

# **D** THE JOURNAL OF **DERIVATIVES**

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A year ago, our big question was where the volatility was: The business section of the newspaper did not seem to be reading the front page. Well, the two are back in sync. Now it seems that the front page is taking its cue from the financial markets, which are worrying that the economy appears to be tiptoeing along the edge of an economic crisis that could rival the 1930s. Is there a silver lining to be detected somewhere? Maybe. For a true believer in the value of derivatives, a small amount of comfort can be taken from the fact that even though tranches of CDOs backed by pools of subprime mortgages are plainly derivatives, the news media has not officially branded the current crisis as “another derivatives disaster.” Viewed from the historical perspective, the problems with CDOs that have become so apparent recently are actually a pretty normal development when an important new type of derivative instrument is introduced. When credit default swaps were launched, it took some experience with the new product before the market became aware that restructuring would create difficulties and the original contract design needed to be modified (and then modified again for European names). In the 1980s, glitches in plain vanilla interest rate swaps were common, until standardized documentation was introduced for swap contracts. And so on. The silver lining in the current CDO blowup, then, may be that it reveals the weaknesses in the system and points the direction toward improving this major new class of derivatives.

Appropriately, the lead article in this issue of the Journal of Derivatives is on CDO pricing. Because defaults are rare (so far, at least), historical data only provides limited information to estimate the loss distribution in a credit portfolio, or even to judge how well a given model specification is likely to work. For example, the industry-standard Gaussian copula model has a hard time producing enough default correlation to match market prices for supersenior tranches, and the need for consistency in default risk and default correlation across the term structure of CDO maturities does not enter the model at all. Hull and White offer a way forward with a new dynamic specification for default intensities that addresses both issues. Our second article also presents an innovative solution to a difficult estimation problem: valuing options with path-dependent

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payoffs and American exercise within a Monte Carlo simulation. The trick is to run time backward. “Starting” with the desired terminal probability distribution for the underlying, simulation paths for the model are generated leading from expiration day back to the present. This allows a great reduction in the amount of computer memory needed to deal with the early exercise decision, and a major increase in computational efficiency.

The next two articles produce closed-form valuation equations for problems that, at first glance, would not seem to be amenable to them. In the first article, Vitiello and Poon revisit option valuation in discrete time. It has been known for about 30 years that there are a few combinations of a returns distribution and a utility function that produce a convenient closed-form risk neutral option pricing relationship even with no continuous rebalancing. Lognormal returns under constant relative risk aversion—leading to the Black-Scholes equation—is the most plausible pair for the real world. But that is obviously rather restrictive (and option prices in the market do not obey canonical Black-Scholes). Here the authors posit a returns distribution that can be written as a mixture of “g distributions” (which are general probability distributions based on the Gaussian) and they derive the matching pricing kernel needed to obtain a closed-form risk neutral pricing equation. In the following article, Wong and Lau obtain a closed-form valuation equation for the turbo call warrant, a kind of exotic option featuring a complicated barrier.

The final article in this issue steps away from derivatives mathematics to examine an important legal/regulatory issue. The article describes the “Son of BOSS” strategy, the (most recent) latest and greatest scheme using derivatives for tax avoidance. As Tucker shows, the strategy appears to satisfy the letter of the law while turning an essentially riskless derivatives position into a large tax loss with no offsetting taxable gain. But appearances are not enough when the IRS can persuade the courts that there is no economic purpose to the trade except for its tax properties.

Having pointed to improvement in the design of future CDOs as the possible silver lining in the current financial discomfort, we continue to keep our fingers crossed and to wish Ben Bernanke and the Fed success in their efforts to keep us away from the abyss and firmly on the path to better credit derivatives.

**Stephen Figlewski**  
**Editor**