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Options on Eurodollar Futures: An Overlooked Derivative?

Although Eurodollar (ED) futures contracts have been used by bankers primarily in connection with gap management applications for decades, only a small percentage of institutions make use of a close cousin — options on ED futures. Whereas ED futures allow users to lock-in three-month LIBOR in advance of anticipated rate-setting dates, options on ED futures create interest rate ceilings or rate floors. These options thus permit hedgers to protect themselves against adverse interest rate moves without necessarily foregoing the beneficial outcomes that may otherwise result when adverse interest rate moves fail to materialize.

Attention in this article is restricted to quarterly expirations of these contracts, which relate to quarterly accrual periods commencing on the third Wednesday of the March-Quarterly cycle. A September ED futures contract trading at a price of 98.75, for example, allows for locking up a rate of 1.25% (= 100.00 - 98.75) for three-month LIBOR, starting the third Wednesday of September, with each contract covering a notional size of $1 million. Buying the contract benefits when prices rise (interest rates fall), while selling benefits when prices fall (rates rise). Thus, the hedger exposed to the risk of rising interest rates would want to sell the contract, while the hedger exposed to the risk of declining interest rates would want to buy the contract. Accordingly, having the right to sell (i.e., owning a put option) imposes as ceiling on prospective liability costs, while having the right to buy (i.e., owning a call option) imposes a floor on prospectively-set asset returns.

To achieve the benefit of options, one must first learn the basics of how these contracts work. Clearly, books have been written on the topic; but still, the essentials can be summarized concisely.

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Option basics

Options come in two types: calls and puts. Calls are the right to buy something at a fixed price. Puts are the right to sell at a fixed price. Both calls and puts have a limited period for which they are in effect. A June call, for example, expires sometime in June; a September put expires in September; etc. The fixed price referred to above is called the exercise or strike price. A 99.00-strike June call on a ED futures contract, for example, gives the buyer of this option

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the right to purchase a June ED futures contract at a price of 99.00. The June call thus translates to a floor at the 1.00% level, and the June put translates to a 1.00% cap.

Calls are said to be in-the-money (out-of-the-money) if the call strike price is below (above) the price of the underlying futures price. Puts would be the reverse: Puts would be in-the-money (out-of-the-money) when strike price is above (below) the underlying futures price. The dividing line occurs when the strike price equals the underlying futures price, in which case the option is at-the-money. This term, however, is used somewhat casually, in that options would typically be characterized as being at-the-money when the underlying futures contract is close to the option strike price, but not necessarily equal.

The price of the option can be divided between its intrinsic value and its time value. Intrinsic value is the amount that an option is in-the-money, and that is the amount that the underlying instrument is above the strike price for the call or below the strike price for the put. (Intrinsic value is never negative.) Time value, which is any excess of the option price above its intrinsic value, decays as the expiration of the option approaches. Ultimately, at expiration, time value erodes to zero, and the terminal value of the option will equal its intrinsic value.

When holding options to expiration, a call will make money only if the price of the underlying instrument rises above the strike price plus the price paid for the option; and a put will make money only if the underlying's price falls below the strike, less the price paid for the option. In any case, however, the maximum at risk for either the call buyer or put buyer is the price originally paid for the option.

Exercising an option on a futures contract results in the establishment of a futures position. If the buyer of a call option exercises that option, he/she then will hold a long futures position, initiated at the exercise price. A seller of that call will be assigned a short futures position, also entered at the strike price. Conversely, the buyer of a put will establish a short futures position at the strike price upon exercise, while a seller of the put will be assigned a long futures position at the exercise price. In all cases, following the establishment of a futures position, the resulting futures contracts will be marked-to-market at the close of the next business day and from then on, until liquidation of the underlying futures position. That said, exercise occurs at the sole discretion of the option buyer; and in the vast majority of cases, rather than exercising their options, participants will simple trade out of them.

Option buyers pay for their options at the time of purchase. No further cash flow adjustments are required until either the option is exercised or sold. This cash flow treatment differs sharply from that of underlying futures contract, which is marked to market and settled in cash, daily.

The option seller receives the price of the option upon its sale at the inception of the trade, but with exchange traded options, sellers must post a margin deposit with the exchange (via a broker). This margin amount typically will exceed the price of the option. Moreover, if the option appreciates in value, additional margin will likely be required.

In general, call option prices move directly with the, price of the underlying futures contract, and put option prices move inversely with the price of the underlying futures contract. The relative price movement of the option as compared to the futures contract depends upon the relationship between the underlying futures price and the exercise price of the option, as well as the time remaining until expiration.

When an option is deep in-the-money, the option will move almost 1-for-1 (in absolute value) with the underlying futures contract. In this case, we say that the delta approaches unity (+1 for calls, -1 for puts, reflecting the direct versus indirect relations, respectively). For the case when options are deep out-of-the-money, the relative move of the option with the underlying futures contract (or the delta) approaches zero. For at-the-money options, where the strike price of the option is close to the price of the underlying futures contract, the delta is about 0.5. Importantly, deltas also will vary with the time to maturity, as well as with price fluctuations.

A Put Example

Consider the hedger who purchases a 99.00-strike put option, intending to cap a forthcoming three-month LIBOR liability exposure at a maximum rate of 1.00%. At expiry, if three-month LIBOR is less than 1.00%, the option expires worthless. In that case, the hedger would enjoy being able to borrow as the lower-than-1.00% market rate. On the other hand, if spot LIBOR were higher 1.00%, the proceeds from the terminal value of the option (i.e., the options intrinsic value) would defray the cost of the at-market, LIBOR-based funding, yielding a combined cost of 1.00%.

A Call Example

For the asset manager poised to receive a prospective interest payment on an asset pegged to a three-month LIBOR reset, the appropriate option hedge would be the purchase of a call option. Buying a 99.00-strike call would institute a 1.00% floor. With this hedge in place, if LIBOR rises above 1.00% at the option's expiration, the option expires worthless, but the hedger would realize the at-market (higher than 1.00%) LIBOR return for the asset being hedged. Alternatively, if LIBOR is below 1.00% when the option expires, combining the call's ending intrinsic value with the at-market LIBOR returns brings the yield to the intended 1.0% floor.

Caveats

The above examples come with two, important caveats. First, both examples make the critical assumption that the exposures being hedged are specifically three-month LIBOR exposures commencing on third Wednesdays of the quarterly March cycle. Put another way, they ignore risks associated with any cross-market hedging applications (i.e., using a LIBOR-based derivative to hedge some other rate, besides LIBOR, pre se), or any timing mis-matches (i.e., hedging a somewhat different period than the specific quarter associated with the futures or options contracts).

Second, the examples ignore the initial costs of the options in their assessment the effective post-hedge interest rates that would be realized. Incorporating these costs into the calculus, however, is actually a trivial exercise. We simply add the cost of the option, expressed in basis points, to the costs of any liability being hedged; or we subtract the cost of the option, again in basis points, from the yield realized on any asset returns being hedged. For example, suppose we buy a 99.00 strike put option at an original premium of 0.10, our anticipated ceiling rate, inclusive of the option premium would be 100.00 – 99.00 + 0.10 = 1.10(%). This result would represent the worst-case annualized interest rate for the quarter being hedged, inclusive of the original option premium.

In such limited space, many of the nuances of options have been omitted from the discussion. Nonetheless, these major points capture the most significant features. Hopefully, they will serve as a basis for implementing a more thoughtful examination of hedging alternatives. Substituting option hedges for futures hedges exchanges the prospect of securing a known fixed rate for a worst-case outcome that would be marginally less attractive, but where some probability of a much more favorable result might arise, as well. Those alternatives deserve consideration.

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