Options with Options

Hedging with options requires making decisions

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For corporates faced with interest rate risk, foreign currency exposures, or uncertainty with respect to the prices of commodity purchases or sales, two critical ongoing questions persist: How much of this risk should be hedged? And, what kind of hedge, if any, should be employed (e.g., futures, forwards, options, swaps, etc.)?

Beyond being able to quantify the magnitude of the exposure, managers must also achieve a comfort level with the possible derivative tools—an appreciation for how they're designed, how they're priced, what they can be expected to deliver, and how to accounted for them.

In each of these market segments mentioned above—interest rate risk, currency risk, and commodity price risk—hedgers can generally choose between two strategic objectives. They can choose to lock in a forthcoming price (or interest rate or foreign exchange rate). They can

also seek to constrain prices to impose one or more boundary conditions. For example, they can structure a hedge to ensure that the effective price, post-hedge, will be no higher than some maximum or no lower than a minimum. Or, they can constrain the effective price to fall within some prescribed price range. For any such hedge objective, the selected derivative would be a contract that serves as an overlay to the original exposure where, ideally, a gain on the derivative would offset the loss associated with the risk being hedged.

Futures, forwards and swaps

Futures, forwards, and swap contracts all serve to lock in an otherwise-uncertain price. Futures and forwards approach this problem using one contract for each discrete pricing incident, while swaps generally address multiple pricing exposures with a single contract. In contrast, option contracts—either individually or in combination—are used to constrain prices in some way without necessarily fixing prices. Outright purchased caps are option contracts that keep effective prices below some worst-case maximum price; floors are options that keep effective prices above some worst-case minimum; and collars (constructed by purchasing caps and selling floors, or vice versa) constrain prices within a best-case/worst-case price range.

Despite the appeal of the purchased option hedge, which explicitly limits price risk allowing the hedger to enjoy the benefit of advantageous price moves, options generally don't tend to be the preferred hedging instrument. The resistance to these contracts generally arises because they require the up-front payment of an option premium.

In contrast, futures, forwards and swaps (and generally collars, as well) require no up-front payment at the start of the transaction. To say that they're free, however, is inappropriate. These contracts may win or they may lose; but the end result won't be known until the contracts settle, at which time cash will be paid or received depending on the associated payment provisions of the contract(s) in question. These contracts are hardly free in those cases when they generate losses.

In reality, despite having no up-front costs, futures, forwards, and swaps have the possibility of a cost that could very well be multiples of the costs associate with the purchase of an alternative option contract. My own feeling is that the focus on the required payment of the option premium is often short-sighted. Premiums matter, but they shouldn't necessarily be overriding. My enthusiasm for options does come with some reservation, however; and that reservation has to do with accounting considerations.

Most commercial hedgers will tend to want to qualify for and apply "special hedge accounting," which ensures that the earnings of the derivative is reported in the same accounting period as the reported earnings associated with the risk being hedged. Without hedge accounting, these two earnings effects could be reported in different time periods, thereby masking the economic intent of the hedge. Hedgers have the discretion to choose, however, between two alternative hedge accounting methodologies.

Under both methods, a prerequisite for qualifying for hedge accounting is that hedgers must satisfy prospective and retrospective hedge effectiveness assessments which require (a) a prospective assessment that justifies the expectation that the intended derivative's gains or losses would offset the effects of the risk being hedged; and (b) a retrospective assessment that validates that the actual offset conformed to expectations, within an acceptable window of tolerance. This notion of offset, however, is complicated in the case of option hedges.

Options pricing

A well-known feature of options is that their premiums (or prices) are made up of two pieces: intrinsic value and time value. Intrinsic value is the difference between the options strike price (or exercise price) and the price of the underlying asset if that difference is beneficial to the option buyer, and otherwise zero. Time value is the residual, i.e., the full price of the option less the intrinsic value.

Consider the right to buy widgets, such as a call option, having a strike price of $50, i.e., the right to buy widgets for $50. And, suppose this option trades for a price of $3 and the current market price for widgets is $52. In this instance, the intrinsic value would be $2 ($52 - $50) and the time value would be $1 ($3 - $2). Ultimately, when this option expires and no time remains, the time value will necessarily erode to $0, and the option will expire at a price equal to its then-prevailing intrinsic value.

It should be clear that if an option is held until its expiration, the starting time value will be lost. This time value thus represents a cost to the option buyer, one that is explicitly known

at the start of the hedge and that will be entirely independent of the way the prices relating to the exposure being hedged will perform during the hedging period. As a consequence, time value creates a bit of a problem for anyone seeking to claim that the option's gain or loss will offset the risk being hedged.

Alternative remedies

The Financial Accounting Standards Board (FASB) provided two alternative remedies for this difficulty, resulting in two alternative hedge accounting treatments for options. Hedgers thus need to understand both of these treatments before choosing the method to apply.

Both approaches effectively rely on a demonstration that the option's intrinsic value changes will closely offset changes in the exposures prices above (for calls) or below (for puts) critical values dictated by the option's strike price. Assuming this result can be expected and validated, the effectiveness testing prerequisites would be satisfied. The precise accounting treatment, however, would depend on the language used in the company's hedge documentation.

Hedge documentation could state either: a) that the assessment of the hedge effectiveness would exclude any consideration of time value changes, or b) that the effectiveness assessment depends on the "total cash flow" the option is expected to generate. The wording dictates the accounting.

In the first case (Method 1), as a corollary to expressly excluding time value from the effectiveness assessment, time value changes would have to be recorded in current earnings; and critically, these earnings impacts would be market-determined period by period. More precisely, applying a prorated share of the time value effects each period is specifically not permitted. Thus, to the extent that time value changes are volatile during that hedging period before the forecasted pricing event occurs, that volatility will be reflected in recognized income.

In contrast to Method 1, Method 2 expressly allows for the deferral of these time value effects to the extent that they are deemed to be effective. Under the second method, the measure of ineffectiveness is found by comparing the gains or

Figure 1: Option Price Consideration

Hedge Horizon	Starting Prices	After 1st expiry	After 2nd expiry	After 3rd expiry	After 4th expiry
Q1	10				
Q2	14	10			
Q3	17	14	10		
Q4	20	17	14	10	
Total	61	41	24	10	0
Price change		-20	-17	-14	-10

losses of the transacted option with those of a hypothetical option, i.e., an option where the underlying asset was identical to the exposure being hedged, with no timing mismatches or basis risk. If the hypothetical option were one-and-the-same as the transacted option, the full change in that option price—time value and intrinsic value changes—would be deemed to be effective, and the overall price change (due to both intrinsic and time value effects) would be posted to other comprehensive income (OCI) each period.

Under both methods, reclassification is required coincidently with the earnings recognition of the associated hedged item. In Method 1, the reclassification amounts necessarily pertain only to the effective portion of intrinsic value changes, while in Method 2 both intrinsic and time value effects are reclassified. Ignoring ineffectiveness, the first method effectively forces realization of the cost associated with time value during the hedging period, i.e., prior to the critical pricing date for the exposure, while the second method defers this cost and causes it to be recognized after the critical pricing date.

Often, the use of options involves addressing multiple exposures at one time, say, hedging a series of interest resets on a variable rate debt tied to one-month LIBOR or hedging purchases or sales that forecasted to arise repeatedly over some planning horizon. We consider such an example with the aid of the following table which depicts a hedge that covers four distinct pricing events, each having its own component option hedge. As is typical, longer-dated options are more expensive than shorter-dated options, but the incremental price increases tend to dampen as the hedge horizon extends.

For this example (Figure 1), assume all options start and end with no intrinsic value, such that the time decay represents the entire change in the value of the options. Under Method 1, where time value changes are recorded in current income, the period by period costs are shown on the bottom line of the table. The largest expense (42) would be recognized in connection with the first expiry, and declining earnings impacts would follow, thereafter.

In contrast, Method 2 requires earnings recognition option by option, reflecting their respective starting prices. Thus, the costs would start out small and increase from there, i.e., a cost of 10 in connection with the first exposure being hedged, growing to 20 by the last. In other words, the first method frontloads the cost of hedges involving multiple options (including caps and floors), while the second method backloads these costs. This generalization, however, deserves to be qualified.

The degree to which Method 1 expenses are front-loaded is somewhat uncertain. The example shown assumes that forward prices and implied volatilities remain static throughout the hedge—neither being realistic assumptions. In fact, the actual earnings recognition under Method 1 is subject to some volatility which may exacerbate or ameliorate the degree of the front-loading of these time value effects.

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