CBOT® Interest Rate Swap Futures

Reference Guide

Chicago Board of Trade

Table of Contents

Introduction

Chicago Board of Trade 5-Year and 10-Year Interest Rate Swap futures are designed to fill a vital need for exchange-traded derivative contracts that reference intermediate- and long-term swap rates:

- Swap futures offer institutional market participants – such as bank treasurers, mortgage-backed securities traders, and fixed-income investment portfolio managers – convenient means for acquiring and laying off exposure to plain vanilla swap rates.

- As with other exchange-traded futures contracts, users of Swap futures should enjoy substantial reductions in administrative costs versus over-the-counter (OTC) alternatives.

- Because Swap futures carry the guarantee of the CBOT clearing services provider, they virtually eliminate counterparty credit risk, allowing users to easily adjust swap rate exposure without tying up credit lines.

- Swap futures enable creation of synthetic spread product portfolios. Further, they facilitate the structuring of a variety of credit spread and bank credit yield curve trades.

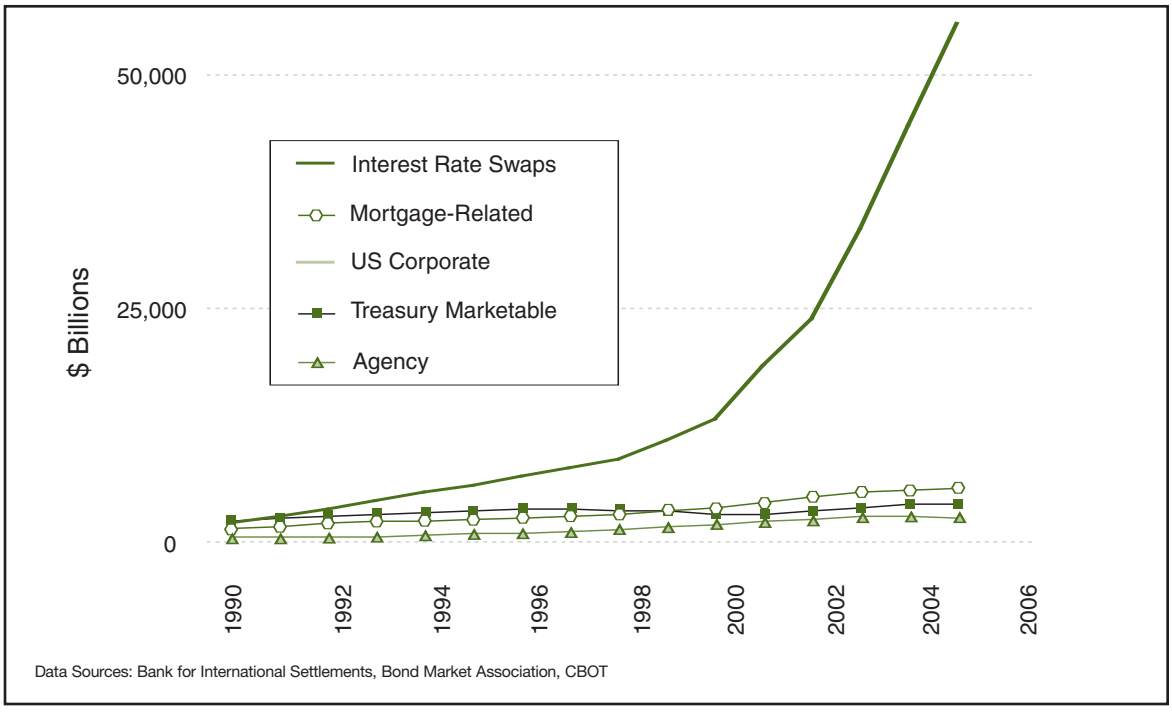
This reference guide reviews key benefits of CBOT Swap futures, discusses their hedge effectiveness, explains the mechanics of contract pricing, and summarizes the salient features of their terms and conditions.

Background

At the end of 1990, the outstanding notional amount of OTC U.S. dollar interest rate swaps was about equal to outstanding U.S. Treasury debt, with both just above $2 trillion. Fifteen years later the notional principal outstanding in OTC swaps exceeded $55 trillion, an order of magnitude more than the Treasury market's $4.1 trillion. (See **Exhibit 1**)

Exhibit 1

Year-End Outstanding Amounts Among Sectors of the U.S. Fixed-Income Market



Data Sources: Bank for International Settlements, Bond Market Association, CBOT

The rapid growth – both absolute and relative – of the OTC swap market, and the explosion in operational costs that has accompanied it, point to the need for an exchange-listed futures contract to help participants in managing their risk exposures. Effective exchange-traded risk management tools, notably Eurodollar futures, have long been available for users of shorter-dated OTC swaps. However, the repertoire of alternatives diminishes severely for users of longer-dated swaps with tenors of five years and beyond. CBOT 5-Year and 10-Year Interest Rate Swap futures were designed to meet this need.

Contract Features

CBOT Swap futures employ an internal rate of return formula to express the fixed rate of a forward-starting swap as the price of a 6% coupon note. The underlying contract reference is the rate for a forward-starting IMM-date interest rate swap – specifically, the par rate for a plain vanilla interest rate swap with forward start date on the third Wednesday ("IMM Wednesday") of the futures contract's expiration month.

Contract specifications call for each contract to be cash settled with reference to the pertinent ISDA (International Swaps and Derivatives Association, Inc.) Benchmark Rate on the last day of trading. ISDA Benchmark mid-market par swap rates are collected at 11:00 a.m. New York time by Reuters Limited and Garban Intercapital plc and are published on Reuters page ISDAFIX3. (Source: Reuters Limited.) Daily publication occurs around 11:30 a.m. New York time.

The $100,000 nominal size of each contract signifies the notional par value of an interest rate swap that exchanges semiannual fixed-rate payments for floating-rate payments. The fixed payments are based on a 6% annual rate, and the floating payments are based on 3-month LIBOR (London Interbank Offered Rate).

Swap futures trade in price terms and are quoted in points ($1,000 per one point), 32nds of points ($31.25 per one 32nd), and halves of 32nds of points ($15.625).

As with CBOT U.S. Treasury Note and Bond futures, the expiration cycle for Swap futures is March, June, September, and December.

For a more extensive discussion of contract terms, see "Contract Pricing Techniques and Conventions" and "Contract Salient Features" on pages 20-23.

Key Benefits

Users of CBOT Swap futures gain many important benefits from the design of these contracts.

Standardization

A Swap futures contract transforms its underlying reference swap rate into an index number that essentially looks and behaves like the price of a 6% coupon note. The mapping from the par swap rate to the contract price is standardized and one-to-one. So is the mapping from the par swap rate to key characteristics of the contract's price behavior, including:

- Interest rate sensitivity of price (i.e., the contract's DV01, the dollar value of a one basis point change in the underlying forward swap rate), and
- Convexity of the contract price with respect to the underlying forward swap rate.

By creating such standardization, CBOT Swap futures offer market participants a convenient device for gauging the relative utility and effectiveness of alternative positions and strategies.

Position Scalability

Importantly, standardization enables contract users to obtain exposure, long or short, to a generic swap rate without having to own a swap. Thus, unlike OTC swap contracts, positions in Swap futures can be entered or liquidated, scaled up or scaled down, without leaving behind either a trail of contractual documentation or a book of non-nettable or non-offsetting interest rate swaps.

Trade Scalability

Because Swap futures are both standardized and exchange-traded, all market participants are treated equitably, regardless of their scale of activity. This means they can use Swap futures to transact generic swap rate exposure in much smaller denominations than is either customary or cost-effective in the OTC swap market.

Administrative Convenience and Low Operational Cost

Using Swap futures eliminates the administrative costs and liabilities (e.g., manpower and record-keeping costs) frequently required in maintaining a book of OTC swap contracts.

Moreover, the cash settlement feature of CBOT Swap futures means there are no trailing contractual obligations after the futures contract has expired. Any financial obligations entailed in a CBOT Swap futures contract expire with the contract, after the final mark to market on the last day of trading. In this way, Swap futures make synthetic swap rate exposure readily available to market participants who would prefer not to be directly involved in OTC swap transactions.

Transparency

Futures markets allow participants with differing information sets and outlooks to discover the equilibrium price of the moment. By making price information available for all to see, CBOT Swap futures provide a reference point – and a daily mark to market – with unmatched transparency.

High-Grade Credit Exposure

The credit guarantee of the CBOT clearing services provider makes CBOT Swap futures contracts comparable to the strongest credits in the OTC market. Among other benefits, this reduces the need for entering into cumbersome bilateral collateralization agreements that are frequently required to alleviate exposure to lower-quality credits in OTC swap agreements.

Capital Efficiency

Besides virtually eliminating credit risk, the clearing house guarantee that backs CBOT Swap futures obviates the need for users to reserve significant amounts of capital against the risk of adverse market moves. By using Swap futures, balance sheet managers – bank treasurers, for example – can substitute (inexpensive) risk management for (expensive) capital.

Moreover, the Common Clearing Link between CBOT and the Chicago Mercantile Exchange (CME), the CBOT's clearing services provider, aids investment managers in achieving the economic goal of putting their capital to the most efficient possible use. Users of CBOT Swap futures who hold counter-positions in correlated futures contracts – CBOT Treasury futures or CME Eurodollar futures, for example—may enjoy potentially substantial reductions in performance bond (margin) postings.

Lower Regulatory Barriers

CBOT Swap futures facilitate easy and flexible access to swap rate exposure for various market participants who might otherwise face impediments. Consider, for example, anyone bound by the Investment Company Act of 1940, such as a mutual fund manager seeking to hedge $1 million of 10-year corporate or agency notes that are priced at a yield spread versus the 10-year swap rate.

Briefly, the Securities and Exchange Commission has interpreted the Investment Company Act to permit a mutual fund to enter into a short futures hedge to protect against losses in an underlying securities position, provided that the notional value of such futures contracts does not exceed the total market value of the securities being hedged. (The relevant passage of the Investment Company Act is found in the US Code at 15 USC 2D, Subchapter I, § 80a–18(f).)

In terms of regulatory compliance, the fund manager above confronts far less challenge in hedging his $1 million position with 10 CBOT Swap futures contracts (each with $100,000 notional value) than he would in attempting to hedge with a 10-year strip of 40 Eurodollar futures (each with $1 million notional value):

- In one case, having used CBOT Swap futures, the manager effectively hedges his asset exposure while complying with the Investment Company Act.
- In the other case, having used Eurodollar futures, he is hedging a $1 million par position with $40 million notional of futures. The practical import of this imbalance is that, to achieve the dual objectives of hedge effectiveness and compliance with the Investment Company Act, the manager would have to limit the scope of his Eurodollar futures hedging program to just $1 million for every $40 million of the underlying 10-year note position.

Off-Exchange Trading

CBOT Swap futures are eligible for a wide variety of off-exchange negotiated transactions. These include:

- ***Exchange-For-Physical (EFP)*** trades, in which a buyer acquires Swap futures from a seller at a mutually agreeable price. At the same time, the futures buyer sells (and the futures seller buys) an equivalent amount of cash-market securities for which the price dynamics are reasonably correlated with the price dynamics of the Swap futures.
- ***Exchange-For-Swap (EFS)*** trades, which are similar to EFP trades, except that the buyer of Swap futures enters into an over-the-counter interest rate swap in which he is a fixed-rate payer. Conversely, the seller of Swap futures takes the other side of the OTC interest rate swap as a fixed-rate receiver. The notional amount of the futures position is approximately equivalent to the notional amount of the OTC interest rate swap.

- ***Exchange-For-Risk (EFR)*** trades, which are similar to EFS trades, except that the buyer of Swap futures enters into an over-the-counter option position with a delta that is positively related to the level of swap rates (e.g., he is either a purchaser of a fixed payer swaption or a seller of a fixed receiver swaption). The seller of the Swap futures takes the other side of the OTC option transaction (e.g., he is either a buyer of a fixed receiver swaption or a seller of a fixed payer swaption). The DV01 of the futures position is approximately equivalent to the delta of the OTC option.
- ***Wholesale*** trades, in which a buyer and seller can bilaterally transact a position in Swap futures, at a negotiated mutually agreeable price, as long as the scale of the futures transaction is large enough to qualify for consideration as a wholesale trade.

The Chicago Board of Trade **Rules & Regulations** is the authoritative source regarding off-exchange transactions. Regulations 444.01, 444.04, and 444.05 govern EFP, EFR, and EFS transactions, respectively. Regulation 331.05 covers wholesale trades. The **Rules & Regulations** can be found on the CBOT website.

Hedge Effectiveness for Spot Swaps

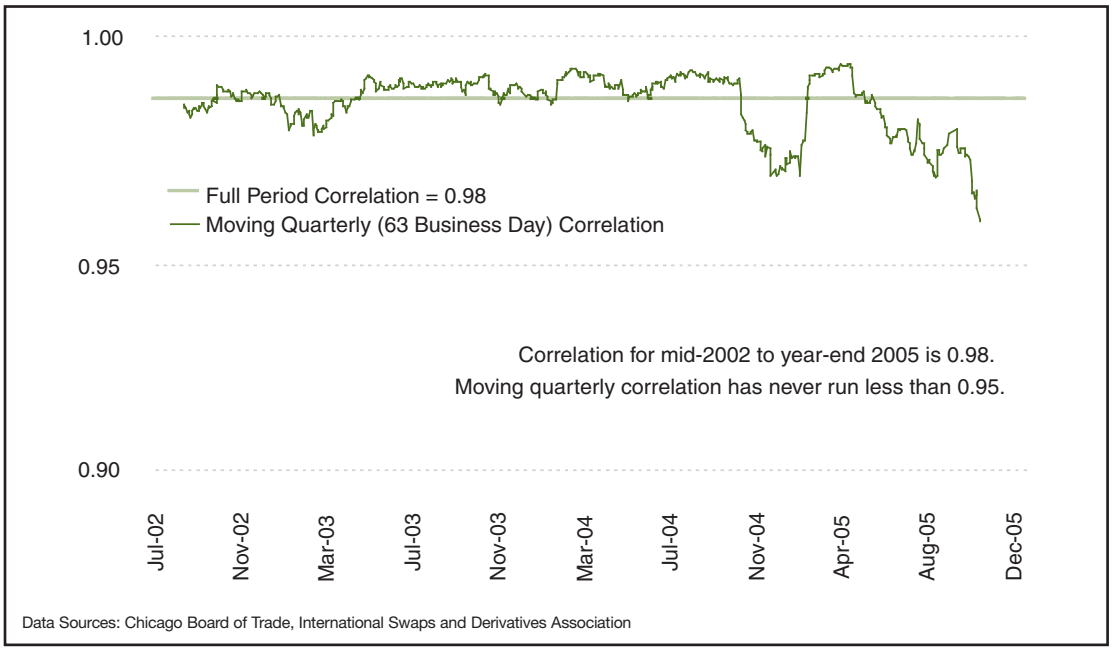
Because the price dynamics of CBOT Swap futures correlate closely with spot swap rate dynamics, they offer an effective exchange-traded hedge for spot swap exposure.

As a rule, the correlation between a CBOT Swap futures contract and the corresponding spot swap rate will be tight as long as the stub rate – the LIBO rate corresponding to the interval between the spot settlement date and the forward-starting (IMM) start date implied in the Swap futures contract – is either nonvolatile, or highly correlated with the futures contract's implied forward-starting swap rate, or both. **Exhibit 2** illustrates this for mid-2002 through December 2005. The straight line marks a full-period correlation of 0.98 between daily changes in spot rates for OTC spot 10-year swaps and daily changes in the forward-starting swap rates implied by front-month 10-Year Swap futures. The wavy line represents moving quarterly correlations, which have held consistently above 0.95.

Exhibit 2

CBOT 10-Year Swap Futures and OTC 10-Year Swaps

Correlations of (a) daily changes in forward-starting swap rates implied by prices of nearby CBOT 10-Year Interest Rate Swap futures with (b) daily changes in ISDA Benchmark Rates for OTC spot 10-year interest rate swaps.



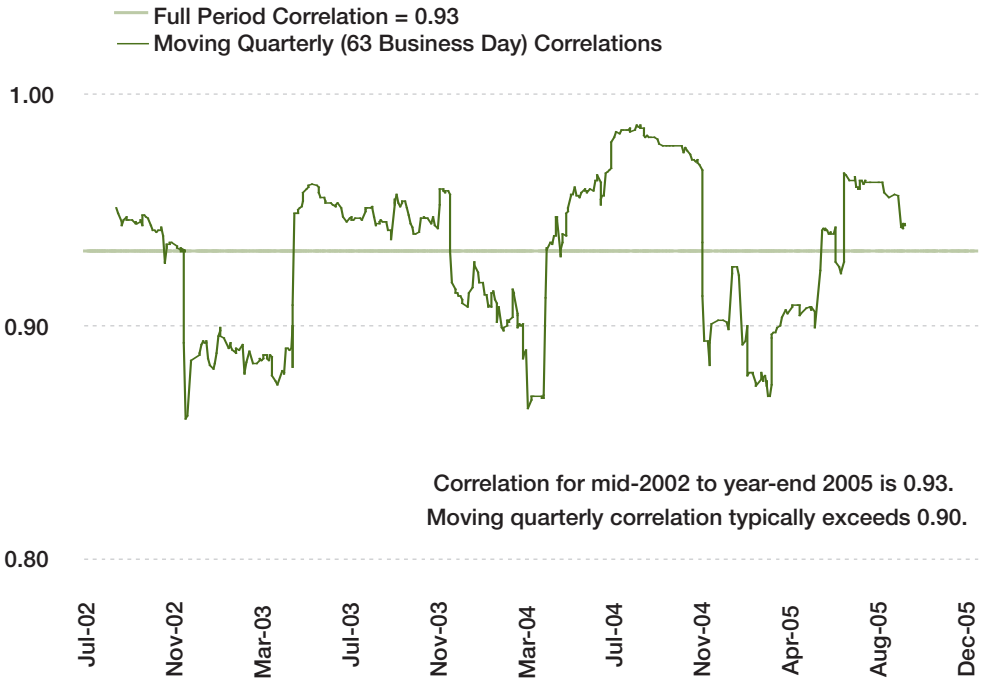
Data Sources: Chicago Board of Trade, International Swaps and Derivatives Association

For the same stretch of history, **Exhibit 3** shows a 0.93 correlation between daily changes in spot rates for OTC 5-year swaps and daily changes in the forward-starting swap rates implied by front-month 5-Year Swap futures. Moving quarterly correlations typically exceed 0.90.

Exhibit 3

CBOT 5-Year Swap Futures and OTC Spot 5-Year Swaps

Correlations of (a) daily changes in forward-starting swap rates implied by prices of nearby CBOT 5-Year Interest Rate Swap futures with (b) daily changes in ISDA Benchmark Rates for OTC spot 5-year interest rate swaps.



Data Sources: Chicago Board of Trade, International Swaps and Derivatives Association

The high and reasonably stable correlations displayed in **Exhibits 2** and **3** attest to the utility of CBOT Swap futures for managing spot swap exposure under a wide range of circumstances:

- Bank treasurers should find Swap futures useful for asset-liability management.
- For proprietary traders, Swap futures are an analytically clean, convenient, standardized tool for spreading generic swap rate exposure against cash market holdings.
- For hedge funds, Swap futures open an avenue for cost-effective creation of synthetic spot swap rate exposure without the administrative costs of OTC alternatives.
- For those who manage books of plain vanilla OTC swaps, Swap futures offer a capital-efficient means to control residual risks, freeing capacity for use in more exotic derivative structures.

In all instances, an added benefit in using CBOT Swap futures for risk control is that they permit relatively straightforward demonstrations of hedge effectiveness for the purpose of regulatory compliance.

Hedge Effectiveness for Spread Product

Plain vanilla swap rates derive from LIBOR, for which the authoritative determination is the daily fixing conducted under the auspices of the BBA (British Bankers Association). The banks that contribute to BBA's daily LIBOR fixing are generally regarded to be of AA- quality. Because LIBO rates contain this credit risk – specifically, the risk that a money-center bank might be unable to make timely repayment of interbank funds it has borrowed – the swap rates that derive from them trade at a spread over corresponding Treasury yields, commonly called the "swap spread."

With AA- as the implied credit exposure in generic plain-vanilla swap rates, CBOT Swap futures are an excellent exchange-traded tool for managing both the credit and interest rate risk exposures of portfolios of investment-grade spread product in the 5-year to 10-year maturity range, including Fannie Mae Benchmark Notes® and Freddie Mac Reference Notes®, investment grade corporate bonds, mortgage-backed securities, and investment grade municipal bonds.

Consider, for example, using CBOT Swap futures for hedging, controlling, and synthesizing risk exposure in high-grade tax-exempt bonds. **Exhibit 4** shows daily closing prices of two highly traded issues from the 10-year sector of the tax-exempt bond market – the State of Connecticut Series D 5% of 1 December 2014, and the New Jersey Transit System Series B 5 1/4% of 15 December 2015 – plotted against prices of nearby CBOT 10-Year Interest Rate Swap futures and, for comparison, prices of on-the-run cash 10-year Treasury notes. All data are end-of-day prices during 2005.

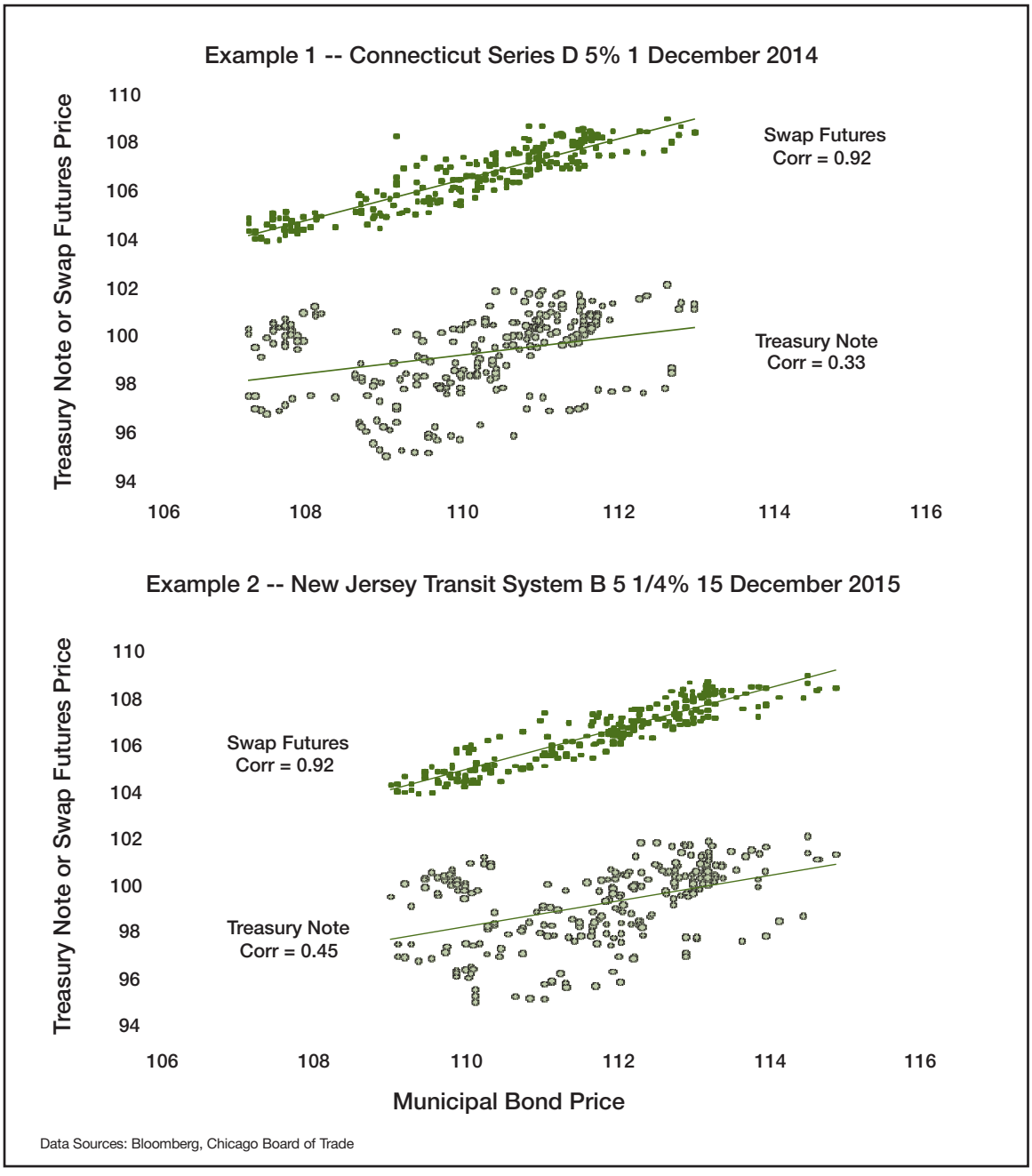
The high correlation between the tax-exempt bonds and CBOT Swap futures attests that Swap futures make an excellent hedging device. In both examples, the price correlation between bonds and Swap futures is 0.92.

More importantly, these results far surpass those for the most plausible alternative hedge, namely on-the-run 10-year Treasury notes. Correlations between municipal bond prices and Treasury prices are significantly lower – in both cases, well below 0.50.

Exhibit 4

Hedge Effectiveness of CBOT Swap Futures for Tax-Exempt Bonds: Two Examples

Price correlation between 10-year tax-exempt bonds, and nearby CBOT 10-Year Swap futures and on-the-run 10-year Treasury notes. Data are daily closing prices, 2005.



Data Sources: Bloomberg, Chicago Board of Trade

More generally, the close price correlation between Swap futures and spread product makes Swap futures potentially useful to a wide variety of market participants:

- Diversified fixed-income portfolio money managers can use Swap futures to hedge against adverse turns in market yields, to synthetically manage duration exposure, or as a means to securitize cash holdings to combat cash drag.
- Holders of mortgage securities can use Swap futures to manage duration exposure.
- Issuers of corporate or tax-exempt bonds can use Swap futures to protect against adverse market events during intervals leading up to issuance.

A significant potential benefit is that Swap futures may assist many market participants in achieving prudent risk management and compliance with FAS 133 accounting requirements.

Synthetic Swap Spreads and Curve Trades

As noted earlier, the swap spread at any given term to maturity reflects the differential between the risk-free Treasury yield and the credit risk presented by AA- financial institutions. A glance at the empirical stylized facts of 5-year and 10-year swap spreads prompts at least three observations.

First, the swap spread is cyclical. The upper panel of **Exhibit 5** illustrates this for late 1987 through 2005. Swap spreads trended down throughout the late 1980s. After a spell of stability in the early 1990s, they widened, peaking in spring 2000 – intriguingly, about the same time that the great equity market rally of the late 1990s reached its apex. Between mid-2000 and early 2003 they retreated again. They spiked briefly during the revaluation of the long-dated end of the yield curve, in spring and summer of 2003, but quickly stabilized. By autumn 2005, they were on the rise again.

Among many interesting features of the upper panel of **Exhibit 5** is the comparison between the two long intervals of relative stability: early to mid-1990s on one hand, and late 2003 to late 2005 on the other. Despite the proliferation in recent years of various means for mitigating the credit exposure in OTC swap contracts (e.g., bilateral collateralization facilities), the average level of swap spreads during the 2003-05 plateau was nonetheless higher than the levels that prevailed a decade earlier.

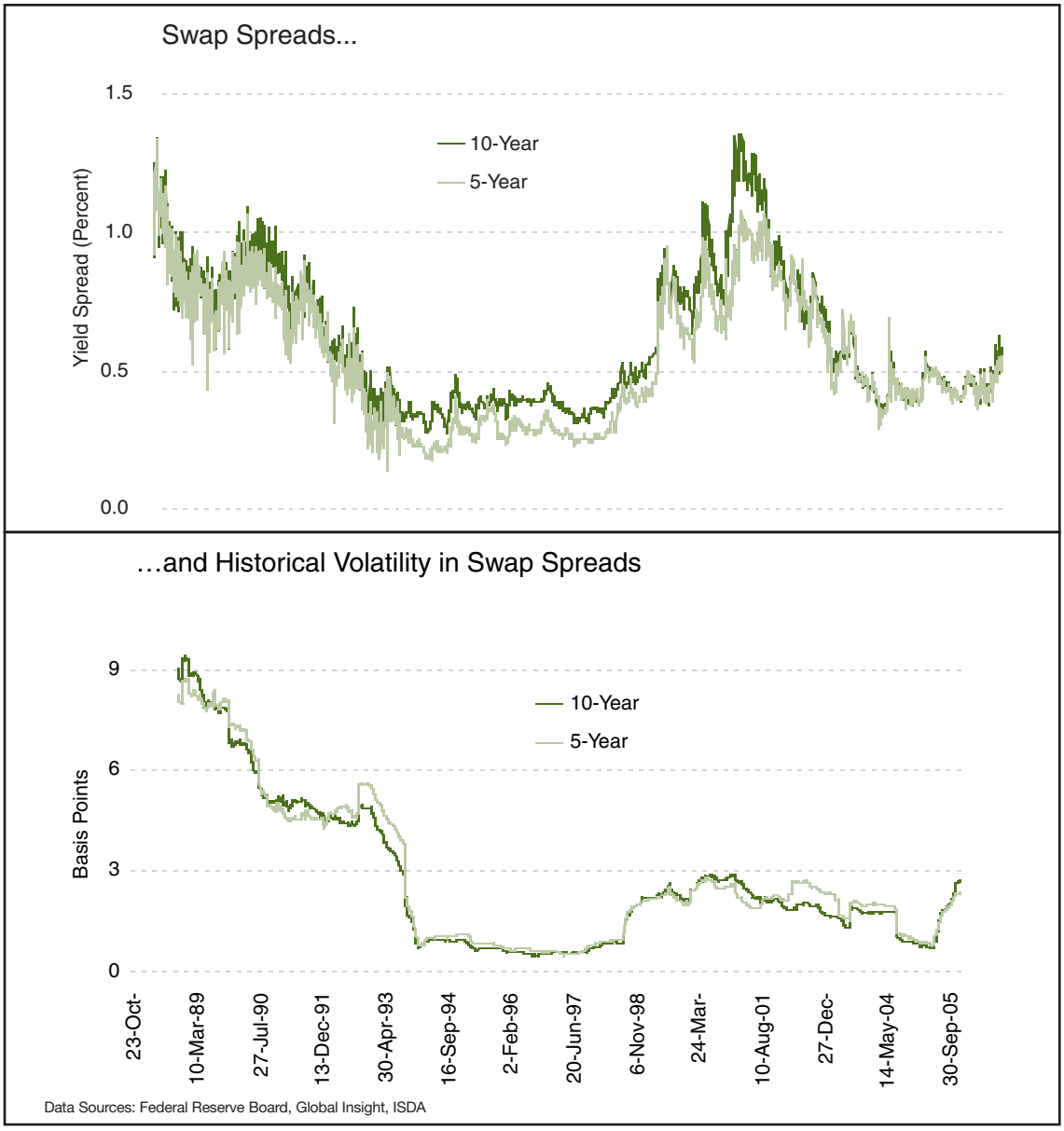
Second, the volatility in swap spreads also has ebbed and flowed cyclically, at least since the early 1990s. The lower panel of **Exhibit 5** illustrates this. (The cause of the pronounced contraction in swap spread volatility that dominated the late 1980s is open to speculation. One plausible candidate is that this reflected nothing more than the transition of the OTC interest rate swap product from novelty to maturity.)

Third, the market directionality embedded in swap spreads – the degree to which they move in sympathy with or counter to the corresponding Treasury yields – appears likewise to be cyclical. Over the long term, swap spreads and Treasury yields are mildly negatively correlated. For the entire interval of October 1987 through December 2005, correlation of daily changes in the swap spread with daily changes in the corresponding Treasury yield is around -0.18, at both 5-year and 10-year maturity points. The magnitude of these two negative correlations is statistically distinct from zero at conventional levels of test significance. However, both correlations are probably too small to be useful for the majority of market participants who are involved in either risk management or strategic spread trading.

Exhibit 5

Swap Spreads: Levels and Volatility, Oct. 1987 to Dec. 2005

Swap spread – either 5-year or 10-year – is swap rate minus corresponding constant-maturity Treasury yield. Swap data sources are mid-market data published by Global Insight (Oct. 1987 to Sep. 1998) or ISDA Benchmark Rates (Oct. 1998 to Dec. 2005). Historical volatility is moving annual (252 business day) volatility (square root of mean of squared daily changes in swap spread).



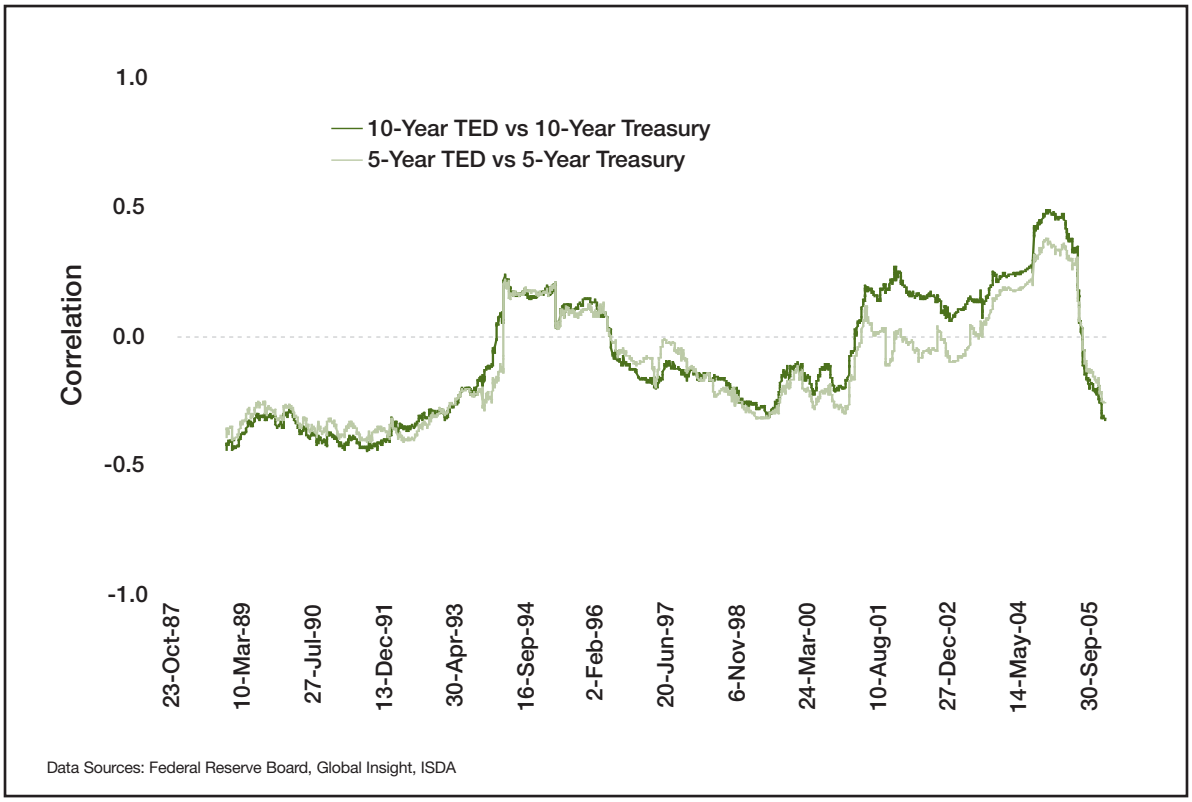
Data Sources: Federal Reserve Board, Global Insight, ISDA

More provocative is an analysis of shorter-term intervals, which reveals that both the direction of correlation and the size of correlation fluctuate cyclically around the full-period correlations given above. **Exhibit 6** illustrates this.

Exhibit 6

Fluctuation in Correlations Between Swap Spreads and Treasury Yields, Oct. 1987 to Dec. 2005

Rolling yearly (252 business day) correlations between (a) daily changes in swap spreads and (b) daily changes in corresponding constant maturity Treasury yields. A yearly correlation value outside the range of -0.161/+0.161rejects, with 99% confidence, the null hypothesis of zero correlation.



Data Sources: Federal Reserve Board, Global Insight, ISDA

Several brief intervals – 1994, and mid-2003 through mid-2005, for example – find swap spreads rising and falling in league with Treasury yields.

Throughout the mid-1990s and, in the case of the 5-year maturity, throughout the early years of the new millennium, swap spreads decoupled from Treasury yields: insofar as their rolling correlations with Treasury yields were statistically indistinguishable from zero, swap spreads were effectively non-directional.

Throughout the late 1980s and early 1990s, and again in the late 1990s, swap spreads were negatively directional, typically widening when companion Treasury yields fell, and vice versa. The year 2005 witnessed a dramatic swing in swap spread directionality, from highly positive to deeply negative. In all instances the magnitude of short-term correlation is always 0.5 or less. As with the long-term correlation levels discussed above, for many market participants this is too small to be useful.

Nonetheless, such fluctuations in both sign and magnitude of correlation between swap spreads and the companion Treasury yields suggest strongly that market participants would benefit from simple ways to isolate and trade swap spread exposure. CBOT 5-Year and 10-Year Interest Rate Swap futures – along with CBOT 5-Year and 10-Year Treasury Note futures – make this possible.

Synthetic Swap Spreads

For example, to act on the view that credit spreads in the 10-year maturity sector are wider than economic conditions warrant, traders can sell the 10-year synthetic swap spread by selling short either CBOT 10-Year Treasury Note futures or on-the-run cash 10-year Treasury notes, and buying a corresponding number of CBOT 10-Year Swap futures. The CBOT Swap futures complex is structured so that either approach offers benefits:

- By implementing the spread as cash (Treasuries) to futures (Swaps), market participants can take advantage of the flexibility of the Exchange's EFP facility in entering or exiting the trade. (See "Off-Exchange Transactions" on page 7).
- By setting up the spread between CBOT Treasury futures and CBOT Swap futures, market participants will enjoy the capital efficiencies arising from the performance bond reductions (i.e., margin breaks) that pertain to such spreads. For more on margins and margin breaks on spreads, visit the CBOT website.

The Swap Spread Curve

Suppose you expect that the Treasury yield curve and the swap rate curve will both steepen, but that the swap curve will steepen relatively less. In effect, you look for the 5-year swap spread to widen relative to the 10-year swap spread. You can act on this view by buying the synthetic swap spread curve.

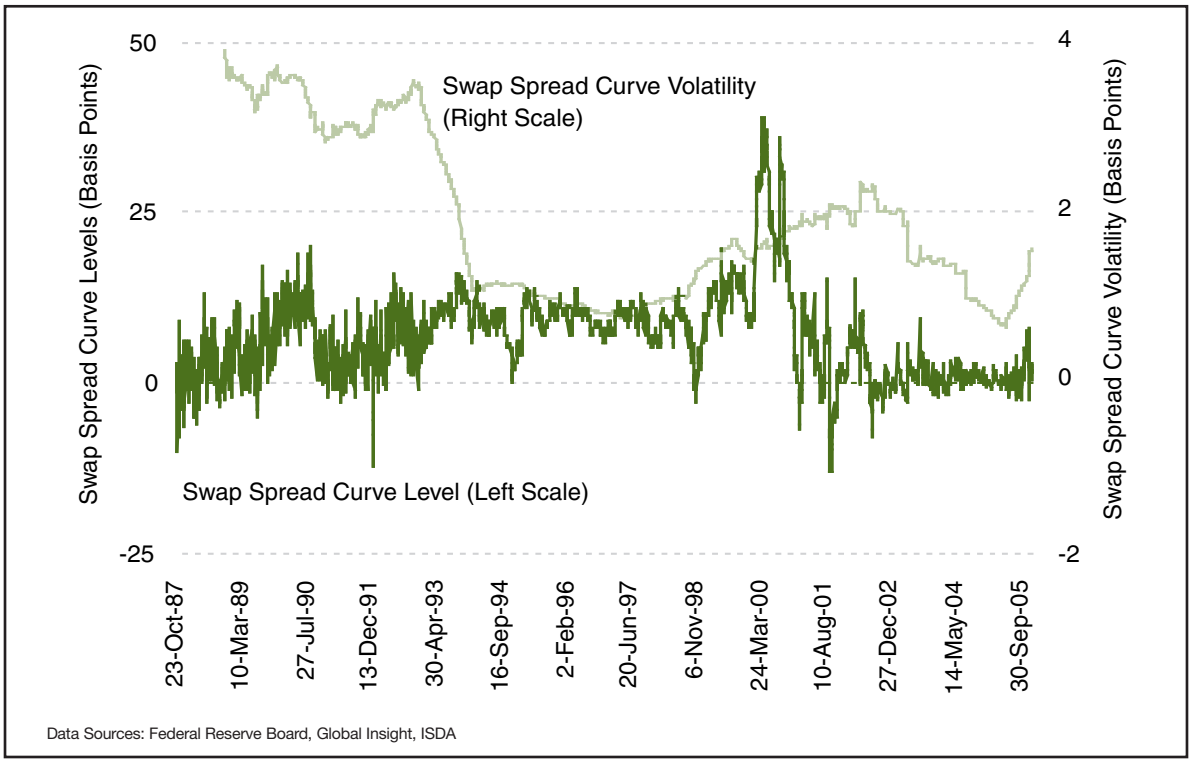
One way to implement this trade is (a) to buy the 5-year synthetic swap spread (buy 5-Year Treasury Note futures and sell a DV01-equivalent number of 5-Year Swap futures) and (b) to sell a corresponding position in the 10-year synthetic swap spread (sell 10-Year Treasury Note futures

and buy a DV01-equivalent number of 10-Year Swap futures). An additional structural feature of the trade is that the 10-year leg would be scaled so that the size of the 10-Year Swap futures position is equivalent in DV01 terms to the 5-Year Swap futures position in the 5-year leg.

Alternatively, as with synthetic swap spreads, market participants with convenient access to the cash Treasuries market might prefer to structure the trade with on-the-run Treasury 5-year and 10-year notes instead of CBOT Treasury futures. Historical data for October 1987 through December 2005, displayed in **Exhibit 7,** suggest why and when the swap spread curve might signify a potentially attractive source of trading opportunities.

Exhibit 7

The Swap Spread Curve: Levels and Historical Volatility, Oct. 1987 to Dec. 2005



Data Sources: Federal Reserve Board, Global Insight, ISDA

The Bank Credit Curve

Finally, with both Swap futures and highly liquid CBOT 30-Day Fed Fund futures readily at hand, CBOT market participants have a cost-effective way of trading the bank credit yield curve. For example, given the view that the market is underreacting to inflation fears and that the bank credit curve will steepen accordingly, traders can buy the curve by taking a long position in Fed Fund futures and a corresponding short position in Swap futures, with both contracts expiring in the same month.

Contract Pricing Techniques and Conventions

The trading unit for CBOT 5-Year or 10-Year Interest Rate Swap futures is the notional price of the fixed-rate side of a plain vanilla 5-year or 10-year U.S. dollar interest rate swap. Here "plain vanilla" denotes a standard fixed-to-floating interest rate swap with notional principal value of $100,000 that would exchange:

- semiannual interest payments at a fixed rate of 6% per annum (measured according to the 30/360 daycount convention), for
- semiannual floating interest payments based on 3-month LIBOR (measured according to the standard actual/360 daycount convention) with spot reset dates (versus IMM reset dates).

In all other respects, the swap rate that serves as the underlying reference for the contract is assumed to adhere to the terms that ISDA prescribes for the purpose of setting the daily Benchmark Rates for 5-year or 10-year U.S. dollar interest rate swaps. (ISDA Benchmark mid-market par swap rates are collected at 11:00 a.m. New York time by Reuters Limited and Garban Intercapital plc and are published on Reuters page ISDAFIX1. Source: Reuters Limited.)

Swap futures expire by cash settlement. The final expiration price of each contract is essentially the value of the notional cash flows described above – a fixed coupon payment of $3,000 each semester through maturity, plus payment of $100,000 principal at maturity – discounted to present value at a yield to maturity equal to the appropriate ISDA Benchmark Rate, as set on the morning of the contract's last day of trading.

The contract final settlement value is determined as follows:

5-year: $100,000 x [6/r + (1-6/r) x $(1+r/200)^{-10}$]
10-year: $100,000 x [6/r + (1-6/r) x $(1+r/200)^{-20}$]

Here, *r* represents the ISDA Benchmark Rate for a 5-year or 10-year interest rate swap on the last day of trading, expressed in percent terms. If, for example, the ISDA Benchmark Rate were six and three quarters percent, then *r* would be 6.75.

The contract final expiration price is this final settlement value rounded to the nearest one quarter of one thirty-second of one price point.

Final Settlement Example

To see how this works in practice, and to better understand the mechanics of the expiration procedure, consider the expiration of December 2005 10-Year Interest Rate Swap futures. As usual IMM Monday – in this instance, 19 December 2005 – was the contract's expiration day and last day of trading.

> (Note that expiration days for Swap futures are customarily the Monday before the third Wednesday of the expiration month – exactly the same expiration calendar as applies to Chicago Mercantile Exchange Eurodollar futures. Their historical connection to the expiration calendar for Eurodollar futures explains why these two days are commonly referred to as "IMM Monday" and "IMM Wednesday," respectively.)

The expiring contract ceased trading at 11:00 a.m. New York time, as Exchange regulations require on any Swap futures expiration day. Around 11:30 a.m. New York time Reuters published the day's ISDA Benchmark Rates.

The 10-Year ISDA Benchmark Rate for 19 December 2005 was 4.979%. (Note that the ISDA convention in publishing this and other Benchmark Rates is to carry them to three decimal places.) Upon its publication, this spot swap rate was transformed by the CBOT into a final contract settlement value according to the formula given above:

$$\$107{,}966.17 = \$100{,}000 \times [\, 6/4.979 + (1 - 6/4.979) \times (1 + 4.979/200)^{-20} \,]$$

Translated into contract price points and 32nds of price points, at $1,000 per price point, this is equivalent to:

107 and 30.92 / 32nds

The Exchange then rounded this result to the nearest quarter of a 32nd to obtain the final expiration price of:

107 and 31 / 32nds

In rare instances when the final settlement value occurs at the exact midpoint between adjacent quarters of a 32nd of a price point, the Exchange obtains the final expiration price by rounding up.

Contract Salient Features

5-Year Interest Rate Swap Futures

Trading Unit	The notional price of the fixed-rate side of a 5-year interest rate swap with $100,000 notional principal, that exchanges semiannual interest payments at a 6% per annum fixed rate for floating interest rate payments based on 3-month LIBOR.
Price Basis	Notional principal value of $100,000. Par is on the basis of 100 points. One point equals $1,000
Tick Size	One half of one thirty-second of one point ($15.625 per contract).
Contract Months	The first three consecutive contracts in the March-June-September-December quarterly cycle.
Last Trading Day	The second London business day preceding the third Wednesday of the expiration month. Trading in expiring contracts ceases at 11:00 a.m. New York time on the last trading day.
Delivery Standard	The notional price of the Trading Unit on the last day of trading, based upon the ISDA Benchmark Rate for a 5-year U.S. dollar interest rate swap on the last day of trading, as published at approximately 11:30 a.m. New York time on Reuters page ISDAFIX1. (ISDA Benchmark mid-market par swap rates are collected at 11:00 a.m. New York time by Reuters Limited and Garban Intercapital plc and published on Reuters page ISDAFIX1. Source: Reuters Limited.)
Delivery Method	Cash settlement. The final settlement value will be determined as: $100,000 * [6/r + (1 – 6/r) * (1 + r/200)-10] where *r* represents the ISDA Benchmark Rate for a 5-year U.S. dollar interest rate swap on the last day of trading, expressed in percent terms. (E.g., if the ISDA Benchmark Rate were five and a quarter percent, then *r* would be 5.25.) Contract expiration price will be the final settlement value rounded to the nearest one quarter of one thirty-second of one point.
Trading Hours	Open auction: 7:20 a.m. to 2:00 p.m. Chicago time, Monday through Friday. Electronic: 6:03 p.m. to 6:00 p.m. Chicago time, Sunday through Friday.
Position Limits and Reportable Positions:	No position limit. Reportable position threshold: 500 contracts. Updates posted in Appendix 4C of CBOT Rules and Regulations.
Margins	For information on margin requirements see CBOT website.
Ticker Symbols	Open auction: NG Electronic: SA

10-Year Interest Rate Swap Futures

Trading Unit	The notional price of the fixed-rate side of a 10-year interest rate swap with $100,000 notional principal, that exchanges semiannual interest payments at a 6% per annum fixed rate for floating interest rate payments based on 3-month LIBOR.
Price Basis	Notional principal value of $100,000. Par is on the basis of 100 points. One point equals $1,000
Tick Size	One half of one thirty-second of one point ($15.625 per contract).
Contract Months	The first three consecutive contracts in the March-June-September-December quarterly cycle.
Last Trading Day	The second London business day preceding the third Wednesday of the expiration month. Trading in expiring contracts ceases at 11:00 a.m. New York time on the last trading day.
Delivery Standard	The notional price of the Trading Unit on the last day of trading, based upon the ISDA Benchmark Rate for a 10-year U.S. dollar interest rate swap on the last day of trading, as published at approximately 11:30 a.m. New York time on Reuters page ISDAFIX1. (ISDA Benchmark mid-market par swap rates are collected at 11:00 a.m. New York time by Reuters Limited and Garban Intercapital plc and published on Reuters page ISDAFIX1. Source: Reuters Limited.)
Delivery Method:	Cash settlement. The final settlement value will be determined as: $100,000 * [6/r + (1 – 6/r) * (1 + r/200)-20] where *r* represents the ISDA Benchmark Rate for a 10-year U.S. dollar interest rate swap on the last day of trading, expressed in percent terms. (e.g., if the ISDA Benchmark Rate were five and a quarter percent, then *r* would be 5.25.) Contract expiration price will be the final settlement value rounded to the nearest one quarter of one thirty-second of one point.
Trading Hours:	Open auction: 7:20 a.m. to 2:00 p.m. Chicago time, Monday through Friday. Electronic: 6:03 p.m. to 6:00 p.m. Chicago time, Sunday through Friday.
Position Limits and Reportable Positions:	No position limit. Reportable position threshold: 500 contracts. Updates posted in Appendix 4C of CBOT Rules and Regulations.
Margins:	For information on margin requirements see CBOT website.
Ticker Symbols:	Open auction: NI Electronic: SR

Notes

Chicago Board of Trade

Business Development
141 W. Jackson Boulevard
Chicago, IL 60604-2994
312-341-7955 • fax: 312-341-3027

New York Office
One Exchange Plaza
55 Broadway, Suite 2602
New York NY 10006
212-943-0102 • fax: 212-943-0109

Europe Office
St. Michael's House
1 George Yard
London EC3V 9DH
United Kingdom
44-20-7929-0021 • fax: 44-20-7929-0558

Latin America Contact
52-55-5605-1136 • fax: 52-55-5605-4381

www.cbot.com

06-000026