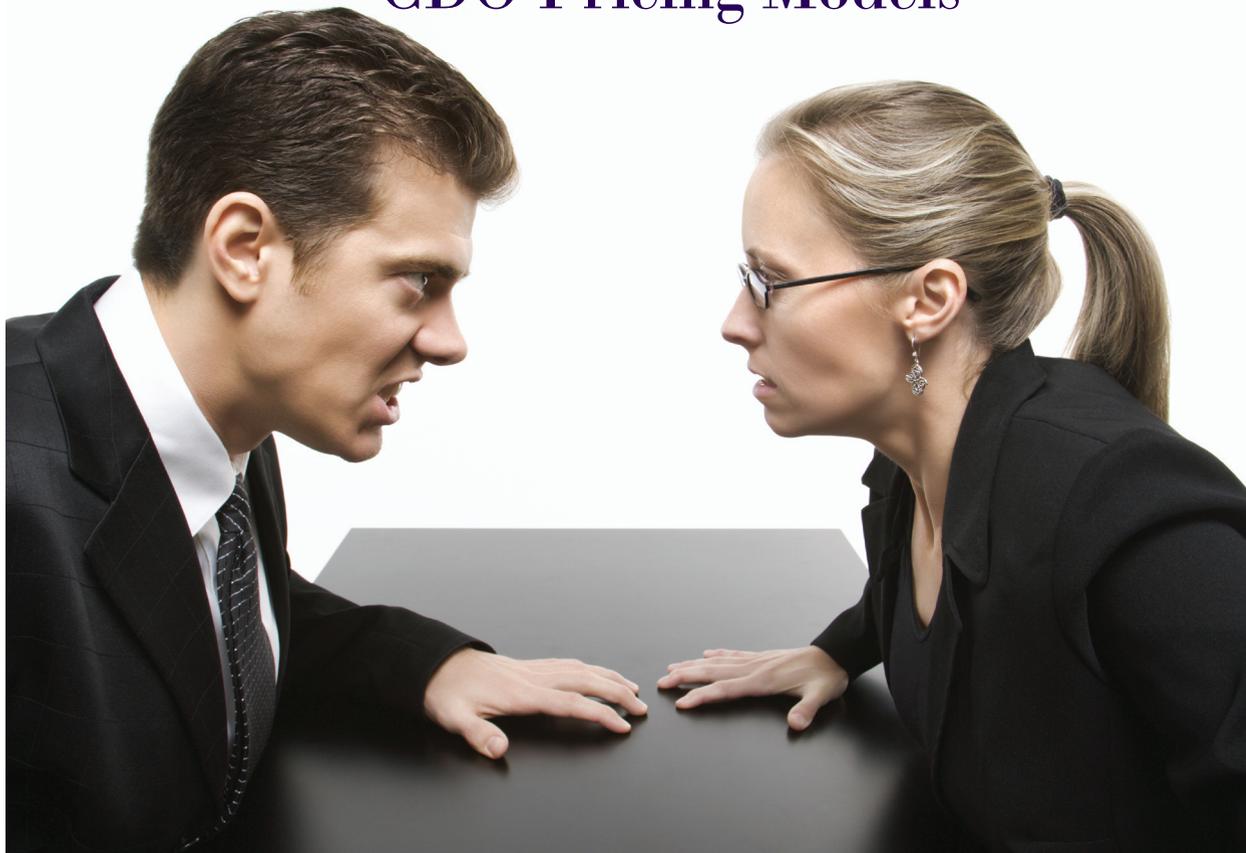


Proposed Fixes to the CDO Pricing Models



BY ANDRE HOROVITZ

FINANCE PROFESSIONALS ARE notorious for disagreeing even on seemingly uncontroversial points. So it is striking that this single message is emerging from all corners of the world's financial system: We're experiencing the strongest storm to financial stability since the Great Depression.

Debates about what ignited the instability have become worldwide. In living rooms and government offices, people are arguing about what was the primary torch. Some say it was:

1. Financial over-engineering by some institutions in an effort to enhance profits.
2. U.S. lenders' lax credit-approval policies in regard to subprime borrowers, supported by stable low interest rates, ever-rising real estate prices, and the ability to "sell away" virtually any undesired risks with no repercussions to the provision accounts.

3. A myopic rating review of credit-enhanced tranches of collateralized debt obligations (CDOs) by the major rating agencies.

4. All of the above.

Let's take a quick, albeit simplified, look at the mechanics of the CDO markets.

Originally, banks pooled loans collateralized by all kinds of receivables—not the least of which were residential mortgages (an enormous market in the United States). They typically tranced these heterogeneous mortgages into three categories or variations thereof:

1. *Equity or junior/high-yield/junk*—Typically non-investment-grade rated, these tranches yielded the highest returns against the accumulation of first losses up to a predetermined threshold. They were either kept on banks' balance sheets or sold to speculative investors such as hedge funds.

2. *Senior or super-senior*—These AAA-rated tranches offered the lowest yields, yet higher than the equivalently rated corporate bonds of the same tenor. They were often secured by a credit enhancement facility. These securities were capable of achieving such high credit ratings because defaults were first crowding the junior and then the “less senior” tranches as they occurred. The typical investors were insurance companies, money market funds, and pension funds, attracted by the comparatively higher yields at very secure credit ratings as guaranteed by the “independent” rating agencies.
3. *Mezzanine*—These middle tranches had ratings that ranged from AA to BBB, and banks often traded them among themselves.

As banks accumulated more of these mezzanine tranches, they created special vehicles off their balance sheets—called *conduits*.¹ These conduits were owned only 49% by the banks that originated them, thus circumventing the need to consolidate the assets on their balance sheets. The banks sold the rest to other equity participants such as mutual funds, re-insurers, and other banks. Investment banks were often retained to operate the conduits as trustees for the fair distribution of losses. The conduits invested typically in long-term, mostly mezzanine CDO tranches and refinanced themselves with commercial paper, three to six months in tenor, rarely up to one year, on a revolving basis. The yield differential at large notional levels created handsome profits with virtually no equity for the contributing conduit owners. No wonder that the state of Saxony in Germany, through its vehicle *Sachsen Landesbank*, invested in several conduits of this kind in an effort to fill the state’s coffers.

To sell these conduits or special investment vehicles, banks often had to provide guarantees (capitalized with the 8% BIS rule) and liquidity facilities in the expectation that they would never be accessed. But they were accessed, and that triggered the liquidity crisis in the second half of 2007.

Adding yet another degree of convolution, banks started accumulating various asset-backed securities (ABSs) and even mezzanine tranches of CDOs, which got further tranced into senior, mezzanine, and junior secondary tranches (the latter sorts are called “CDO squared” in the structured credit jargon). Then, using complex mathematical models, they convinced rating agencies that these CDOs (or their variations) were worth the ratings given. Investors were then given the choice of instruments ranging in structural complexity from plain-vanilla bonds and debentures to structured notes to tranches of CDOs collateralized by pools of loans or ABSs (such as securitized mortgages) to

tranches of CDOs collateralized by...other CDOs! They were all rated the same by the same rating agency, suggesting the same degree of default risk.

It is true that the few tranches that traded in the secondary markets (most were highly illiquid) were trading at spreads higher than the original CDOs and/or the benchmark bonds. The reason given for this was the “liquidity premium,” since a AA rating assigned by Standard and Poor’s or Moody’s suggested that the securities would have to be identical in terms of both default and transition—that is, migration to a different rating within one year.

If we have learned one thing over the past few months, it is that this last paradigm has failed miserably. The question is, why?

Many have questioned the independence of the rating agencies. By 2006, they derived over half of their revenues from rating complex tranches for their clients—the banks—which owned and/or operated the special investment vehicles or conduits. In many cases, the rating agencies provided consulting services to banks (mostly via ring-fenced subsidiaries), counseling them on how to structure the collateralized tranches in order to receive the desired AAA ratings. Those tranches were stamped for additional ratings-related fees by the same agencies. Rating agencies are now working overtime to downgrade to junk billions of dollars of CDO tranches, some of which they rated AAA as recently as the beginning of the year.

Such developments could inspire a sequel to the 1987 film *Wall Street*, conspicuously filled with conflicts of interest and occasionally pointing to conspiracy theories (picture Michael Douglas, in his 60s now, as Gordon Gekko, in the role of a senior rating agency executive). Clearly, some significant improvements to the rating models, be they agency owned or internal to banks, are urgently needed.

Roger Ferguson, currently on the executive committee of Swiss Re and a former Federal Reserve Board Governor who worked with Alan Greenspan, is calling for a new rating standard for structured credits that is completely different from the one for corporate bonds. “It would be more helpful for rating agencies to provide ranges of uncertainty around punctual ratings for structured products,” said Ferguson in an interview with the German business daily *Handelsblatt* on December 7, 2007.

What would these improvements have to look like to regain credibility with the investor community? Most traded credit-risk securities entail a relative discount to the homologous non-credit-risk instruments. They quantify the likelihood of default during the holding period or the migration to a worse rating on a net-present-value basis. Their securitized cousins, on the other

hand, entail an additional component of risk. We'll call it *structural risk*.

This structural risk, inherent in the tranches and related to the pool of loans collateralizing the security, determines the migration probability of default (or states thereof). The driving force is the migration velocity, the speed with which the prices of securitized tranches change once certain levels of default in the collateral pool are occurring. Consequently, it is natural for the migration velocity of a CDO tranche collateralized by a pool of mezzanine CDOs to be inherently higher (all other things being equal) than that of a tranche collateralized by a pool of residential mortgages. It is analogous to the gamma profile of a compound option relative to a vanilla option.

Most hazard rate (intensity-based) credit models in use, including the ones used to date in pricing CDOs,² are driven and parameterized by the default rate or migration, either through jump-diffusion processes or processes encompassing correlated default/migration events (via copulas).

What's needed is the expansion of such models to make them more dynamic, yet still realistic, and the driving processes velocity based. A complete model framework and a parameterization of such models are beyond the scope of this article, but it's not too soon to trigger the impulse of model development in such a direction. ❖

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Notes

1. The now famous *structured investment vehicles* (SIVs) are similar to conduits, just more leveraged with bank loans at low rates, thus enhancing returns for equity holders.
2. See Arnaud de Servigny and Norbert Jobst, "The Handbook of Structured Finance," published by McGraw-Hill, January 2007, and also Darrell Duffie and Kenneth J. Singleton, "Credit Risk: Pricing, Measurement, and Management," published by Princeton University Press, January 2003.