DEVIL in the DETAILS

Derivatives' valuations: assessing alternative methodologies

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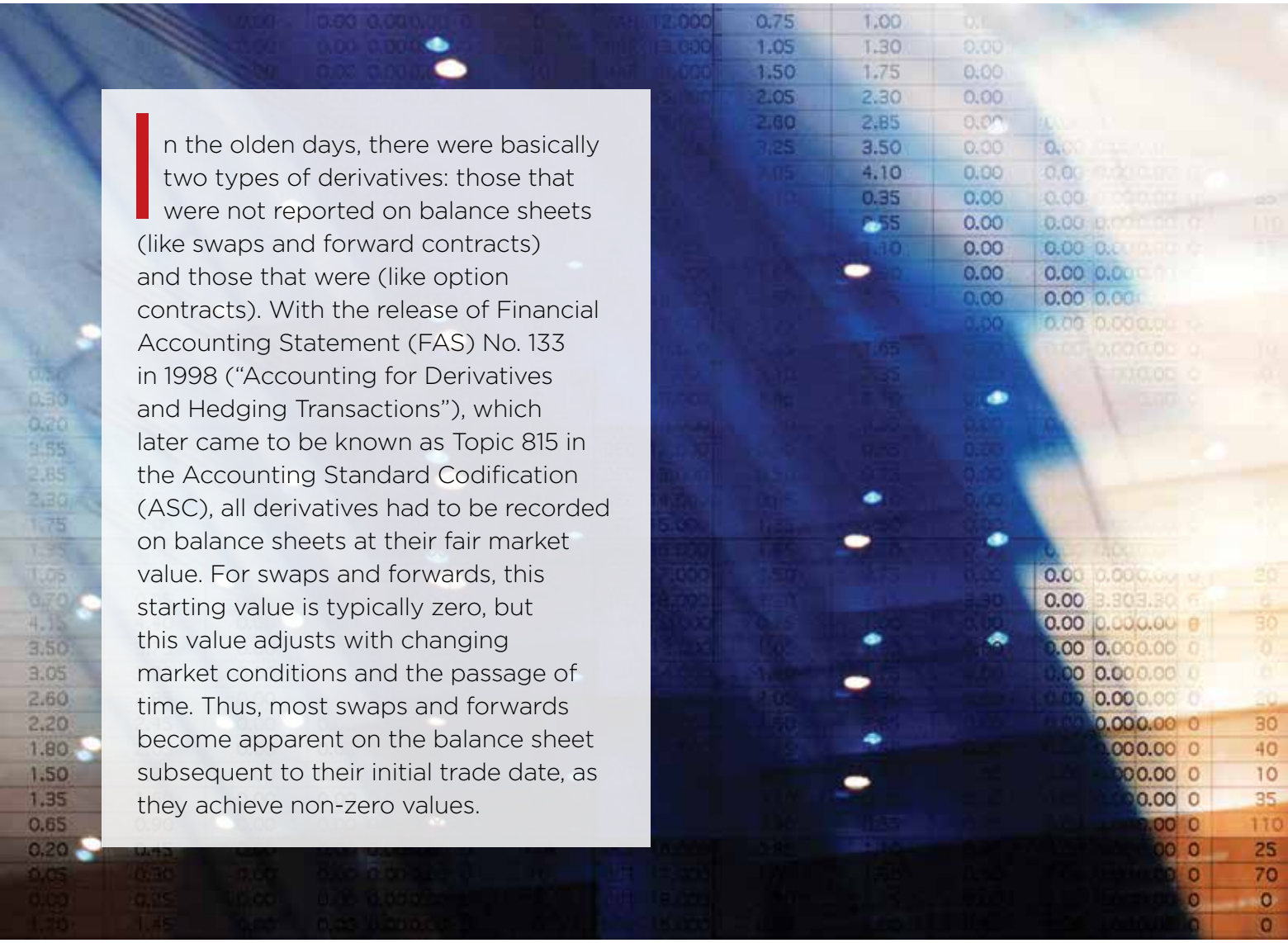

In the olden days, there were basically two types of derivatives: those that were not reported on balance sheets (like swaps and forward contracts) and those that were (like option contracts). With the release of Financial Accounting Statement (FAS) No. 133 in 1998 ("Accounting for Derivatives and Hedging Transactions"), which later came to be known as Topic 815 in the Accounting Standard Codification (ASC), all derivatives had to be recorded on balance sheets at their fair market value. For swaps and forwards, this starting value is typically zero, but this value adjusts with changing market conditions and the passage of time. Thus, most swaps and forwards become apparent on the balance sheet subsequent to their initial trade date, as they achieve non-zero values.

Prior to FAS 133, many holders of these kinds of derivatives didn't necessarily worry about the value of these derivatives, as long as they had confidence that they would perform as advertised, e.g., that swaps would convert future cash flows from fixed to floating or vice versa, and that forwards would lock in prospective prices. In any case, the new accounting rules forced derivatives users to report the market values of these derivatives on the balance sheet, for the first time.

The idea of valuing a derivative is reasonably straightforward, but the devil is in the details. The first concern is the notion of fair value. In fact, it's harder to agree on what this term means than you might think, in that value is really in the eye of the beholder. Some are willing to pay higher prices than others for the same good or commodity, so what's fair to one might not be fair to another. Clearly, for balance sheet presentation purposes, FASB doesn't want us to think about fair value in such a subjective way. Rather, the carrying value should be a reflection of market (rather than individual) sensibilities.

For some goods or commodities, where a formalized market mechanism exists that publicly displays bids and offers, market prices are transparent. Those bids and offers are market prices, and balance sheet carrying values should reflect those prices. Generally, the exit price for derivative positions should be the price at which derivatives are recorded on the balance sheet, which may be derived from the bid or the offer, depending on whether the instrument under consideration is carried as an asset or liability, but mid-market pricing is an acceptable practice in most cases. Another convention is to look at the value of the latest transaction and assume it to have been freely negotiated between the parties, without duress. Of course, market conditions can change abruptly, and last-sale prices won't necessarily reflect market conditions anytime subsequent to that last transfer. Thus, the farther back in time we have to search for a last trade, the less confident we should be in that valuation. Furthermore, whether this last price was a fulfillment of a bid or offer price is typically ignored.

Bigger problems

Much bigger problems arise when prices are not readily transparent. In those instances, reporting entities are forced to use models to value derivative positions. In this effort, the mathematical and technological sophistication in use today may instill a false sense of the level of precision attributable to these estimates. Models provide estimates of fair value and those estimates are only as good as the models themselves or the models' inputs that underlie those valuations.

The conceptual starting point for valuing a derivative is an appreciation that the fair value should be a reflection of the present value of expected future cash flows. Put another way, one can calculate the present value of expected future cash flows and use this calculated value as the estimate of the contract's fair value. Thus, fair value and present value have come to be tantamount to the same thing. In making this calculation, two challenges are present: (1) How should future cash flows be estimated, and (2) what are the appropriate interest rates that should be used for discounting purposes?

For most swaps and forward contracts, one can usually observe forward prices or else infer them from objectively observed market data, making the first calculation nearly trivial. For option contracts, on the other hand, expected future cash flows have to reflect a probabilistic assessment of prospective spot prices—an exercise that ultimately relies on assuming some estimated price volatility throughout the term of the derivative being valued.

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The discounting issue is also fraught. Fair value should reflect the credit quality of the counterparties to the contracts, both in terms of what would be correct, economically, and what's required for balance sheet presentation by statute. But practice divides in terms of the methodology to apply to get there. Two methods currently are used. Both methods typically start with the derivation of forward prices or the identification of forward curves,

but after that, the two methods take different approaches with respect to addressing credit risk. The more intuitive approach uses the standard discounted cash flow (DCF) analysis, applying discount rates that reflect the risk premiums applicable to the owing party, cash flow by cash flow.

Thus, this "risk-adjusted DCF" approach uses up to three yield curves: a forward curve (or a set of forward prices) used to generate the expected cash flows and yield curves pertaining to any party of the contract with any obligation to pay. These yield curves are necessary to derive the risk-adjusted discount rates that would be used, cash flow by cash flow. Either or both parties may have this obligation. For example if Party A has the obligation to pay the first cash flow, Party A's discount rate would be used for discounting that first cash flow. And if Party B had the obligation to pay the second cash flow, Party B's discount rate would be used to discount the second cash flow, etc.

Alternative methodology

The alternative methodology takes credit conditions into account by employing a two-step process. Under this approach we first value the derivative by discounting expected future cash flows using a proxy for "risk free" discount rates, and then we make a separate credit valuation adjustment to this original, risk-free valuation. Practice derives these risk free discount rate proxies from the yield curve of overnight indexed swaps (OIS), which reflect spot and forward overnight fed funds rates.

Although this second method is widely adopted, it requires firm-specific data relating to the trading parties and explicit assumptions about probabilities of default and expected recovery rates. Often, these data are simply unavailable. As a result, those who use these methods are forced to base their valuations on their best guesses of various inputs or else relying on data from some other institution deemed to be similar. Moreover, the second method generally derives some inputs from the market for credit default swaps. Even if these instruments are traded for the parties of the derivative contract, those credit default swaps may be associated with maturities other than the maturity of the derivative under consideration. Regardless, under his method of valuation, we're forced to use what we have.

While presented as distinct approaches, in an ideal world both approaches should generate the same values. That is, risk-adjusted interest rates should reflect assumed probabilities of default and recovery rates; and similarly, probabilities of default and recovery rates should be consistent with some set of risk-adjusted discount rates. Thus, to the extent that the different methodologies yield different values, the differences can likely be ascribed to the inconsistency of available data sets. Thus, when disparities of valuations are found, it's not clear which approach, if either, would necessarily be the better point of departure. That said, the risk-adjusted discounted cash flow approach has the clear advantage of being the more accessible and intuitive method of the two.

Thus far, discussion has focused on valuing a single derivative. But what if that derivative is one of many covered by a master netting agreement? Does that agreement justify an alternative approach? It's possible. It may be reasonable to value a portfolio of contracts that fall under the jurisdiction of a single master netting agreement as if those resulting cash flows derived from a single contract. As before, the valuation could reasonably be made using either of the above described methodologies. Clearly, though, the value of any component of that portfolio would likely differ from the valuation assuming it been priced individually. On the other hand, if the parties have the flexibility to liquidate individual contracts, it the sum of exit prices of the individual contracts might seem to be the more appropriate carrying value for balance sheet presentation purposes.

A second challenge deals with collateral considerations. The valuation methods discussed above presume that the swap under consideration had been transacted in the absence of any requirement relating to collateral adjustments between the parties of the swap. In fact, such collateral adjustments are frequently required under the International Swap Dealers Association's credit support agreement. This feature typically requires the losing party to pledge collateral to the winning party, when specified valuation threshold conditions are satisfied. And when derivatives positions are fully collateralized, the need for a credit valuation adjustment is obviated. In this situation, practice has evolved to value contracts by discounting future cash flows with risk-free discount rates.

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