rate of Default



5. THE TEST

But which, when stressed, might lead to a greater rate of default.



Stress Test:

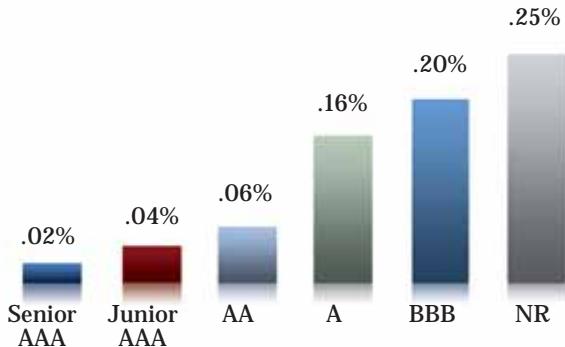
Four quarters in a row of contraction in the gross domestic product

6. The Result

Here, projected default rates go up. Yields: 150% higher defaults on mid-grade CDOs, 100% on high grade CDOs, roughly.

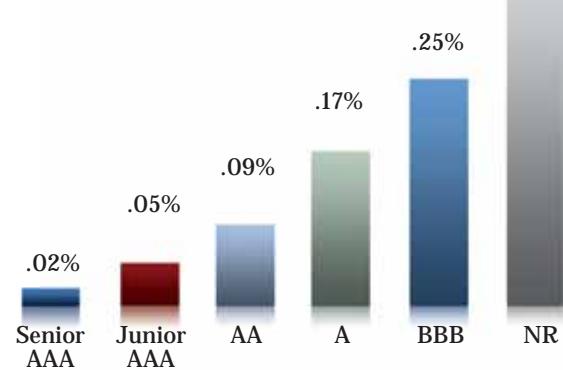
High Grade CDO:

Expected Rate of Default



Mid Grade CDO

Expected Rate of Default



7. Recovery

But exposure is reduced by recovery rate, which means that a \$100,000 loss can be reduced to \$50,000, if the asset is sold for one-half of the value it was given.

Ratings of the debt obligation change over time, based on the actual default and recovery rates. ♦

SOURCES: UBS Securities “Risk Profile of Subprime Mortgages,” Black Diamond Risk Enterprises, ZDNet research. Numbers are examples and results are directionally accurate.

"Nobody wants to be the dentist of the financial services industry."

said FRS Global's Entin. It's not enough to know what the "value at risk"—how much you're exposed—is, but how big the risk is that the person or "entity" you're doing business with goes away.

The idea of EMMA, or the Entity Master Management Application, was to allow Goldman Sachs to see "connected counterparty risk," said corporate art consultant Valerie Cooper of Stamford, CT, who led the development project for Goldman in the 1990s.

The goal was to be able to see who the company was developing a relationship with – and whether decisions might be made by a party you didn't know about. At one point, it took Scotland Yard detectives to do comprehensive background checks on companies, Cooper recalled.

Disbelief, in concert

The worst financial firestorm since the Second World War is due not to the lack of ability to assess risk by securities firms but a "collective suspension of disbelief" about the quality of the underlying assets, Entin said.

In fact, that "suspension of belief" may well have contributed to the problem. If you are a trader, responsible for getting the highest possible return for your employer, you are more likely to trade securities that have low likelihoods of high-impact risks, said Rowe. Think the one or five percent slice and higher returns than the norm.

Meanwhile, memories are short and conflict avoidance long on Wall Street. The average financial services career

lasts only 15 or 20 years—making it easy to forget the lessons of the savings-and-loan debacle of the 1980s.

Saying "no" is not part of the typical process of managing risk. "Nobody wants to be the dentist of the financial services industry," said Arvanitis. "Risk managers aren't compensated nearly well enough to go up against the guy with the commission who is saying, 'go!'"

But Goldman did not succumb. The firm is obsessive about analyzing and counteracting risk, noted Ellis, not just relying on models.

"Gerry Corrigan is no more able to model risk than I am," said Whalen. "And I rate banks."

Viniar and DuVally would repeatedly note that besides scrutinizing its capital commitments, inspecting the relationships it established, and recording the background exhaustively, Goldman would "hedge and collateralize" its vast positions in CDOs and credit default swaps as the subprime crisis led to the end of independent investment banks.

Goldman, as DuVally notes, is not perfect. A hedge fund it launched in January 2008 that was supposed to pick stocks and other investments based on human judgment rather than computer models, lost \$989 million in the first nine months of the year. The company's trading revenue has plunged from nearly \$30 billion in 2008, to a negative number by the end of last year. And Goldman lost \$2.1 billion overall in the fourth quarter, its first quarterly loss since going public in 1999.

But Goldman survived the credit crisis that defined 2008, albeit as a commercial bank holding company. Today, Goldman feeds off of deposits, in addition to engaging in its historical businesses in investment banking, securities trading and money management. Goldman's survival was a testament to its ability to test and retest its financial assumptions, quickly respond, and find other buyers for bad obligations when others wrote off low-probability events such as a national housing price decline and its domino effects, said Santiago.

Goldman tries to ingrain the process of risk hunting and retesting assumptions. "It's almost like windsprints at the end of football practice," said Ellis as 2008 wound down. "The other guys look at you and say 'why are you doing that?,' when practice is already done. But you do it because you think it gives you a little something extra, when it counts."

In addition, an ability and willingness to communicate findings and fears about risk is also critical, said Rogers and Ellis. On any given day in 2007, as the subprime crisis unfolded, Goldman figured with 95 percent confidence that it could lose \$138 million. That was the "value at risk" on a bad day.

And that sum was double the \$70 million at risk each day in 2005. That fact doubled the importance of vigilance—and talking about it. The Goldman culture of communicating findings up and down among "partners" is where the company sets itself apart, Rogers and Ellis said.

Information, in Rogers' phrase, does not get lost.

Making connections

But information itself is not enough. Action, such as hedging risks with counter bets or softening them with demands for more collateral—more real estate—from "counterparties" is also essential.

The "hedging and collateralizing" came into play in helping Goldman seal itself off from the implosion of AIG, the huge insurer which had to be bailed out by the federal

government when the housing collapse meant it had to pay out on its credit default swaps. In those swaps, AIG agreed to take on the risk of subprime mortgages when borrowers defaulted. Parties such as Goldman, who paid for the swaps, in effect, were insured against rising default rates.

In October, the *New York Times* would report that Goldman Sachs was exposed to the tune of \$20 billion, at the time of AIG's near-collapse. Goldman called its exposure "immaterial," due to its hedging and ability to demand more collateral. The fact that AIG, over the course of one weekend, was kept afloat, was seen as indicative of one other distinctive characteristic of Goldman's edge—its political connections. Goldman has typically relied on well-placed eyes and ears. E. Gerald Corrigan, Chairman of Goldman's Counterparty Risk Management Policy Group, served as president of the Federal Reserve Bank of New York from 1985 until 1993. Former CEO Henry Paulson is now Treasury Secretary. And former chief operating officer Thain went on to become chief of the New York Stock Exchange and then Merrill Lynch, now a part of Bank of America.

"Goldman is a lobbying firm, Goldman is a political intelligence firm, as much as it is (an investment) dealer," Whalen said.

Call it coincidence, but AIG managed to come up with \$20 billion in September, to shore up its promises to pay its "counterparties" for credit defaults. Gov. David Paterson allowed state insurance superintendent Eric Dinallo to relax rules and allow AIG to borrow that amount from insurance subsidiaries which had nothing to do with backing up risks taken by AIG's Wall Street customers.

Shortly thereafter, AIG got a \$150 billion rescue package from the U.S. government to prevent its collapse. Making the call to bail out AIG: Treasury Secretary Paulson, the former chief executive of Goldman Sachs.

"I find it very foresighted of Goldman to have a treasury secretary of their own," said Arvanitis. "And to be in a position to be able to say: This is going to destroy the markets."

Without the AIG bailout, “they’d be gone,” said John R. Talbott, a former Goldman Sachs banker and author of *Obamanomics: How Bottom-Up Economic Prosperity Will Replace Trickle-Down Economics* (2008, Consortium Book Sales).

It’s that “foresight” that is indicative of Goldman’s analyses of risk. “Goldman did a better job of insulating itself,” Willen of the Fed in Boston said.

Arvanitis, in fact, believes that Goldman was ready to file papers to be transformed into a bank holding company long before it came on the radar of federal regulators. Blankfein, he noted, had made a comment months earlier that he was “not sure deposit-funding would be that valuable to us.” The message: Goldman was thinking about it, nonetheless.

Not that Goldman escaped unscathed. The company’s total revenue was just \$3.7 billion in its final quarter of 2008, down from \$13.6 billion in the prior quarter and \$21.5 billion a year earlier. The biggest drag: Its principal investments and trading pulled down revenue by \$4.5 billion.

“We didn’t get everything right, and there are more than a few decisions we’d like to take back,” Blankfein would tell attendees in November at a Merrill Lynch financial services conference.

But the company had continued to sidestep the risks that had consumed so many of its long-time rivals, from Bear Stearns to Citigroup. A benchmark of its risk, for instance, is how heavily the company is “levered”—its debt obligations compared to the amount of capital its shareholders put into the company. Its leverage, Blankfein noted, had fallen from 2.5 times its shareholders’ stake at the end of 2007, to less than 1, by the end of the third quarter of 2008.

“On a relative basis, we are pleased with where we are today,” he said.

Black Swans, golden guts

The essential skill is not to rely just on models and stress testing, but to steer clear of “exposures” to risk. In the end, it takes a willingness to think through what the numbers in an analysis or simulation might portend.

In the case of Goldman Sachs, “they try their what-if scenarios and say if this all went to hell, what would we do? Where’s our second ditch, our third ditch? What do we fall back to? They think about things like that,” Arvanitis said.

In the end, such thinking is all that may matter, said Talbott, the former Goldman Sachs banker and author of *The Coming Crash in the Housing Market: 10 Things You Can Do Now to Protect Your Most Valuable Investment* (McGraw-Hill, 2003).

“If I were the risk manager for Citibank, there are a hundred businesses, there are a thousand securities, and they’re in 120 countries. It’s something like a million different problems, right?” he said. “One guy can’t tell me what the risks of each of those different businesses are. That’s why you hire good businessmen to run each of those (businesses). Because they know.”

If the gold standard in risk analysis is Goldman Sachs, its system in a sense can be traced back to its “golden gut” feel and its willingness to look for something wrong and model the outcome. Somebody at the top “had to recognize the problem and that it was time to do something about it,” Rowe said.

“We don’t have artificial intelligence (that allows) the computer to step outside a problem and ask the questions what if, why, what causes this and what could go wrong,” Talbott said. “I haven’t seen that computer yet.” ♦

About the author: Tom Steinert-Threlkeld is a journalist who has looked at what media could become, rather than what it currently constitutes. Most recently, he served as editorial director of Broadcasting and Cable as well as Multichannel News magazines for Reed Business Information. Prior to Reed, he was vice president of the Enterprise Group of Ziff Davis Media, where he founded Baseline magazine and within four years made it a National Magazine Awards finalist for General Excellence. He also was the editor in chief of Inter@ctive Week.

CXO CHECKLISTS

What You Should Ask About: Risk Analysis Systems

If you're a CIO:

- ✓ What kind of infrastructure do you have in place already?
- ✓ What will the new requirements be?
- ✓ How complex will they be?
- ✓ How long do I need to analyze what I need?
- ✓ How much time do I have before I have to make a decision?
- ✓ Can I build upon a system in place or recently obtained through an acquisition?
- ✓ Is the vendor showing me screens about how the system will work, or is it actually a process?
- ✓ Can I run a proof that it works, using actual in-house data?
- ✓ Does the data need to be in a certain form?
- ✓ Do I actually have the data that is required?
- ✓ What does each piece of data actually mean?
- ✓ If the data is a date, what is the meaning of that date? Is it a start date? An ending date? A reset date? What?
- ✓ How do I know the data is reliable?

If you're a CRO (Chief Risk Officer):

- ✓ What will be the key indicators of risk?
- ✓ What extreme scenarios of possible events do I want to run?
- ✓ What data will I have to gather?
- ✓ What calculations will I be driving?
- ✓ What will regulators want to know?
- ✓ Do the indicators need to be "real time"? Or will end of day suffice?
- ✓ How easy will it be to show or prove how the numbers got created?

SOURCE: SAS Institute

If you're a CFO:

- ✓ What will it cost to maintain and operate the system, once in place?
- ✓ What kind of data-gathering organization and systems will we need?
- ✓ Do I have to invest in expert knowledge to define the need?
- ✓ Do I need to invest in experts to maintain the system?
- ✓ What will tell me where losses might occur?
- ✓ What will tell me where to invest money?
- ✓ What will be the daily measures of risk?
- ✓ What will be the long-term measures of risk?
- ✓ How do I adjust the return on capital for risk?
- ✓ Will it tell me where losses might occur?
- ✓ What will accounting rules require?

If you're a CEO:

- ✓ What red flags do I want?
- ✓ What views of these do I want?
 - By entire company's holdings?
 - By divisional operation?
 - By trading desk?
 - By trader?
- ✓ Do I want breakouts?
 - Performance and risk per portfolio, best and worst?
 - Performance and risk per customer, best and worst?
 - Performance and risk by agent, best and worst?
- ✓ What are the key risk indicators I want to track? Mortgage values? What else?
- ✓ How will I know what I am actually earning money on?
- ✓ What will my customers want to know? ♦