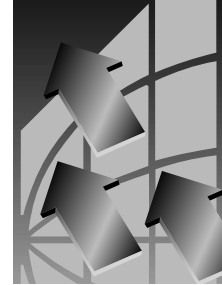




C M E

OPEN INTERESTS

Eurodollar Bundles and Packs



Right from their introduction in September 1994, Eurodollar bundles have proven to be a powerful and convenient tool for those who deal in strips of ED futures contracts. Since then, the original bundle concept has been expanded to include 1-, 2-, 3-, 4-, 5-, 6-, 7-, 8-, 9-, 10-year and 5-year “forward” bundles. In this paper we spell out what ED bundles are and how they work.

What are ED bundles?

An ED bundle is the simultaneous sale or purchase of one each of a series of consecutive ED contracts. The first contract in any bundle is generally the first quarterly contract in the ED strip, though since October 1998, bundles can be constructed starting with *any* quarterly contract. The leading exception to this convention is the 5-year “forward” bundle, which covers years 5 through 10 of the Eurodollar futures strip. For example, on April 11, 2000, the first contract in the 5-year “forward” bundle would be June 2005 (the 21st quarterly contract in the strip), and March 2010 (the 40th contract) the last.

The terminal contract depends upon the bundle’s term to maturity. The CME offers 1-, 2-, 3-, 4-, 5-, 6-, 7-, 8-, 9- and 10-year terms to maturity. The specifics for each term as of April 11, 2000 appear in the first three columns of the table below.

Bundle Features

Term to Maturity	Comprising One Each of	Terminal Contract	DV-01 (\$)	DV-Tick (\$)
1-year	first 4 contracts	March 2001	100	25
2-year	first 8 contracts	March 2002	200	50
3-year	first 12 contracts	March 2003	300	75
4-year	first 16 contracts	March 2004	400	100
5-year	first 20 contracts	March 2005	500	125
6-year*	first 24 contracts	March 2006	600	150
7-year	first 28 contracts	March 2007	700	175
8-year*	first 32 contracts	March 2008	800	200
9-year*	first 36 contracts	March 2009	900	225
10-year	first 40 contracts	March 2010	1,000	250
5-year “fwd”	last 20 contracts	March 2010	500	125

* 6-, 8- and 9-year Bundles were first listed on April 17, 2000.

Making Prices in Bundles

For any bundle, the price will be quoted in terms of net change during the current trading session from the previous trading day’s settlement level. Specifically, the bundle’s price quotation will reflect the simple average of the net price changes of each of the bundle’s constituent contracts.

Example 1: A trade is executed in the 2-year bundle at a price quotation of -1. This reflects an agreement between the buyer and seller that among the nearest eight ED contracts (for example the June '00 ED to the March '02 ED) the average net change in the contracts' prices (versus their price levels at yesterday's settlement) is minus one tick.

Example 2: Assume that all of the nearest 21 contracts (e.g., the June '00 ED to the June '05 ED) have enjoyed a three-tick increase in the price since yesterday's settlement; at the same time the prices of each of the next seven contracts (e.g., the September '05 ED to the March '07 ED) have posted net gains of four ticks. Under these conditions, the implied fair-value price quotation for the 7-year bundle would be:

$$\frac{[(21*3) + (7*4)]}{28} = 3.25 \text{ ticks}$$

Example 2 raises a critical point. Bundle prices are quoted in increments of one quarter (1/4) of a basis point.

For ED bundles the value of .01 will always be four times greater than the value of the quarter tick minimum price increment. These differences are summarized in the previous table.

Un-bundling After the Trade

After a buyer and a seller have agreed upon the price and quantity of a bundle, they must assign mutually agreeable prices to each of the bundle's constituents. In principle, the traders may set these component prices arbitrarily, subject to one restriction: the price of at least one constituent ED contract must lie within that contract's trading range for the day (assuming that at least one of the ED contracts in the bundle has established a trading range). CME regulations are designed this way to ensure that bundle prices will remain tethered to the price action of the underlying individual ED contracts.

In the vast majority of cases, traders and clearing firms make use of a computerized system that automatically assigns individual prices to the contracts in a bundle. This system was designed by the CME to simplify the administrative aspects of the bundle trade.

The pricing algorithm used by the CME is based upon the following principle: To the extent that adjustments are necessary to bring the average price of the bundle's components into conformity with the bundle's traded price, **these price adjustments should begin with the most deferred ED contract in the bundle and should work forward to the nearest ED contract.** The following example illustrates the application of these principles.

Suppose that a buyer and a seller who are transacting in the 3-year bundle have agreed upon a net price change of -2.5 basis points (bps) versus the previous day's settlement level. Suppose, moreover, that the day's actual net price changes for the bundle's constituent ED contracts are as follows: -2 bps for the nearest eight contracts and -3 bps for the next four contracts. The implied average price change is $[(8* - 2) + (4* - 3)] / 12 = -2.33$ bps, which exceeds the bundle's price change by one sixth of a basis point.

The CME algorithm would resolve this disagreement in two steps, dealing first with the integer portion of the –2.5-tick trade price (the 2), and then with the fractional portion (the 0.5). Specifically, the algorithm would begin by assigning to each of the twelve contracts in the bundle a net price change of –2 ticks from the previous day’s close. Then it would adjust these price changes downward, proceeding one contract at a time, beginning with the bundle’s terminal contract and working forward—until the average net price change for the bundle is the agreed-upon –2.5 ticks. Following this procedure would result in net price changes of –2 ticks for the bundle’s six nearest contracts and –3 ticks for its six most deferred contracts. The result is an average price change of $(6 * -2 + 6 * -3) / 12 = -2.5$ bps, as desired.

Simple to Structure, Simple to Execute

By construction, bundles are well-suited to traders and investors who deal in LIBOR-based floating-rate products. Obvious examples include investment banks that routinely carry syndication inventories of floating-rate notes, corporate treasuries that issue floating-rate debt, or commercial bankers who wish to hedge the risk exposure entailed in periodic loan-rollover agreements.

However, bundles’ most avid followers are likely to be those market participants who deal in long-dated Treasury-Eurodollar (TED) spreads. Such trades entail the purchase (or sale) of a Treasury security and the simultaneous sale (or purchase) of a strip of Eurodollar futures contracts with a comparable notional term to maturity. A frequently encountered version comprises a long position in the two-year Treasury note and a short position in some combination of the nearest seven or eight ED contracts.

Despite their popularity, until the introduction of Eurodollar bundles such transactions suffered for lack of any generic standard. Bond dealerships that promote long-dated TED spreads to their clients tend to recommend trades that involve odd numbers of Eurodollar contracts, differing from one point in the ED strip to the next. The dealers customarily justify their formulations by appealing to proprietary yield-curve models. These models purport to link the future spot interest rates that are represented by the Eurodollar futures strip to the implied zero-coupon yield curve that is embedded in the prices of U.S. Treasury securities.

Most such yield-curve models produce speciously precise results: too often, mathematical interpolation of painstaking exactitude sits cheek-by-jowl with broad, crude assumptions about the actual shape of the term structure of the Treasury-to-Eurodollar yield spread. Unfortunately, this is precisely the actuarial risk—a default by an off-U.S.-shore commercial bank on its liabilities (versus the default-free character of the U.S. Treasury’s debt)—that is at the very heart of the TED-spread trade and that imparts any value to it.

In this context, the CME’s introduction of evenly weighted bundles of Eurodollar contracts serves two useful ends. First, it establishes a readily available, widely acceptable, and easily interpretable benchmark by which the performance of any other TED trade can be judged.

Second, and more importantly, it facilitates cleaner, more rapid execution of the Eurodollar side of the trade. Instead of being forced to construct lengthy and idiosyncratic ED strip positions contract by contract (always a risky proposition, especially in a fast-moving market), the futures broker now has the capability of executing one trade on behalf of the client that establishes price, quantity, and the allocation of the bundle’s component prices.

EURODOLLAR PACKS

1. **What are Eurodollar packs?**

Packs are the simultaneous purchase or sale of an equally weighted, consecutive series of four Eurodollar futures, quoted on an average net change basis from the previous day's close. This quoting method is similar to that for Eurodollar bundles.

2. **Why packs?**

Packs are an alternative method of executing a strip trade. All four contract months in the strip are executed in a single transaction, eliminating the inconvenience of partial fills, particularly in the deferred contract months.

3. **How many are there?**

Packs, like Eurodollar futures, are designated by a color code that corresponds to their position on the yield curve. The most commonly traded Packs¹ are the Red, Green, Blue, Gold, Purple, Orange, Pink, Silver, and Copper², corresponding to Eurodollar futures years 2-10, respectively. "Pack spreads" (e.g., Pack butterflies and individual contract months versus Packs) are also listed for trading.

4. **How are packs quoted?**

Packs are quoted in minimum one-quarter-basis point (.25) increments, e.g., + 2.5/bid + 2.75/ask.

5. **How are prices assigned to individual legs?**

Any price consistent with the agreed-upon average net change for the pack at which the trade occurred may be assigned to the individual legs. Because of this, packs are classified as spread trades. Any prices can be assigned to individual contracts, as long as they are consistent with the agreed-upon average net change. Whole-basis-point prices are assigned to individual legs of the Pack consistent with the traded price. For example, if a pack is down 2.25 ticks, then individual contracts will be -2, -2, -2, and -3.

¹ "Rolling" Bundles and Packs were introduced in October 1998. These Packs and Bundles can be constructed starting with any quarterly Eurodollar expiration (provided of course, that the last contract in the combination does not extend beyond the last listed contract).

² There is a one-day delay in listing a new 10-year Bundle and Copper Pack after the expiration of the front quarterly futures contract. This is due to the one day lag between expiration of the front quarterly contract and the listing of the 40th quarterly Eurodollar contract.

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