CME Group
A CME/Chicago Board of Trade/NYMEX Company

INTEREST RATE PRODUCTS

Zero Coupon Interest Rate Swap Futures vs. OTC Swaps

Zero Coupon Interest Rate Swap futures always represent the prices of new par swaps.

June 2009

By: David Boberski, Managing Director
OTC Research & Product Development
david.boberski@cmegroup.com

All derivatives can be described by their response to instantaneous moves in the market, and also by their change over time. In fixed income derivatives, the sensitivity to an instantaneous change in yield is measured in terms of the dollar value of a 1-basis point change in yield, or DV01. The performance over time, ignoring changes in yield, is measured in terms of carry.

Each leg of Zero Coupon Interest Rate Swap futures and OTC swaps can be measured along these two dimensions, as illustrated in Figure 1. Since the fixed leg of the swap is always priced to discount factors that come from the prevailing par swap curve, they move in lock step with the OTC market. By definition, their price must change to reflect the prevailing par swap curve, and the DV01s of the Zero Coupon Swap futures and OTC instruments match. Since the price adjusts to the prevailing par curve during instantaneous shocks, the "pull to par" or change over time of each Zero Coupon Swap futures price also matches the OTC market. The fixed rate side is by far the most risky, and Zero Coupon Swap futures match the OTC market, which means the two enjoy the same correlation to mortgages, corporate and municipal bonds.

The floating rate side of an OTC swap is based on a 3-month LIBOR rate that is fixed every quarter and held constant between reset dates. It also always references the original notional amount. In contrast, the LIBOR rate used in Zero Coupon Swap futures is based on the period from today to the nearest quarterly expiration, which is the so called "stub" rate. For example, on March 15, 2009, the futures references the 3-month LIBOR rate from March 15th to June 15th. On March 16th, it references the interpolated 89-day rate based on the prevailing LIBOR curve. The formulas can be found in "Zero Interest Rate Swap Futures Pricing."

Empirically, there has been little average difference between the two approaches, as illustrated in Figure 2. The average difference between the interpolated stub rate and a 3-month LIBOR rate has held steady every quarter – approximately 2.4 basis points from January 1998 to May 2009. Although the average difference has been small, the individual observations on any given day at times have been large.

FIGURE 1:
Zero Coupon Interest Rate Swap Futures vs. OTC Swaps

	Comparison of Characteristics	
	Risk / DV01	Carry / Roll Down
Fixed Side	Same	Same
Floating Side	Same	Different*

* The floating rates are fixed at the reset date in an OTC swap. Zero Coupon Swap futures use the prevailing rate from today to the first quarterly maturity, which is often referred to as the "stub" period.

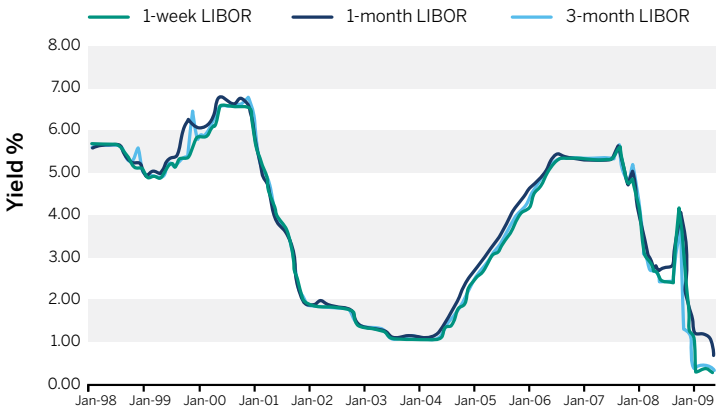
* The futures reference the market value of each zero coupon cash flow.

There have been instances in the past when LIBOR jumps or drops on a reset day, favoring either the buyer or seller, and they have had to live with this distortion until the next reset date. Since Zero Coupon Swap futures always reflect prevailing rates they would also reflect the short-term jump, but would then readjust if the move proves to be temporary. Zero Coupon Swap futures are less dependent on where LIBOR happens to be on a single day.

A second difference between the OTC and Zero Coupon Swap futures markets has to do with the notional amount referenced in the LIBOR calculation. OTC swaps always reference the same notional amount, which is effectively the face value of the swap. Zero Coupon Swap futures function more like LIBOR financed bonds, and where the LIBOR interest is applied to the current market value rather than to the face amount. The implication is that the carry over time between OTC and Zero Coupon Swap futures will be different for an "off coupon" swap.

While it is true that the slope of the back-end of the curve has been positive much of the time, the front-end of the curve has been much more volatile. Volatility does not favor either the buyer or seller, and while this design aspect is different than OTC swaps, it references only prevailing rates.

FIGURE 2:
Snapshot of spot rates, implied forward rates and interpolated discount factors.



Source: British Bankers' Association

- Over the period shown there have been dramatic changes to the shape of the front-end of the curve that led to differences between overnight and term rates.
- Throughout the currency crisis in 1998, the tech bubble bursting in 2001 to today's credit crisis, there has never been a systematic divergence between the rates shown, but differences have lingered for substantial periods.
- A payer of fixed interest on an OTC swap receives the same 3-month LIBOR rate between reset dates.
- A buyer of Zero Coupon Swap futures pays the "stub" rate from today to the first reset date.
- Combining these two positions effectively nets the DV01 of the two fixed rate sides and finances a 3-month LIBOR rate at the prevailing LIBOR "stub" rate, creating a carry trade.
- This carry trade may or may not be profitable, depending on the slope of the LIBOR curve.
- Carry trades are not "arbitrage" trades because they do not offer riskless profits, especially in the volatile front-end of the curve.

For more information on Zero Coupon Interest Rate Swap futures, visit **www.cmegroup.com/zeroswaps**.

IR247.4/0/0709