The dangers of complexity

The dramatic financial market changes of the past 20 years have introduced daunting complexity into the system. Much of this complexity is the necessary consequence of valuable innovations. David Rowe argues, however, that complexity for its own sake is dangerous

Complaints about complexity are hardly new, nor are they without foundation in fact. Since the dawn of the Industrial Revolution, the world has become progressively more complicated. While such complexity causes a degree of discomfort and frustration for everyone, most of us believe these negatives are far outweighed by the associated comforts and conveniences that technological advance makes possible. This familiar phenomenon can be observed in the evolution of financial derivatives. Despite daunting complexity that has hampered broad public understanding, financial derivatives play a significant positive role in diversifying risk and shifting it, at a cost, from those less able to bear it to those more able and willing to do so.

Nor are only the basic forms of derivatives contracts socially useful. Over four years ago, I entitled a column in this series *In Defence of Exotics* (*Risk* September 2000, page 105). My main point at that time was that many options that are more difficult to price and hedge than traditional European-style puts and calls arise from specific end-user requirements. Examples of these are such structures as knock-out and average rate options that introduce path dependency.

That said, while complexity is often a necessary byproduct of beneficial advances, it is not a good thing in and of itself. Unnecessary complexity demands time and resources for training just to stay current with unfolding innovations. More insidiously, however, complexity can be a tool for the highly sophisticated to take advantage of those less knowledgeable, either consciously or inadvertently. This is largely what transpired in the interest rate derivatives market in the early 1990s.

In one of the most infamous cases, Bankers Trust entered into a swap with Gibson Greeting Cards in which Gibson received a then above-market fixed rate of 5.5% while paying Libor-squared divided by 6%. In this transaction, net payments remain in favour of Gibson for Libor up to almost 5.75%.[1] Beyond this point, however, losses mount rapidly since increases in Libor soon cause the floating-leg payments to rise more than twice as fast as the increase in payments on a simple Libor leg.[2] The question that must be asked of such a structure is what rationale does it have other than to hide the risk, which justifies a higher fixed rate, behind a haze of complexity.

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History rhymes

America's favourite folk philosopher, Mark Twain, is often quoted to the effect that: "History doesn't repeat itself... but it does rhyme." Perhaps one of the few benefits of growing older is an improved ear for the rhyme of history. Lately I have sensed some poetic consistency between events in the collateralised debt obligation (CDO) market and those in the swap market more than a decade ago.

Credit risk management has been revolutionised in the past 20 years. In the mid-1980s, it was characterised by painstaking micro-analysis and careful underwriting of new credit extensions. The development of credit derivatives and CDOs introduced a stiff dose of market discipline into this field. For the most part, this has made a valuable contribution to improving credit risk management. Financial institutions that were held captive by the industry concentrations of their home markets can diversify effectively in ways that were previously impossible.

CDOs structured with tiered loss tranches have attracted a variety of investors with a wide range of risk/reward profiles into the debt markets. Everyone understands that default correlation is central to the distribution of total credit losses in a CDO. Nevertheless, the casual, even simplistic, manner in which correlation is treated in quoting prices for these instruments should give one pause. Rather than building on the characteristics of the actual underlying instruments in a portfolio, each tranche is priced on the basis of one pair-wise correlation across all names. Not only that, but the single common correlation used for all names is different for different tranches, leading to what is known as the correlation smile. Introducing a fat-tailed multivariate distribution of default drivers, instead of the usual assumption of a multivariate normal distribution, can reduce this anomaly.[3] Nevertheless, the very assumption of a single constant default correlation across all pairs of underlying names is a simplification of dramatic proportions.

Despite the obviously weak foundation for treating default correlation in the pricing of CDOs, the market is beginning to introduce even greater complexity. In the past two years, a number of CDO-squared structures have come to market. These are compound structures where the tranches of a CDO-squared are composed of tranches of simple CDOs or mixed pools of such tranches. In a December 2003 report, Standard & Poor's said: "These transactions have become very popular as market participants seek to compensate for tightening investment-grade spreads." In August 2004, *Credit* magazine cited yield enhancement from 5 basis points for triple-A tranches to as much as 75bp for triple-B tranches. Now there is talk of CDO-cubed structures where the tranches are composed of tranches of a CDO-squared. Reaching for higher yield by accepting greater complexity and less transparency... it sure begins to sound like what that other American folk philosopher, Yogi Berra, called "déjà vu all over again". ■

[1] The effective breakeven point on this swap is Libor of 5.7445 because (5.7445²)/6 = 5.49988
[2] The incremental increase in the effective floating rate is the change in Libor times Libor/3
[3] A summary of relevant recent work by John Hull and Alan White can be found at www.risk.sungard.com/creditrisktoronto/PrmiaPresentation.pdf