

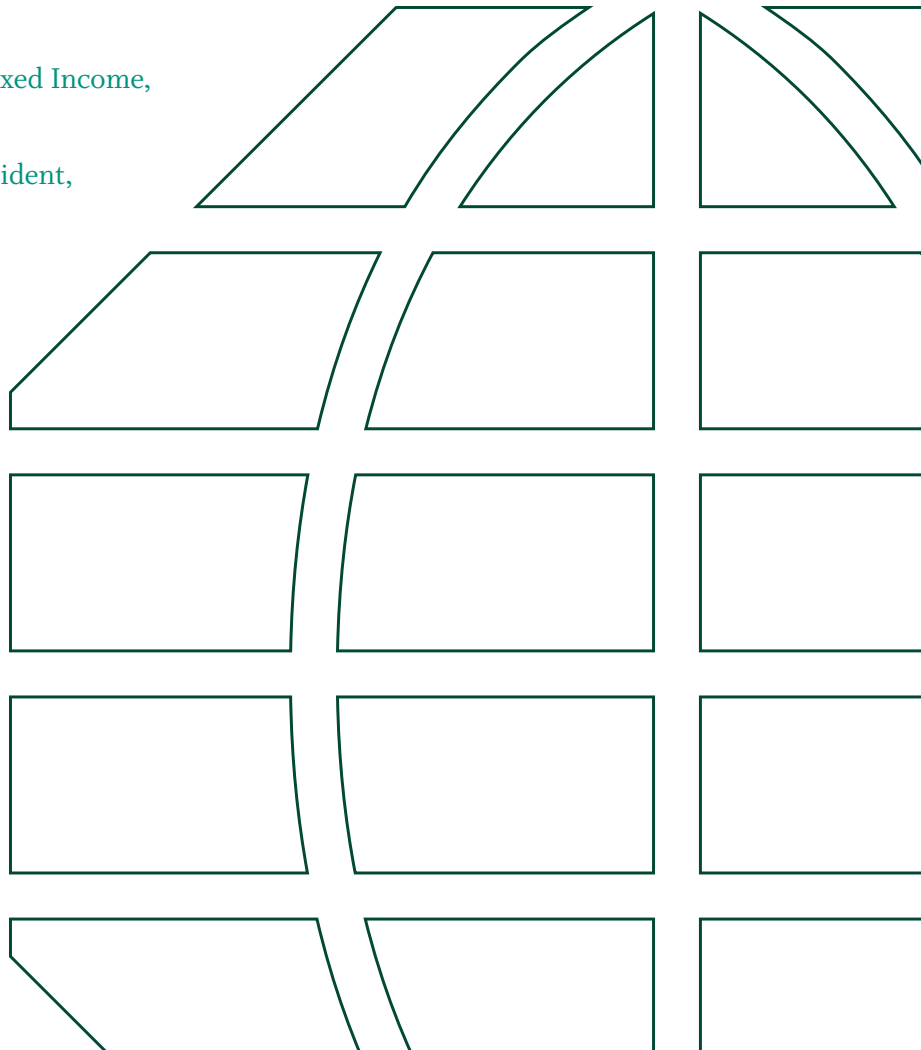
INTEREST RATE PRODUCTS

Creating Inexpensive Swaps

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The purpose of this piece is twofold: educate the reader on how to create inexpensive swaps and how to properly account for them.

A company anticipates debt issuance next quarter or wants to lock in bank debt interest costs and likes the level of today's rates. Time to put on a LIBOR rate lock¹, right? Also, one of its subsidiaries is funded in the short run but wants to manage duration² risk of newly created assets in the pipeline. A forward starting swap³ would fit the bill. And, finally, another affiliate needs to account for the fixed/floater differential on held residuals, the balance of which decreases over time. No problem there – an amortizing swap⁴ will match up nicely.

Now, one only has to call up a dealer or dealers, send anticipated cash flows if necessary and negotiate the swap rate. Quotes among the dealers are usually fairly tight given the standardized pricing tools available, so the CFO/treasurer/trader feels pretty good about locking up the best possible rate. But did he or she actually do so?

Not a chance.

Over-the-counter (OTC) swaps⁵ are, quite simply, a retail market. For short medium-term hedges, the dealer community prices and ultimately hedges its LIBOR-based swaps off the CME Group Eurodollar futures yield curve (for those with a Bloomberg terminal, type EDS or EDSF <go>). [Note that Eurodollar futures are simply 3-month LIBOR forwards; it is the market's prediction today as to where certain 3-month LIBOR segments will be in the future. There are 40 consecutive quarterly contracts currently trading, so a LIBOR yield curve can be constructed up to ten years.]

More specifically, if a company wants to contract to pay fixed/receive floating with a dealer, that dealer will immediately reference the Eurodollar curve, crunch some numbers to arrive at a swap rate – by chaining together the various implied forward rates given the targeted tenor – and add in several more basis points (bps) for the effort. (Today, adding perhaps 10 to 50 bps or more!) If the company executes with the dealer, that dealer will have a strong inclination to lay off this risk, pay fixed itself, and lock in a spread as to what it just sold to its consumer. If it cannot in short order balance its risk by contracting with another corporate account, its derivatives desk will invariably punch up a CME Globex screen and in this example, execute the equivalent of a pay-fixed swap by selling a strip of Eurodollars.

So, can corporate America pursue this methodology itself? Yes. Corporate Treasuries can implement this do-it-yourself strategy and benefit from the cost savings from employing interest rate futures, compared to incurring the credit charges of OTC swaps. And given the generic and transparent nature of exchange-traded Eurodollar futures pricing, risk managers will also be able to pursue an easier path to hedge accounting by avoiding the hassle of guessing or modeling valuation of OTC derivatives.

The remainder of this article consists of: (a) Q&A format that provides definitions, contract specifications, operational aspects and nomenclature of the interest rate futures market; and (b) a section on accounting considerations that shows how to implement this swap replication strategy in a manner compliant with Financial Accounting Standards Board (FAS) Statement 133 *Accounting for Derivative Instruments and Hedging Activities*.

SECTION 1: Q&A on Eurodollar Futures

Q. Define Eurodollars and Eurodollar futures.

A. A Eurodollar is a dollar on deposit with a bank abroad, typically in Europe. In practice, Eurodollar futures (100 – futures price) are a proxy for the forward AA/AAA LIBOR-based credit curve. LIBOR (as delineated by the Eurodollar curve) is the benchmark for most bank lending these days.

Q. How do Eurodollar futures work?

A. Eurodollar futures are traded at CME Group. They were set up as 3-month forward rates with a static dollar value of \$25 per bp (\$1 million notional with length of 90 days: usually $\$1\text{MM} \times .0001 \times 90 / 360$. Durational equivalent chunk of 0.25 yrs each). Price is computed as follows: 100 minus that particular forward rate. For example, EDZ1 (symbol for December 2011 Eurodollar futures contract) may be trading at 95.335, implying a 3-month forward rate of 4.665 percent from December 16, 2011 (the date EDZ1 “expires”), to March 26, 2012. Futures products like to focus on price rather than yield; that is why the contract was flipped upside down and the 100 – price rule was implemented.

Q. So, at expiry, we would enter into a 3-month swap?

A. Actually, no. Eurodollar futures are cash settled – a user does not take or make delivery nor enter into any swaps at expiration. All gains and losses are netted out in cash. So, in terms of how one “locks up” or fixes forward rates, the calculation for such is an ex-post numerical calculation; compare rates at T0 to rates at T1 and adjust for any gains/losses during the hedge period to tie back into the rate at T0. This works well when hedging a related risk, such as the LIBOR rate on a loan.

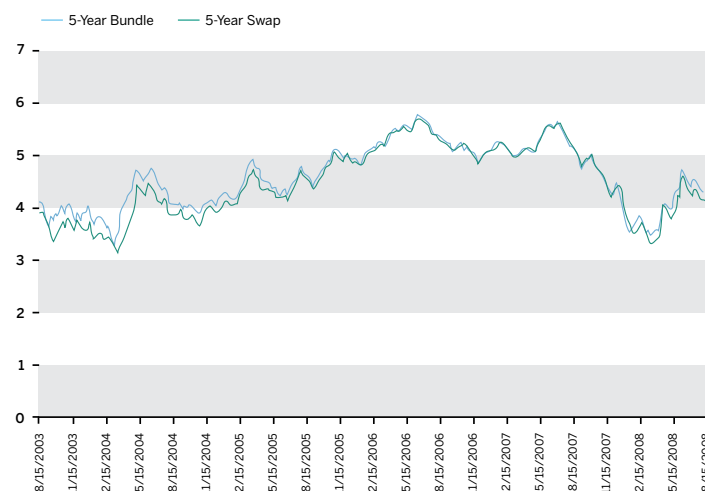
Q. OK, what are packs and bundles?

A. Every market has its own jargon and Eurodollar futures are no different. A pack is just a combination of four consecutive contracts so that one-year of duration is derived (4×0.25). A bundle is simply an aggregation of consecutive packs. A 3-year bundle thus has 12 contracts, a 4-year bundle has 16 contracts, and so on.

Q. Why are they used?

A. Packs and bundles are used by portfolio managers to adjust duration and by entities (Wall Street, companies with large commercial paper conduits⁶, pipeline/asset-backed-security originators, mortgage servicers, etc.) seeking to hedge a LIBOR-related risk. Bundles themselves are a proxy for swaps as the graph below shows.

5-Year Bundle vs. 5-Year Swap



Source: CME Research and Bloomberg

The graph illustrates the tight correlation between 5-year LIBOR swaps and 5-year implied Eurodollar bundle rates. Again, Eurodollars are not just a proxy for OTC LIBOR swaps, they are the instrument with which dealers reference to arrive at their swap quotes – truly the tail wagging the dog.

Q. What about swap replication?

- A. If someone normally wants to enter into a pay-fixed swap with a 5-year tenor, he or she can replicate such by instead selling a 5-year bundle. [Note that duration ought to be considered: the duration of a 5-year swap as of this writing is roughly 4.50 years whereas the duration of a 5-year bundle (again, 20 consecutive quarterly contracts) is 5 years; Eurodollar futures throw off no coupon, so in a sense, they are a “zero”. Now, if one truly wants to replicate the 4.50 duration of such a 5-year pay-fixed swap, one may do a lesser number of the 5-year bundle by ratio adjusting.]

Q. Well, how is duration on Eurodollars calculated?

- A. Equation is: $(\# \text{ of contracts} \times 0.25) / \# \text{ of millions}$. Quite simply, if you did a short \$5 million 2-year bundle at CME Group, you'd have executed 40 contracts (5 x 8 contracts per two-year bundle). So, the math is $40 \times 0.25 / 5$, which equals 2.00 years of duration.

Q. In everyday practice, how could we utilize Eurodollar futures?

- A. Say the company is going to issue 5-year debt. In the old days, it may do a “rate lock” by selling treasuries against it. Nowadays, a forward starting pay-fixed LIBOR swap is used. In Eurodollar futures terms, one would simply sell a “5-year bundle” to accomplish the same objective.

Another example: The company needs to hedge the fixed portion of its production – both the fixed rate loans plus the fixed rate portion of any hybrid loans (hybrids are those loans or instruments that have both a fixed and floating-rate component). Again, a strip of Eurodollar futures would be sold or “shorted” to accomplish the hedge. Essentially, the company would be “locking up” the forward financing required to fund the asset. (This is looking at the hedge from the liability side – FAS 133 implications to be discussed later in article. Note that if one were to take the asset hedge fair value (“FV”) approach, the number of Eurodollar contracts needed would coincidentally be the same).

Q. Let's talk dollars and cents ... What's the cost comparison between OTC swaps and Eurodollar futures strips/packs/bundles?

- A. If one were to enter into a \$10 million dollar 5-year pay-fixed bullet swap (an interest-rate swap tailored to a loan with a bullet, or non-amortizing, maturity) at 5.85 and immediately exited the same position 5 seconds later, the bid-offer get-in, get-out spread would probably be 4 bps per annum (meaning you exited at 5.89). In reality, some clients, depending upon their credit profile, may pay 10 to 50 bps per annum. This means transaction costs of \$50,000 to \$250,000 for the OTC swap. So, one gets to pay a minimum of \$20k just for playing ($\$10\text{MM} \times .0004 \times 5$) {it's actually a bit less due to duration and discounting, but the point is made}.

With exchange-traded Eurodollars, one would normally only experience a one bp in-out fee plus ½ bp for typical commission fees. Thus, the cost in Eurodollars is 200 (10 contracts per quarter x 4 quarters per year x 5 years) x $1.5 \times \$25$ per bp, which is only \$7,500.

Q. And caps/floors/collars?

- A. Again, dealers will simply reference where the Eurodollar puts and calls are trading, adjust for any date count timing differences and volatility axes (axe is street term for a trading desk's “leaning or bias” as to what price level it is willing to deal), and add a couple bps in for the effort.

In fact, Eurodollar options are incredibly easy to use in place of OTC caps and floors (and collars), and may be a lot less costly.

Q. Let's talk operational issues. We understand with futures that the posting of margin is required. How much margin is involved?

- A. Each contract currently requires \$1,100 (hedge margin as of 1/15/09) of initial margin, usually posted the next day. As a side note, because all entities post daily margin, or performance bond, they effectively can “arbitrage” their respective credit rating; for example, a BBB-rated company may notice swap spreads 4+ bps wide in OTC-land (between pay-fixed and receive-fixed, that is), but with Eurodollar futures, its spread is only, at most, 1 bp because everyone's credit is essentially equal due to the fact that CME Clearing already has a 44 bp cushion ($\$1,100 / \$25 = 44$ bps) on each and every contract. Again, and this cannot be emphasized enough, a company can, by putting its margin money on the table upfront, achieve the tightest bid-ask LIBOR derivative spreads available in the marketplace – no more penalty for not being the size of World Bank! Besides ease of execution, this is certainly one of the main selling points of using Eurodollar futures in lieu of OTC LIBOR swaps.

Given the recent and ongoing credit crunch, balance sheet scrutiny and counterparty worthiness are back in vogue. OTC swaps can be done with collateral but may be one-way, and the company still has counterparty risk. However, with CME Clearing acting as the counterparty, the risk of default with Eurodollar futures is virtually eliminated and participants benefit from two-way collateral and the financial safeguards of CME Clearing.

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Q. OK, what about maintenance margin?

- A. There is daily settlement for all futures contracts, Eurodollars inclusive. What that means is that gains/losses are posted every day to the client account. For example:
- A company sells one EDU1 (the symbol for the September 2011 Eurodollar contract) @ 95.36 and that's coincidentally the settle price at the end of the day.
 - The next day the company wires in \$1,100 for initial margin and makes no additional trades.
 - At the end of the next day, EDU1 settles @ 95.40, 4 bps above where the company sold it.
 - The following day, the company wires in \$100 ($95.36 - 95.40 \times \$2,500$) to cover the mark-to-market (“MTM”) loss.

Similarly, if the price dropped, meaning the implied rate rose, from the original 95.36 level, money would be credited to the company's account.

Note that rather than guessing where the mark is on your OTC swap, the Eurodollar futures position will automatically be marked-to-market on a daily basis.

Q. Where is the margin money held?

- A. Market participants “clear” their business with a futures commission merchant (FCM). Required margin monies will be sent from the FCM to be held at CME Clearing. The FCM acts as intermediary and will directly handle all the wiring of monies to and from the company as well as creating daily transaction/MTM statements.

Q. Up until recently, firms did not have to post (or rarely posted) collateral on OTC swap hedges. If futures are used, this settling up of a margin requirement may be as often as daily. Is it truly worth it?

A. The posting of margin and/or the wiring of monies back and forth sometimes seems like too much of an operational burden for some treasury departments (of course, some firms will simply post a T-bill in excess of margin required, significantly reducing or eliminating daily wire transactions). The ultimate decision on whether or not to use interest rate futures should take into account the following factors:

- Can the company “arb” its credit rating when it comes to derivative usage?
- Can it use its credit lines with the dealers for something else other than derivatives?
- To what extent is the firm “encouraged” to use existing relationships for expensive derivatives in order to keep the credit spigot open?
- Is the counterparty a desired credit risk?
- And finally, consideration of the bottom line by examining the cost differentials between the two hedge products:

- Savings between OTC vs. Eurodollar futures: up to \$250,000 (per \$10 million/5-year swap, per the example on the previous page)
- Negligible opportunity cost of margin monies employed: (\$20,000)
- Operational costs/savings: ??? no ISDA, no complex FAS 157 reporting

That \$250,000 figure above is arbitrary and certainly depends heavily on one’s current credit ratings and dealer relationships. Nonetheless, the cost savings – in this example of a \$10 million 5-year swap (roughly 4.25 duration) – would probably range from \$50,000 to \$250,000.

SECTION 2: Accounting Considerations

Reducing hedge costs is great, but it would be a hard sell internally for treasury departments if we could not document this replication methodology within the FAS 133 construct. Below, we will focus on a strategy for the cash flow (“CF”) method – though it could be adapted to the FV method if the accepted valuation of the asset is derived by the sum of the LIBOR curve plus a company-related credit spread.

For derivative activities to qualify for hedge accounting, the following record should be made at the inception of the hedge:

- Description of the hedging relationship and the risk management objective and strategy for undertaking hedge.
- The benchmark for all cash flow designated hedge strategies will be LIBOR. LIBOR is related directly to the Cost of Funds (CoF) for a company, and CoF may be expressed as LIBOR+X (where “X” reflects the incremental CoF over LIBOR due to credit, liquidity and other open market factors). All cash flow based hedge strategies will consist solely of LIBOR futures (Eurodollars that cash settle to the three-month London Inter-Bank Offered Rate). The hedges will be affected in such a manner as to reflect the forecasted transaction of the company fixing its cost of funds for debt to be issued or for a forward matched funding need related to specific assets being originated, accumulated or aggregated for intended forward sale/securitization.
- The risk management objective of this hedge strategy is to fix the LIBOR component of the company’s forward cost of funds in amounts equal to the projected (ex-ante) forward principal that will require funding. If necessary, risk management will anticipate ineffectiveness of the hedge by anticipating any changes in cash flow (prepayments, defaults and other factors, if applicable) due to possible interest rate outcomes during the time period between the forecasted transaction and actualization of the forecasted transaction. [Note: For straight corporate debenture issuance, calculations other than the initial present valuing will not be necessary. For assets with embedded options (callables, mortgages, etc.), issuers will already be well familiar with this challenge.] Finally, recreating, ex post facto, the “ideal derivative hedge” and netting that hypothetical economic experience from the realized hedge experience will ascertain hedge effectiveness.

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- The strategy will require that each asset/debt class be characterized by:
 1. Defining expected forward principal balances at quarterly intervals throughout the tenor of the expected life of the asset. These balances will reflect adjustments for expected prepayment, default and other factors, ex ante, if necessary.
 2. Each expected quarterly forward principal balance will be discounted/present valued at a rate equal to the prevailing forward 3-month LIBOR rate as traded in the corresponding quarterly Eurodollar futures contract (or discounted via some agreed upon swap rate across the curve).

(1) and (2) above will be performed for varying interest rate levels and the probability of those interest rate outcomes will be ascribed to the resulting cash flows (again, only necessary for negatively convex securities).
 3. The sum of all probable interest rate outcomes multiplied by the respective probability of their occurrence shall define the “static cash flow” expectation for the period of the forecasted hedge for each specific asset class. These static cash flows will be expressed as a factor, or expected percentage of original principal remaining at each quarterly interval.
 4. Contingent upon asset production/debt need, each respective “static cash flow” factor over the tenor of the specific class will be multiplied by the production/debt amount. The resulting quarterly products will be the amount of LIBOR needing to be “fixed” at each point along the forward LIBOR curve to hedge the forecasted transaction of matched funding the asset.
 5. Upon issuance of the debenture or match funding of the asset via security issuance, the LIBOR hedge shall be removed.
 6. The levels of forward LIBOR realized in the liquidation of the hedge shall be the levels of LIBOR used for recreating the hypothetical, ex post facto, “ideal hedge.”
 7. The gain (loss) of the hypothetical position will be subtracted from the absolute value of the gain (loss) in the concluded hedge strategy to determine hedge effectiveness.
- Of course, the above methodology can be applied to the hedge use of both OTC swaps and Eurodollar futures. Since the latter, however, is a literal yet much less expensive proxy for the former, this should certainly incent corporate treasury departments to fully investigate the use of Eurodollar futures in lieu of swaps. Also, under FAS 157 *Fair Value Measurements*, futures are Level 1 since there is an absolute observable market price (to say the least! – Eurodollar futures are the most liquid interest rate contract in the world) whereas swaps are only Level 2 at best.
- In light of recent market volatility, it is questionable as to whether OTC swaps can even still be considered Level 2 given that counterparty risk must also be assessed. Again, Eurodollar futures, cleared by CME Clearing, have little or no counterparty risk.
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1. LIBOR is the London Interbank Offered Rate, the yield curve benchmark that most of Corporate America is tied to when soliciting borrowed funds. A “rate lock” is a street term where an entity effectuates a hedge trade to fix, or lock in, today’s rates so that there minimal market or interest rate risk when it ultimately issues its debt.
2. Duration – the weighted average maturity of an asset or portfolio on a present-valued basis.
3. Forward starting derivative – a derivative arranged today to be effective on a future date.
4. Amortizing swap – an interest rate swap tailored to a decreasing notional balance.
5. Over-the-counter swaps – a negotiated forward contract between a buyer and a seller (usually with one party being a financial institution), which quite simply swaps a set of cash flows.
6. Conduit – a special-purpose corporate vehicle for issuing commercial paper.



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