

Confidential Presentation

Interest Rate Futures

An Introduction to Interest Rate Futures Markets and the
Lehman Brothers Integrated Futures Product

September 2003

LEHMAN BROTHERS



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Part A: Interest Rate Futures Product Overview

Introduction

Introduction

- ◆ Interest Rate Futures⁽¹⁾ are liquid, transparent financial instruments which are used to express market views; manage duration, curve and volatility risk; modify and enhance portfolio performance and replicate indices
- ◆ Futures offer many advantages over other investment vehicles, including
 - Anonymity
 - Credit Quality
 - Leverage
 - Liquidity
 - Low Transaction Costs
 - Mark-to-Market (Daily)
 - Operational Efficiencies
 - Portfolio Diversification
 - Price Discovery
 - Price Transparency
 - Risk Management

1. Refers to both futures and options on futures.

Note: this presentation is intended as an introductory, non-comprehensive primer focused predominantly on USD Interest Rate Futures. Lehman Brothers will be happy to answer any questions or inquiries you have about USD or non-USD Interest Rate Futures markets

Contracts and Markets

Product Definition

Contracts and Markets

Futures Contract: A legally binding agreement, made on a Futures exchange, to buy or sell a financial instrument or commodity at some time in the future. Futures contracts are standardized according to the quality, quantity, and delivery time and location for each commodity. The key variables are price and, in the case of some Futures contracts, deliverable grade



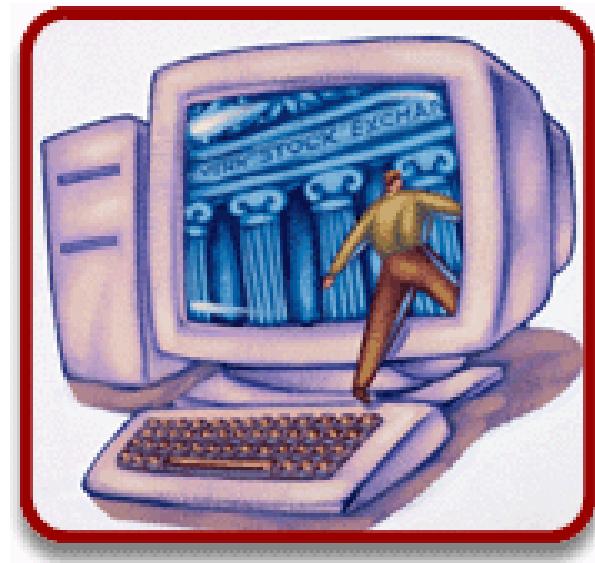
Source: CBOT.com, Bloomberg

Product Definition

Futures Exchange - Open Outcry:
auction-like form of exchange where traders verbalize their buy and sell orders in a trading pit. Contracts are made when bids and offers are matched



Futures Exchange - Electronic:
networked matching of buy and sell orders through the exchange system or via vendors connected to the exchange system



Source: CBOT.com, Bloomberg

Types of Contracts

Treasury Futures	
◆ Exchanges	
– CBOT	
– Broker Tec	
◆ Underlying Deliverable	
– 2 year UST (CBOT only)	
– 5 year UST	
– 10 year UST	
– 30 year UST	
◆ Contract Months	
– March	
– June	
– September	
– December	

Example: 10Y Futures Contract Table

GRAB Comdty CT
<PAGE> now scrolls 17 contracts. Enter # <GO> to scroll contracts.
Session:D Contract Table
US 5YR NOTE (CBT)
Exchange Web Page Pricing Date: 3/14/03 Price Display: 2
Chicago Board of Trade --RS REPORTED 3/14 -- 2
Grey date = options trading
Last Change Time High 2 Low OpenInt TotVol Previous Close
1FVH3 Mar03 114-08 s + 07 Close 114-08 114-03a 70394 10141 114-01
2FVM3 Jun03 113-19 s + 08 Close 113-21+ 113-08+ 741889 80278 113-11
3FVU3 Sep03 0 0
4FVZ3 Dec03 0 0
5FVH4 Mar04 0 0
6FVM4 Jun04 0 0

Australia 61 2 3777 6000 Brazil 5511 3046 4500 Europe 44 20 2330 2500 Germany 49 69 530410
Hong Kong 852 2977 6000 Japan 61 3 3201 6900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2003 Bloomberg L.P.
6559-1110-0 31-Mar-03 17:49:16

Source: Bloomberg

Types of Contracts

Contracts and Markets

EuroDollar Futures	
◆ Exchanges ⁽¹⁾	
– CME	
– CME GLOBEX	
– SGX	
◆ Underlying	
– 3-month LIBOR	
◆ Contract Months	
– Total of 44 contracts:	
• 40 months on a quarterly cycle (10 years)	
• 4 nearest additional months	
– Contracts trade individually and as part of Bundles and Packs	

Example: EuroDollar Futures Contract Table															
Comdty CT															
<PAGE> now scrolls 17 contracts. Enter # <GO> to scroll contracts.															
Session:D Contract Table															
90DAY EURO\$ FUTR															
Exchange Web Page				Pricing Date: 3/14/03			Price Display: 2								
Chicago Mercantile Exchange															
Grey date = options trading															
TOT: 4756902 1156755 Previous															
↓	Scroll	Last	Change	Time	High	2	Low	OpenInt	TotVol						
1	EDH3 Mar03	98.750s	unch	Close	98.7850	98.7600	50602	25093	98.7600						
2	EDJ3 Apr03	98.7750s	+.0150	Close	98.7850	98.7600	5035	354	98.790						
3	EDK3 May03	98.805s	+.015	Close	98.820b	98.800	724765	192657	98.785						
4	EDM3 Jun03	98.815s	+.030	Close	98.850	98.780	651	0	98.760						
5	EDN3 Jul03	98.785s	+.025	Close	98.785b	98.785	59	0	98.750						
6	EDQ3 Aug03	98.750s	unch	Close	98.740	98.635	619143	206699	98.660						
7	EDU3 Sep03	98.705s	+.045	Close	98.740	98.635	574119	246161	98.430						
8	EDZ3 Dec03	98.490s	+.060	Close	98.515	98.410	424257	156352	98.155						
9	EDH4 Mar04	98.190s	+.035	Close	98.230	98.115	290370	62489	97.820						
10	EDM4 Jun04	97.860s	+.040	Close	97.895b	97.790	213430	39999	97.480						
11	EDU4 Sep04	97.510s	+.030	Close	97.550	97.445a	214589	34906	97.160						
12	EDZ4 Dec04	97.190s	+.030	Close	97.225	97.130	149422	15246	96.895						
13	EDH5 Mar05	96.930s	+.035	Close	96.955	96.870	123341	12068	96.655						
14	EDM5 Jun05	96.690s	+.035	Close	96.715	96.630	118539	12396	96.425						
15	EDU5 Sep05	96.465s	+.040	Close	96.485	96.400	106825	9000	96.210						
16	EDZ5 Dec05	96.250s	+.040	Close	96.260	96.185	89476	5162	96.025						
17	EDH6 Mar06	96.065s	+.040	Close	96.070	96.000a									
Australia 61 2 3777 8600 Brazil 5511 3040 4500 Europe 44 20 7350 7500 Germany 49 69 530410															
Hong Kong 852 2977 6000 Japan 61 3 3201 6900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2003 Bloomberg L.P.															
GSS9-1110-0 31-Mar-03 17:54+17															

Source: Bloomberg

- All three exchanges are fungible with respect to clearing.. Client must request MOS (Mutual Offset System) on each order and incurs an additional \$0.50 charge when moving from CME/GLOBEX to SIMEX but incurs no additional MOS charge when moving from SGX to CME

Eurodollar Futures: Packs and Bundles

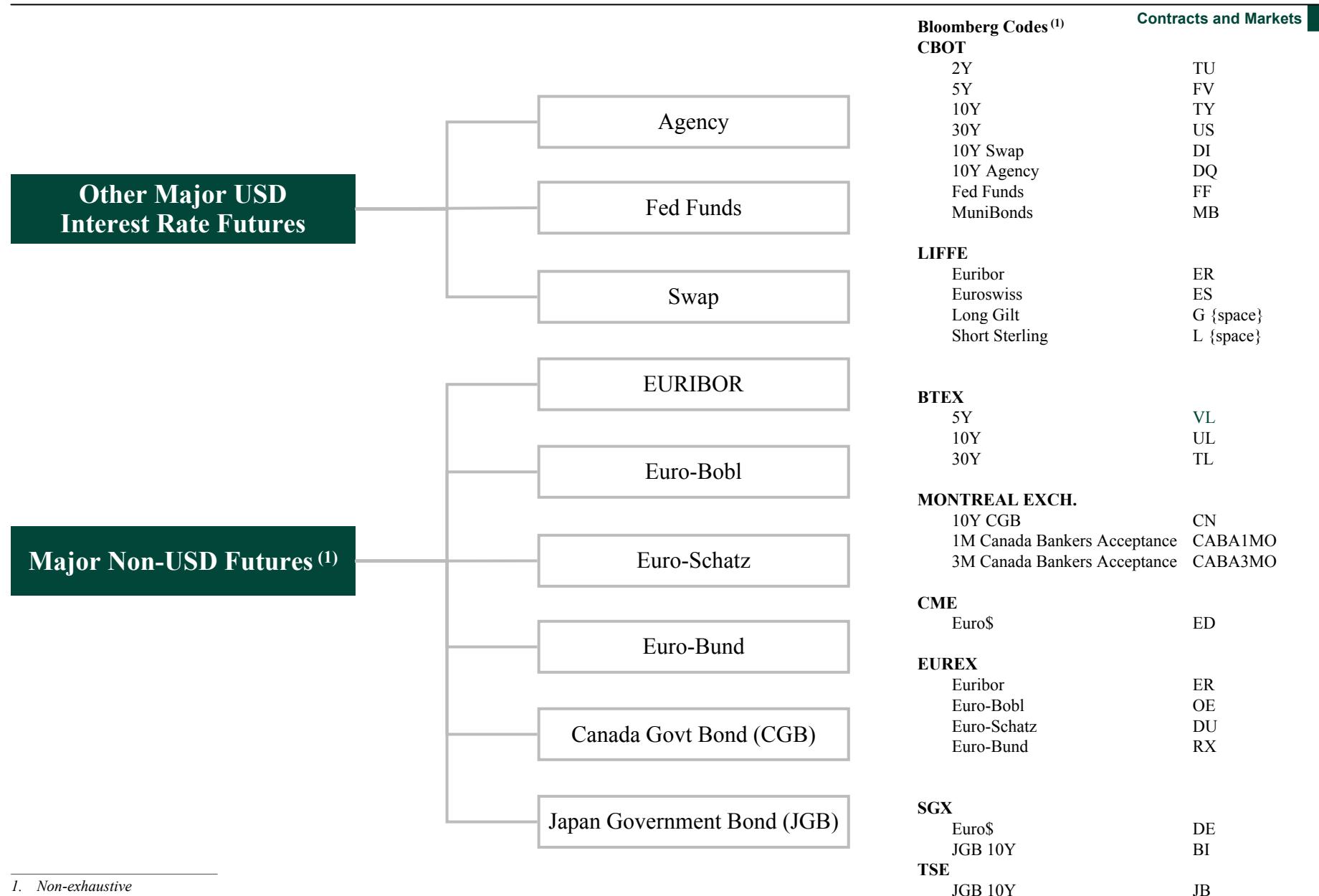
Contracts and Markets

Bundle: A Eurodollar bundle is the simultaneous sale or purchase of equal lots of a series of consecutive Eurodollar Futures contracts. The first contract in any bundle is generally the first quarterly contract in the Eurodollar strip

Pack: A pack is the simultaneous purchase or sale of an equal number each of four consecutive futures contracts, quoted on an average net change basis from the previous day's settlement price. Packs provide a readily available, widely accepted method for executing multiple futures contracts with a single transaction. Packs are referenced according to a coded color ("Front", "Red", "Green", "Blue", "Gold", etc.). A new contract rolls into and an old contract rolls out of each pack on a quarterly basis

Source: Bloomberg, CME.com

Types of Contracts



Contract Liquidity

Contracts and Markets

Average Daily Volume		Average Open Interest	
Contract	Notional Equivalent (\$bil)	Contract	Notional Equivalent (\$tril)
ED	\$802B	ED	\$4T
US	\$22B	US	\$47T
TY	\$38B	TY	\$80T
FV	\$20B	FV	\$62T
TU	\$3B	TU	\$21T

Source: CBOT.com; CME.com; 2002 Data.

Economic Characteristics

Duration

Economic Characteristics

UST Futures

- ◆ Defined as the price sensitivity of the Futures contract based on changes in the spot or forward yield of the bonds in the underlying basket
- ◆ Futures contract duration tracks the duration of the Cheapest-to-Deliver (CTD) bond in the basket but is also influenced by market expectations for potential switches in the CTD
- ◆ Significant yield curve shifts drive switches in the futures contract's underlying CTD and, therefore, the duration of that contract

EuroDollar Futures

- ◆ Duration is constant and uniform across all EuroDollar contracts

Source: Bloomberg; Fixed Income Securities, B. Tuckman

Convexity

Economic Characteristics

UST Futures

- ◆ Defined as the sensitivity of contract duration to changes in the yield of bonds in the underlying basket. Futures contracts are negatively convex because the CTD switches to a lower duration bond in a market rally and a higher duration bond in a backup
- ◆ Futures contracts display negative convexity because the buyer of the futures contract implicitly sells optionality to the contract seller. Types of implied options that the short can exercise include:
 - Quality Option: short chooses among bonds in the underlying basket for delivery
 - Timing Option: short chooses when, during the delivery month, to deliver the bonds
 - Switch Option: short chooses whether to deliver the bond that was the CTD at the time settlement price was assessed or to switch to a new CTD (usually in the event that market conditions have brought about a shift in the CTD of the contract)
- ◆ The negative convexity of Futures contracts can readily be hedged using puts or calls. A properly constructed hedge can eliminate all negative convexity that is specific to the Futures contract

EuroDollar Futures

- ◆ Convexity is zero since duration is constant

Source: Bloomberg; Fixed Income Securities, B. Tuckman

Fixed Income Research

Publications

Global Economics

Global Strategy

Fixed Income Indices

Fixed Income Toolkit

Webcasts

Products

Interest Rates

-US Treasuries

-US Agencies

-US Derivatives

-Repo

Futures

-European Governments

-European Derivatives

-Asian Governments

-Asian Derivatives

Credit

Mortgages / ABS / CMBS

Municipals

Global Foreign Exchange

Services

Strategic Client Services

Futures Clearing

Client Operations

Internal Only

Client Management

e-Commerce

STAR

Electronic Trading

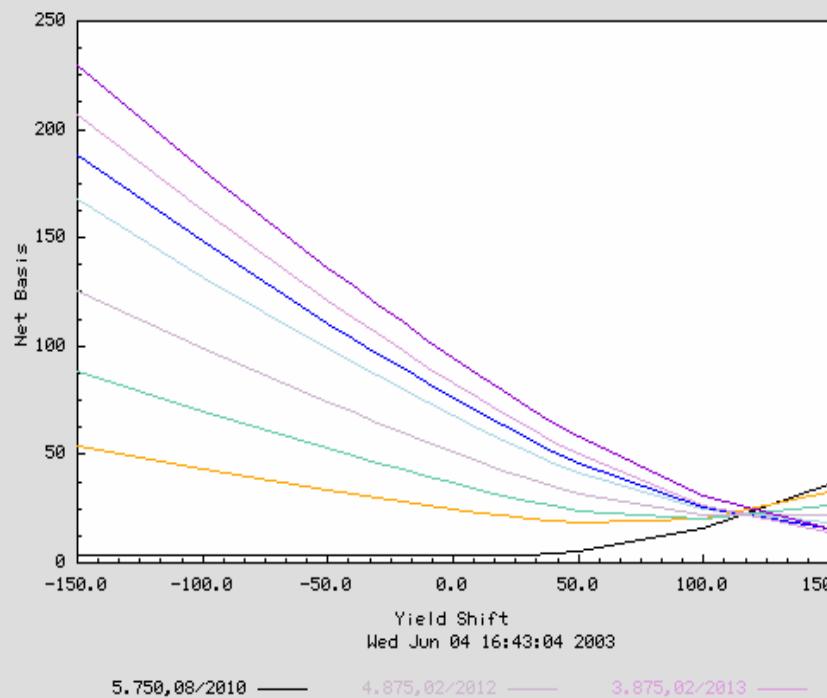
Futures

Reports **Analytic Tools**

Deliverable Information



Yield Shift vs. Net Basis for TYU2003 -- Pricing Date: 06/03/2003



See [Printable Version](#)

Customers

Futures Customer Categories

Customers



Customer Strategies

Customers

Basis Trading

- ◆ Exploit or hedge against inefficiencies or potential changes in the basis through simultaneous purchase and sale of qualifying cash securities and futures contracts
- ◆ May be executed as an EFP⁽¹⁾ or as separate cash and futures trades

Calendar Trading

- ◆ Trading across quarterly cycle futures contracts either in order to follow market liquidity as contracts roll forward or to extract relative value from the calendar spreads

Curve Trading

- ◆ Exploit or hedge against potential changes in the shape of yield curves
- ◆ Express curve view

Duration Management

- ◆ Interest rate futures are widely used to manage portfolio duration

Volatility Trading

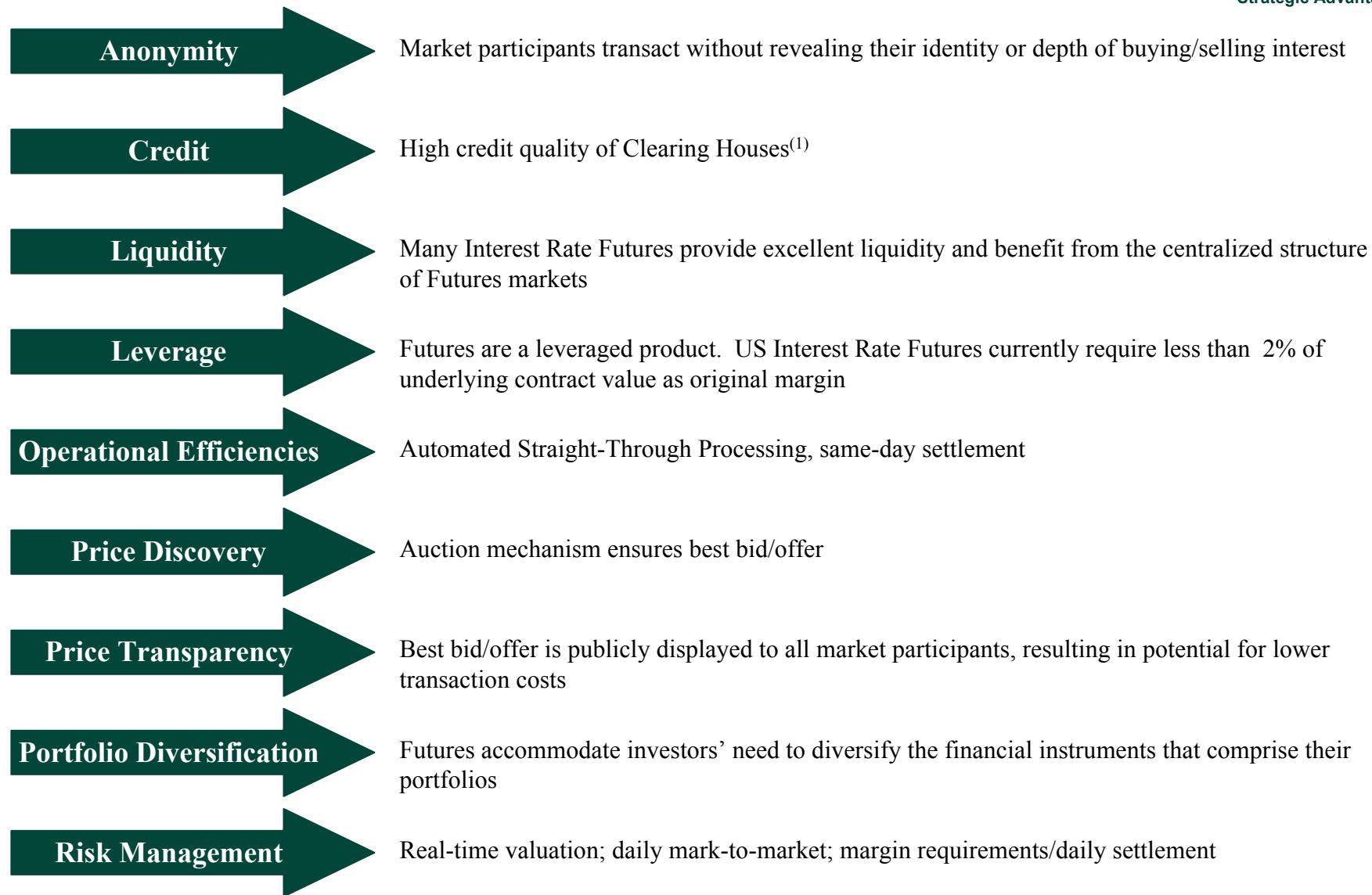
- ◆ Express volatility view or hedge volatility exposure

1. Exchange for Physical: An EFP is a transaction in which one party buys the cash market and sells the futures market while the opposite party sells the cash market and buys the futures market. The terms of such transactions are privately negotiated

Strategic Advantages

Benefits of Futures

Strategic Advantages



1. BOTCC is S&P-rated AAA

Execution

Forms of Trade Execution

Execution

Electronic Trading

- ◆ Electronic matching of bids and offers provides for more efficient and anonymous execution than has traditionally been available via open outcry
- ◆ Grown in recent years to become the primary method of futures execution by volume⁽¹⁾

Open Outcry

- ◆ Traditional auction system whereby traders exchange bids and offers in a trading pit

Block Trading

- ◆ Execution of large buy/sell orders negotiated off the trading floor
- ◆ Available on the CME and BrokerTec, among others, subject to trade size and reporting time requirements

EFPs (Exchange for Physicals)

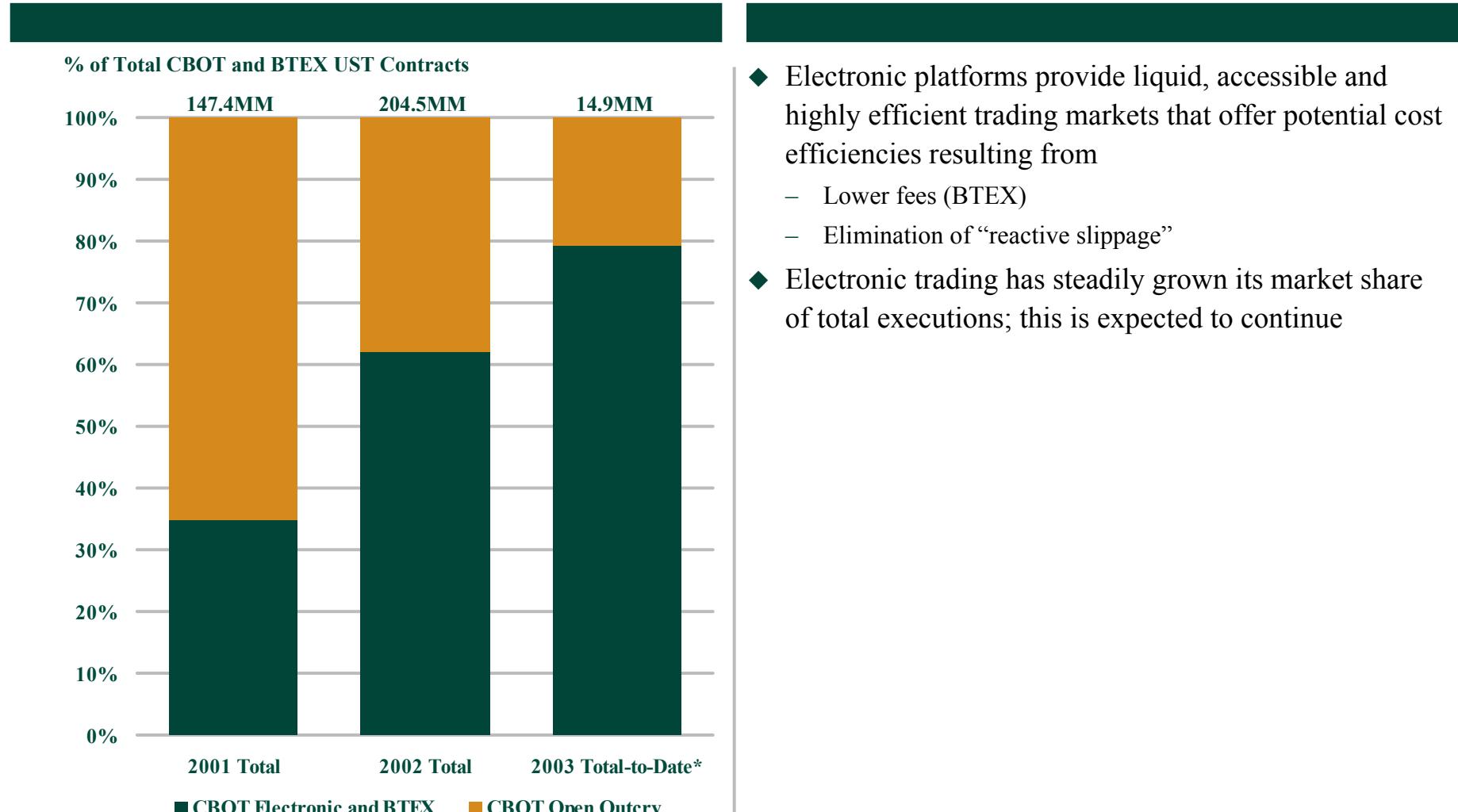
- ◆ Traders privately negotiate the terms of the transaction, exchange the qualifying cash market instrument with the offsetting futures contracts. One example is a Treasury basis trade

1. Data is for UST Futures

Electronic Trading

The Rise of Electronic Trading in U.S. Treasury Futures

Electronic Trading ■



Total Trading Volume in 5, 10, 30 year contracts – Open Outcry and Electronic; data excludes options on futures, which currently trade only via open outcry

*Source: CBOT, BrokerTec Thru 1/28/03.

Common Strategies

Basis Trading

Common Strategies

◆ Overview

- The bond basis is defined as follows:

$$\text{Net Basis} = \text{Forward Bond Price} - \text{Conversion Factor [CF]} * \text{Futures Price}$$

$$\text{CF} * \text{Futures Price} = \text{CTD Price} - \text{Expected Carry} - \text{Option Value}$$

- Buying the basis entails buying the underlying bond and selling the futures contract. Selling the basis entails selling the underlying bond and buying the futures contract. A view that a contract is too cheap drives a “sell basis” trading decision whereas a rich contract drives a “buy basis” decision
- Views on volatility (both implied and realized) and repo also factor into a trader’s decision on whether to buy or sell the basis and how to hedge because of the implied optionality imbedded in the futures contract
- Short basis positions are short volatility, convexity, and forward repo because they consist of long futures and short cash positions

◆ Factors Influencing Trading Decisions

- Market directionality: market movement affects underlying deliverability and therefore the profit/loss profile of any basis trade
- Contract Rich/Cheap: short basis positions benefit when the contract richens since the CTD can shift if yields change to a significant enough degree
- Bond Rich/Cheap: short basis positions benefit when the underlying bond cheapens against the fitted curve
- Volatility: long basis positions (i.e. short futures, long bond) benefit from increased volatility because of the optionality imbedded in the futures contract
- Exposure to any of these factors may be hedged as desired

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Internal Only
[Client Management](#)
[e-Commerce](#)
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Futures
[Reports](#) [Analytic Tools](#)
Deliverable InformationSelect Contract: Pricing Date: Select Value:

Net Basis, USZ2002

Analysis for Pricing Date: 12/13/2002

To plot the values select from the following bonds and press **Analysis Type**

<input checked="" type="radio"/> Yield Shift	-100	-50	-40	-30	-20	-10	+0	+10	+20	+30	+40	+50	+100	+150
<input type="radio"/> Future Price	123- 152	117- 150	116- 083	115- 013	113- 260	112- 182	111- 096	110- 003	108- 223	107- 123	106- 026	104- 253	98- 087	92- 02+
<input type="radio"/> Dollar Duration	122.4	120.6	121.4	122.4	124.0	125.8	127.6	129.0	129.9	130.1	130.1	130.1	127.9	119.1
<input type="radio"/> Modified Duration	9.91	10.27	10.44	10.64	10.89	11.18	11.46	11.73	11.95	12.12	12.26	12.41	13.01	12.93
<input type="radio"/> Option Value	0-000	0-002	0-012	0-010	0-011	0-012	0-022	0-023	0-027	0-016	0-011	0-011	0-017	0-000

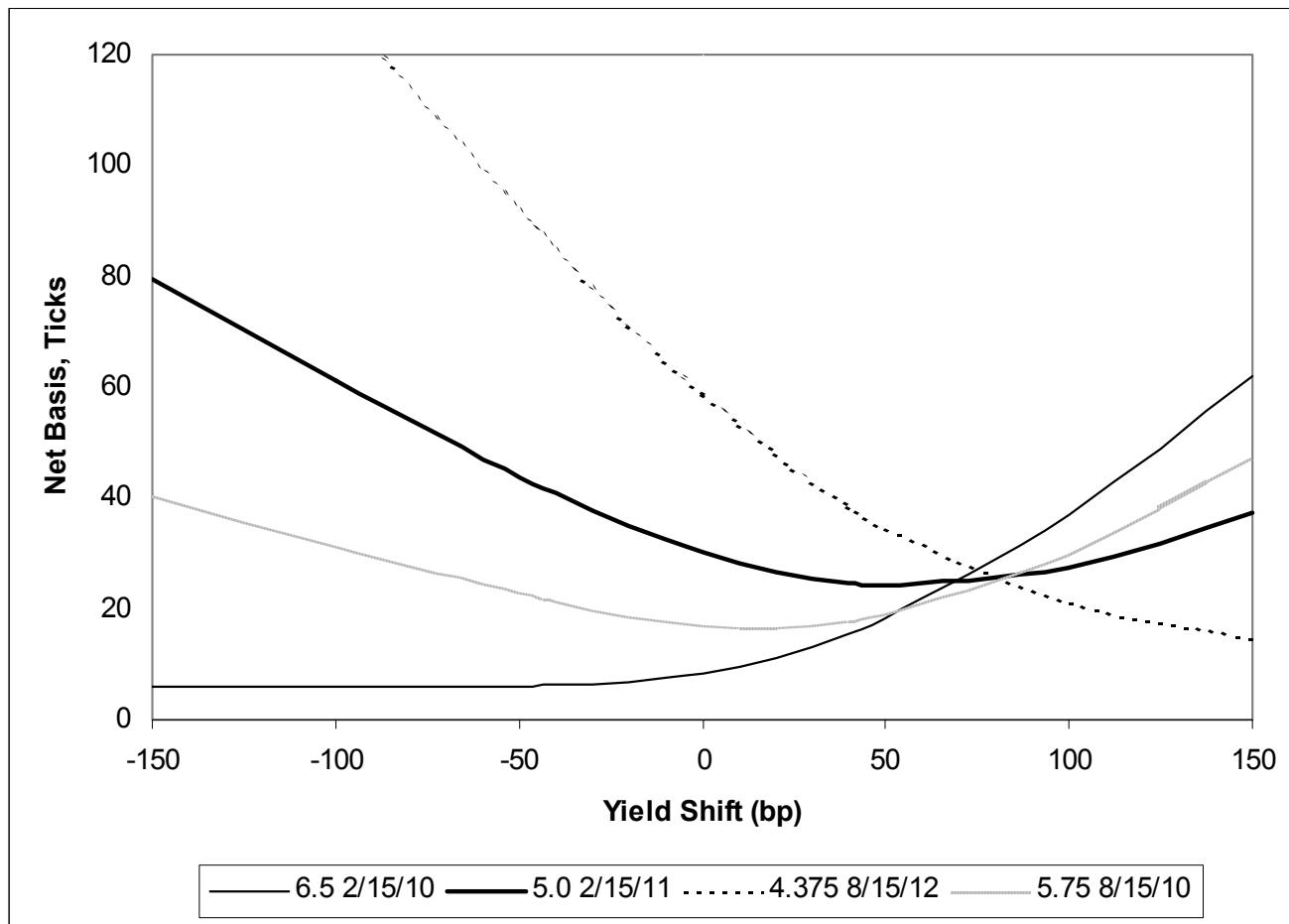
Deliverable Securities
 Select all Bonds for graphing Deselect all Bonds

<input checked="" type="checkbox"/> 9.125 05/15/2018	-2.9	1.0	3.9	8.0	13.1	19.2	27.0	36.6	47.5	58.8	70.3	82.1	150.7	218.8
<input checked="" type="checkbox"/> 9.000 11/15/2018	0.2	-1.6	0.2	3.3	7.3	12.5	19.3	28.0	37.9	48.4	59.0	69.9	134.5	199.1
<input checked="" type="checkbox"/> 8.875 02/15/2019	2.4	-2.6	-1.3	1.1	4.6	9.2	15.5	23.5	32.9	42.8	52.9	63.3	125.4	187.8
<input checked="" type="checkbox"/> 8.125 08/15/2019	15.4	1.7	1.1	1.8	3.6	6.3	10.8	16.9	24.3	32.3	40.4	49.0	101.5	155.1
<input checked="" type="checkbox"/> 8.500 02/15/2020	16.6	-0.3	-1.3	-1.0	0.3	2.8	7.0	12.9	20.3	28.2	36.3	44.8	97.9	152.4

Basis Trading

Common Strategies

*The 2/15/10 is the CTD here because it has the lowest net basis under current conditions
(i.e. 0 bps yield shift)*



Source: LehmanLive

Calendar Spread Trading

Common Strategies

- ◆ Buying/selling Futures calendars is buying or selling front contract vs. back contract, especially during calendar roll “season”
- ◆ There are two types of Calendar Spread Trading:
 - Rolling Positions: investors roll long or short positions forward as open interest shifts from the back contract to the front; these trades are typically not duration-neutral or hedged
 - Relative Value: investors attempt to extract relative value from calendar spreads, typically through a duration-neutral and hedged trade
- ◆ Factors influencing calendar trading decisions include
 - Contract Rel Val: assess model rich/cheap vs. expected rich/cheap for a given point in the roll cycle
 - Curve View: if contract CTDs are different, long calendar positions (long the front contract, short the back contract) have a curve steepening bias
 - Repo: since Futures contracts are termed to contract expiry and since the back contract in a calendar spread trade has a longer time to expiry than the front, the back contract suffers disproportionately when repo rates fall, thereby benefiting long calendar spread positions and hurting short calendar spread positions
 - Volatility: long calendar positions are generally short gamma and long vega:
 - Short Gamma: as realized volatility increases, calendar spreads tighten because front contracts are more negatively convex than back contracts
 - Long Vega: as implied volatility increases, calendar spreads widen because the implied optionality of front contracts does not increase as much as that of back contracts

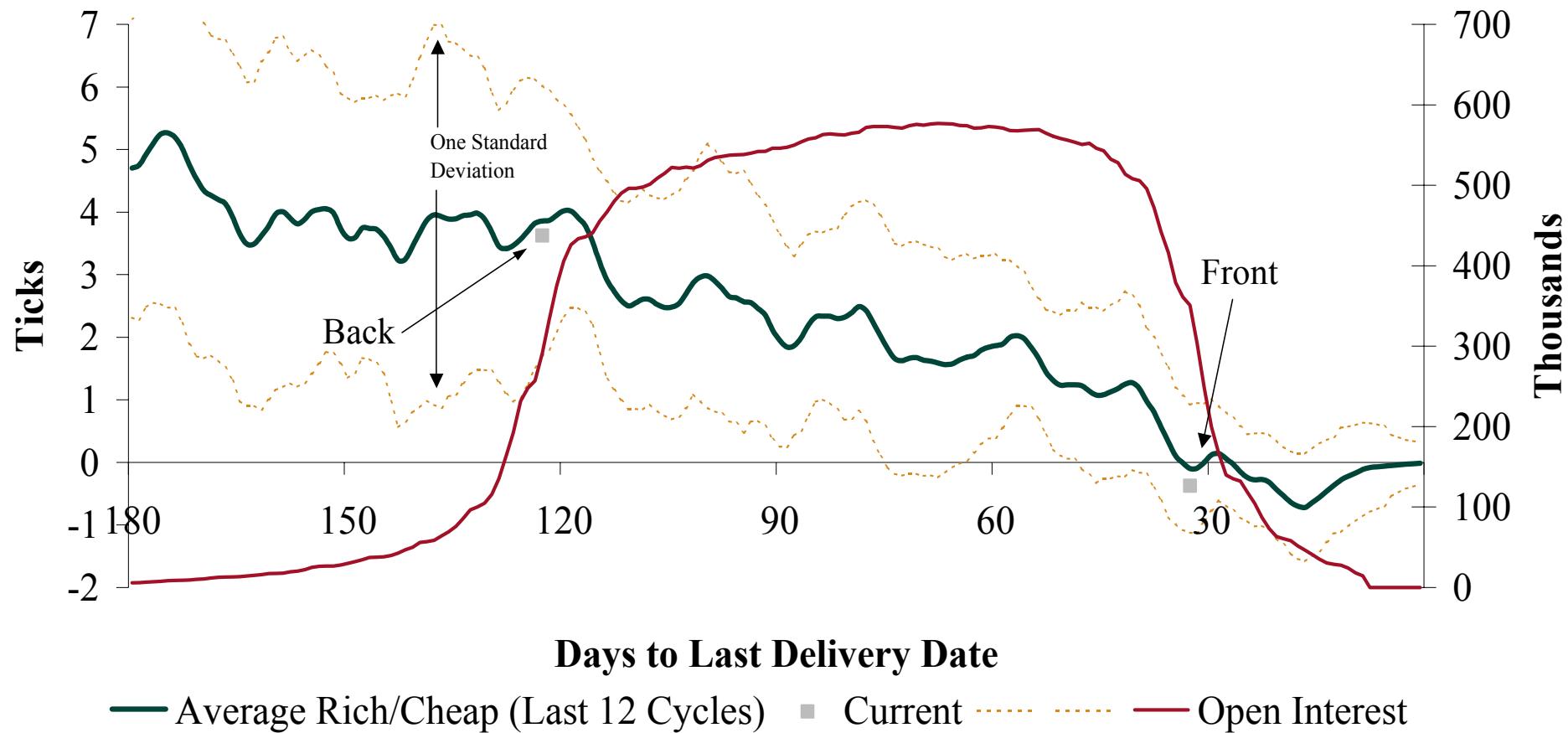
Pricing: 12/13/02
Settle: 12/16/02

Government Strategy
(212) 526-6566

	2 Year		5 Year		10 Year		30 Year	
	TUZ2	TUH3	FVZ2	FVH3	TYZ2	TYH3	USZ2	USH3
Futures Close								
Change from Yesterday	107-12+	106-296	112-29+	111-190	114-02	112-22+	111-12	110-01
Delivery Option ^a	-0-01+	-0-010	-0-04+	-0-04+	-0-090	-0-10+	-0-280	-0-280
Rich/Cheap (32nds) ^b	0-000	0-000	0-000	0-000	0-003	0-025	0-022	0-090
High/Low (30 days)	-0.5	1.1	-1.0	0.6	-1.1	3.3	-2.2	-2.8
R/C ZScore (30 days)	1.7/-0.9	10.5/0.7	1.5/-1.1	3.8/0.6	3.5/-3.0	8.2/2.6	0.2/-3.1	1.4/-4.6
CTD^c								
Coupon	1.875	2.000	4.375	4.375	6.500	6.500	7.250	7.625
Maturity	09/30/04	12/31/04	05/15/07	05/15/07	02/15/10	02/15/10	08/15/22	11/15/22
Yield (%)	1.786	1.924	2.917	2.917	3.701	3.701	5.031	5.031
Yield Change(bp)	3.0	2.9	3.7	3.7	5.3	5.3	7.0	7.1
Net Basis (32nds) ^d	-0.5	1.0	-0.9	0.6	-0.7	6.0	0.0	7.2
Term Repo (%) ^e	1.02	1.19	1.00	0.90	1.11	1.06	1.20	1.20
Implied Repo (%) ^f	1.35	1.06	1.65	0.84	1.54	0.52	1.18	0.62
Calendar (32nds)								
Market Close	Bid ^k	Offer ^k						
Change from Yesterday	14.75	14.75	42.50	42.50	43.50	43.50	43.00	43.00
Fair Value ^t	-0.50	-0.50	0.00	0.00	1.50	1.50	0.00	0.00
Rich/Cheap to Mid-Market	13.1		40.9		39.2		43.6	
Rich/Cheap Yesterday	-1.7		-1.6		-4.3		0.6	
High/Low (30 days)	-2.5		-1.6		-3.5		0.8	
ZScore	0.3/-9.6		-1.3/-3.0		-1.4/-7.8		3.1/-1.4	
Calendar Delta (32nds)								
+1 bp Level ^g	0.4		1.0		-0.3		-0.5	
+1 bp CTD Slope ^h	0.07		-0.00		0.13		-0.01	
	0.6		-		-		4.1	

Calendar Spread Trading

Common Strategies



Source: LehmanLive; data current as of 2/26. Average computed over previous 12 cycles

Other Futures Trading Strategies

Common Strategies

Curve Trading

- ◆ Investors express views on the yield curve shape or hedge curve exposure through flatteners and steepeners
- ◆ Advantages of curve trading using futures instead of other financial instruments include:
 - Outstanding liquidity
 - Lack of repo requirement

Duration Management Trading

- ◆ Investors manage portfolio duration by buying or selling futures contracts to affect the duration of their total portfolio

Volatility Trading

- ◆ Investors express views on volatility or hedge volatility exposure by buying or selling options on futures contracts
- ◆ In the case of futures contracts that have baskets of deliverable securities underlying them, the futures contract seller has implied optionality and therefore the futures contract is exposed to volatility

Options on Futures

Market Overview

Options on Futures

Options on UST Futures

- ◆ Exchange
 - CBOT
- ◆ Underlying
 - 2 year contract (TU)
 - 5 year contract (FV)
 - 10 year contract (TY)
 - 30 year contract (US)
- ◆ Total of 4-6 expiries:
 - 4 months on a quarterly cycle (1 year). These four expiries comprise most of the liquidity
 - 2 nearest additional months on front futures delivery month expiring one and two months before the standard quarterly option series

GRAB
At 13:49 Vol 4,945 Op 112-28 Hi 113-06 Lo 112-27+ OpInt 20,024
Template List Edit Contract Months Security List TYU3 Comdty Go

Comdty OMON

Option Monitor: US 10YR NOTE FUT Sep03
Center 113.13 Number of Strikes 18 -or- 2% from Center Exchange C (Composite)

Ticker	Strike
TYU3 SEP 03	(Contracts)
① TYU3C	105
② TYU3C	106
③ TYU3C	107
④ TYU3C	108
⑤ TYU3C	109
⑥ TYU3C	110
⑦ TYU3C	111
⑧ TYU3C	112
⑨ TYU3C	113
⑩ TYU3C	114
⑪ TYU3C	115
⑫ TYU3C	116
⑬ TYU3C	117
⑭ TYU3C	118
⑮ TYU3C	119
⑯ TYU3C	120
⑰ TYU3C	121
⑱ TYU3C	122

Australia 61 2 2777 86
Hong Kong 852 2977 600

GRAB
At 14:01 Vol 65,268 Op 113-23 Hi 114-08 Lo 113-22 OpInt 865,510
Template List Edit Contract Months Security List TYM3 Comdty Go

Comdty OMON

Option Monitor: US 10YR NOTE FUT Jun03
Center 114.14 Number of Strikes 18 -or- 2% from Center Exchange C (Composite)

Ticker	Strike
TYM3 JUN 03	(Contracts)
① TYM3C	105
② TYM3C	106
③ TYM3C	107
④ TYM3C	108
⑤ TYM3C	109
⑥ TYM3C	110
⑦ TYM3C	111
⑧ TYM3C	112
⑨ TYM3C	113
⑩ TYM3C	114
⑪ TYM3C	115
⑫ TYM3C	116
⑬ TYM3C	117
⑭ TYM3C	118
⑮ TYM3C	119
⑯ TYM3C	120
⑰ TYM3C	121
⑱ TYM3C	122

Australia 61 2 2777 86
Hong Kong 852 2977 600

GRAB
At 13:59 Vol 65,268 Op 113-23 Hi 114-08 Lo 113-22 OpInt 865,510
Template List Edit Contract Months Security List TYK3 Comdty Go

Comdty OMON

Option Monitor: US 10YR NOTE FUT Jun03
Center 111.13 Number of Strikes 18 -or- 2% from Center Exchange C (Composite)

Ticker	Strike	Bid	Ask	Last	Volume	Ticker	Strike	Bid	Ask	Last	Volume
TYM3 MAY 03	(Contract Size: 100000.00)					TYM3 MAY 03	(Contract Size: 100000.00)				
① TYK3C	106					⑩ TYK3P	106			'01 u	325
② TYK3C	107					⑪ TYK3P	107			'01 u	50
③ TYK3C	108					⑫ TYK3P	108			'01	
④ TYK3C	109					⑬ TYK3P	109	'01	'02	'03 u	875
⑤ TYK3C	110					⑭ TYK3P	110			'06 u	1587
⑥ TYK3C	111					⑮ TYK3P	111			'06	7457
⑦ TYK3C	112					⑯ TYK3P	112			'13	19458
⑧ TYK3C	113					⑰ TYK3P	113			'22	7654
⑨ TYK3C	114					⑱ TYK3P	114			'43	5751
⑩ TYK3C	115					⑲ TYK3P	115			'23	190
⑪ TYK3C	116					⑳ TYK3P	116			'227 u	3
⑫ TYK3C	117					㉑ TYK3P	117			'23 u	63
⑬ TYK3C	118					㉒ TYK3P	118				
⑭ TYK3C	119					㉓ TYK3P	119				
⑮ TYK3C	120					㉔ TYK3P	120				
⑯ TYK3C	121					㉕ TYK3P	121				
⑰ TYK3C	122					㉖ TYK3P	122				
⑱ TYK3C	123					㉗ TYK3P	123				

Australia 61 2 2777 86
Brazil 5511 3048 4500
Europe 44 20 7330 7500
Hong Kong 852 2977 6000 Japan 81 3 3201 6900 Singapore 65 6212 1000 U.S. 1 212 318 2000
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6524-1110-0 09-Apr-03 14:01:24

Source: Bloomberg

Market Overview

Options on Futures

Options on EuroDollar Futures

- ◆ Exchanges
 - CME
 - CME GLOBEX
 - SGX
- ◆ Total of 18 expiries:
 - 8 quarterly
 - 2 serial
 - 6 one-year mid-curve
 - 2 two-year mid-curve
- ◆ Option Maturities
 - Quarterly
 - Midcurve
 - Serial

GRAB
At 15:00 Vol 19,243 Op 96.795 Hi 96.870 Lo 96.790 OptInt 165,350

Comdty OMON

Template List | Edit | Contract Months | Security List | OEMHS Comdty | Go

Option Monitor: EUROS 1YR MID-CRV Mar05

Center 96.86 Number of Strikes 18 -or- 24 from Center Exchange C
(Composite)

Ticker	Strike	Bid	Ask	Last	Volume	Ticker	Strike	Bid	Ask	Last	Volume
OEH5 MAR 03	96.795	.0000	.0000	96.790	165,350	OEH5 MAR 03	96.795	.0000	.0000	96.790	165,350
1) OEH4C						1) OEH4C					
2) OEH4C						2) OEH4C					
3) OEH4C						3) OEH4C					
4) OEH4C						4) OEH4C					
5) OEH4C						5) OEH4C					

GRAB
At 15:00 Vol 55,252 Op 97.860 Hi 97.950b Lo 97.860 OptInt 348,410

Comdty OMON

Template List | Edit | Contract Months | Security List | OEM4 Comdty | Go

Option Monitor: EUROS 1YR MID-CRV Jun04

Center 97.95 Number of Strikes 18 -or- 24 from Center Exchange C
(Composite)

Ticker	Strike	Bid	Ask	Last	Volume	Ticker	Strike	Bid	Ask	Last	Volume
OEM4 MAY 03	97.860	.0000	.0000	97.860	348,410	OEM4 MAY 03	97.860	.0000	.0000	97.860	348,410
1) OEM3C						1) OEM3C					
2) OEM3C						2) OEM3C					
3) OEM3C						3) OEM3C					
4) OEM3C						4) OEM3C					
5) OEM3C						5) OEM3C					
6) OEM3C						6) OEM3C					
7) OEM3C						7) OEM3C					
8) OEM3C						8) OEM3C					
9) OEM3C						9) OEM3C					
10) OEM3C						10) OEM3C					
11) OEM3C						11) OEM3C					
12) OEM3C						12) OEM3C					
13) OEM3C						13) OEM3C					
14) OEM3C						14) OEM3C					
15) OEM3C						15) OEM3C					
16) OEM3C						16) OEM3C					
17) OEM3C						17) OEM3C					

GRAB
At 15:00 Vol 55,252 Op 97.860 Hi 97.950b Lo 97.860 OptInt 348,410

Comdty OMON

Template List | Edit | Contract Months | Security List | OEM4 Comdty | Go

Option Monitor: EUROS 1YR MID-CRV Jun04

Center 97.95 Number of Strikes 18 -or- 24 from Center Exchange C
(Composite)

Ticker	Strike	Bid	Ask	Last	Volume	Ticker	Strike	Bid	Ask	Last	Volume
OEM4 APR 03	(Contract Size: 1000000.00)					OEM4 APR 03	(Contract Size: 1000000.00)				
1) OEM3P	96.6250					1) OEM3P	96.6250				
2) OEM3P	96.7500					2) OEM3P	96.7500				
3) OEM3P	96.8750					3) OEM3P	96.8750				
4) OEM3P	97.0000					4) OEM3P	97.0000				
5) OEM3P	97.1250					5) OEM3P	97.1250				
6) OEM3P	97.2500					6) OEM3P	97.2500				
7) OEM3P	97.3750					7) OEM3P	97.3750				
8) OEM3P	97.5000					8) OEM3P	97.5000				
9) OEM3P	97.6250					9) OEM3P	97.6250				
10) OEM3P	97.7500	.1800				10) OEM3P	97.7500	.1800			
11) OEM3P	97.8750	.1050	.1150	.1150	3560	11) OEM3P	97.8750	.1050	.1150	.1150	3560
12) OEM3P	98.0000	.0400	.0450	.0450	6000	12) OEM3P	98.0000	.0400	.0450	.0450	6000
13) OEM3P	98.1250	.0050				13) OEM3P	98.1250				
14) OEM3P	98.2500					14) OEM3P	98.2500				
15) OEM3P	98.3750					15) OEM3P	98.3750				
16) OEM3P	98.5000					16) OEM3P	98.5000				
17) OEM3P	98.7500					17) OEM3P	98.7500				
18) OEM3P	99.0000					18) OEM3P	99.0000				

Australia 61 2 Hong Kong 652 2977 6800 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 920410 Hong Kong 652 2977 6800 Japan 81 3 3201 6900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2003 Bloomberg L.P. 6524-1110-0 09-Apr-03 16:49:58

Source: Bloomberg

The Eurodollar Strip

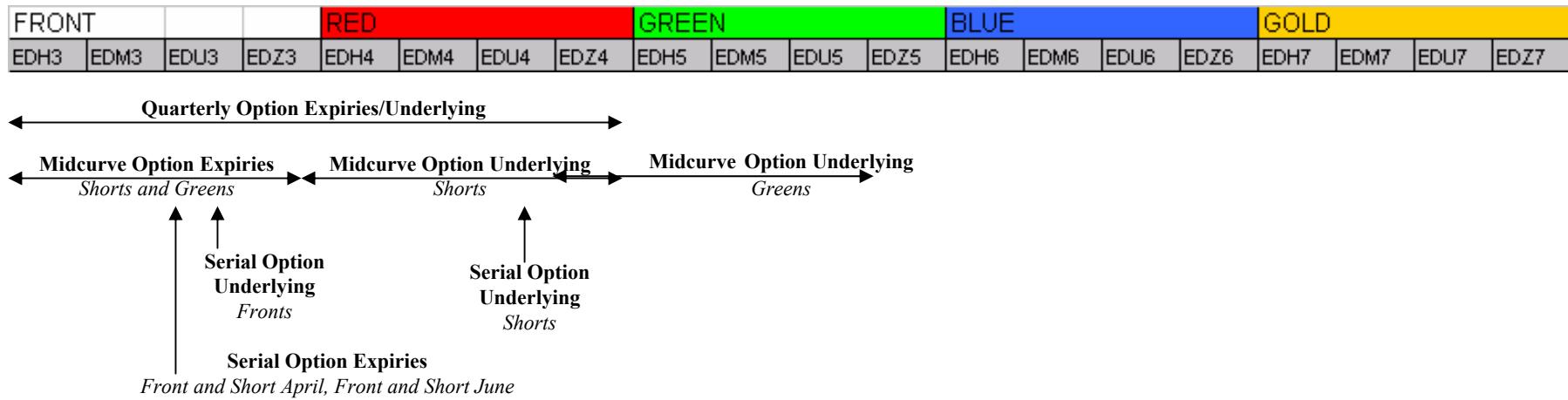
Options on Futures

FRONT		RED				GREEN				BLUE				GOLD					
EDH3	EDM3	EDU3	EDZ3	EDH4	EDM4	EDU4	EDZ4	EDH5	EDM5	EDU5	EDZ5	EDH6	EDM6	EDU6	EDZ6	EDH7	EDM7	EDU7	EDZ7

- ◆ The Eurodollar strip is comprised of 10 years of contracts. In this example, the first five years ("packs") are shown with EDH3 thru EDZ7
- ◆ The first 5 years are the most liquid; liquidity decreases thereafter
- ◆ Nomenclature for these first five, liquid packs: Fronts/Reds/Greens/Blues/Golds

Eurodollar Maturity Structure

Options on Futures



- ◆ Options on Eurodollars are traded on the first 12 contracts: Fronts, Reds, and Greens
- ◆ There are three different option maturity structures: Quarterlies, Midcurves, and Serials
 - Quarterlies: Expiry is coincident with the contract month. Quarterly options are available in the Front and the Red packs. Ex: EDU3 option on EDU3 contract, EDU4 option on EDU4 contract
 - Midcurves: Expiry is one or two years before the contract expires. Ex: EDU3 option on EDU4 or EDU5 contract
 - Serials: Expiry is one, two, thirteen or fourteen months before the contract expires. Ex: EDU3 option on EDU4 or EDU5 contract

Eurodollar Option Pricing and Nomenclature

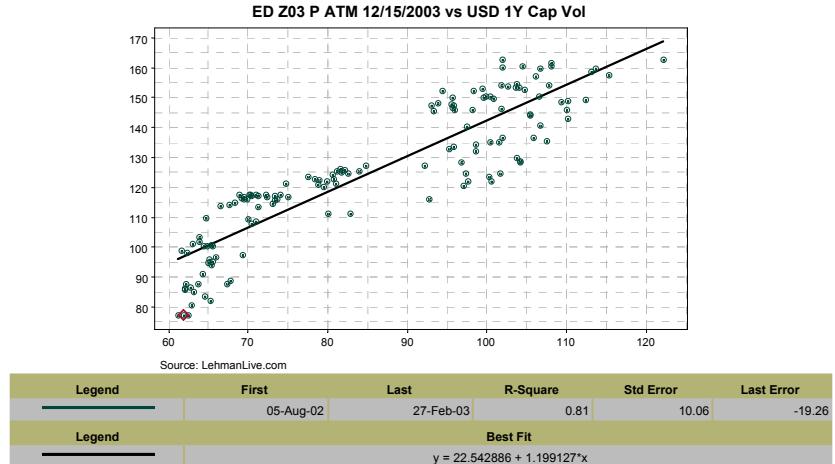
Options on Futures

- ◆ Eurodollar prices are given as *100 - Implied 3mo LIBOR*
 - Ex: the EDZ3 contract shows a price of 98.40 because its implied 3ML rate is 1.6%
- ◆ Options are struck every 25 bp (98.00, 98.25, 98.50 etc.)
- ◆ The two digits on either side of the decimal provide an abbreviated name for a given option: the call struck at 98.50, for example, is referred to simply as the “85 Call”

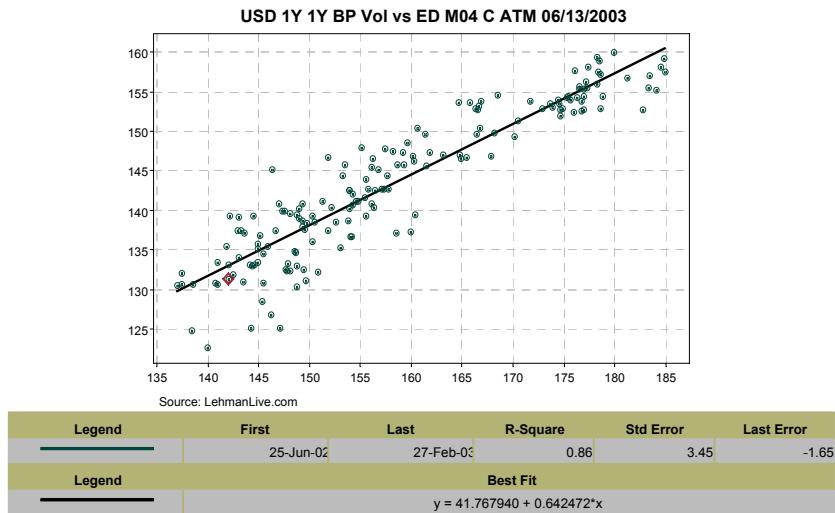
Eurodollar Options: Applications

Options on Futures

- The Fronts and Reds are often used to hedge libor caps and floors



- Midcurve options are used for hedging short dated swaptions



Common Option Strategies

Options on Futures

Profile	Portfolio	Outlook	Profit Potential	Loss Potential	Time Decay
	Long call	bull	unlimited	limited	bad
	Short call	bear/neutral	limited	unlimited	good
	Long put	bear	unlimited	limited	bad
	Short put	bull/neutral	limited	unlimited	good
	Bull spread	bullish	limited	limited	neutral
	Bear spread	bearish	limited	limited	neutral
	Long straddle	volatile	unlimited	limited	bad
	Short straddle	stable	limited	unlimited	good

Common Option Strategies

Options on Futures

Profile	Portfolio	Outlook	Profit Potential	Loss Potential	Time Decay
	Long strangle	volatile	unlimited	limited	bad
	Short strangle	stable	limited	unlimited	good
	Long butterfly	stable	limited	limited	mixed
	Short butterfly	volatile	limited	limited	mixed
	Long corridor	stable	limited	limited	mixed
	Short corridor	volatile	limited	limited	mixed
	Call ratio spread	bearish / neutral	limited	unlimited	mixed
	Put ratio spread	bullish / neutral	limited	unlimited	mixed
	Call ratio backspread	bullish / volatile	unlimited	limited	mixed
	Put ratio backspread	bearish / volatile	unlimited	limited	mixed

Conditional Eurodollar Curve Trades

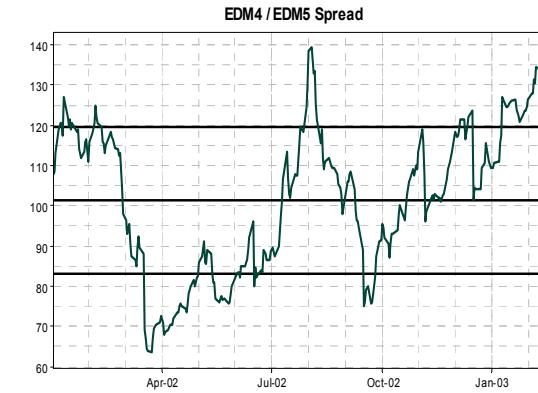
Options on Futures

- ◆ Traders construct conditional curve trades by calendar spreading puts or calls
- ◆ Conditional 1s-2s flattener example
 - Futures Prices: EDM4 97.715, EDM5 96.390
 - Spot Calendar Spread: 132.5bps
 - Picking strikes: First out puts
 - Executing: Buy Short June 97.50 put, Sell Green Jun 96.25 put
 - Net position gets you long the Greens and Short the Reds

Conditional Eurodollar Curve Trades

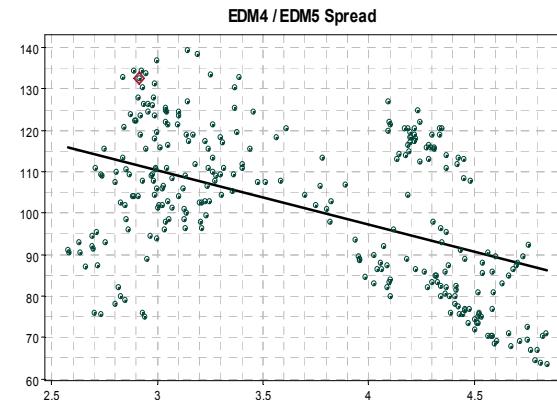
Options on Futures

- The EDM4/EDM5 spread is near the high end of its range



Legend	Axis	02-Jan-02 to 14-Feb-03	Last	Minimum	Maximum	Mean	Std. Dev.
—	Left		132.50	63.50 25-Mar-02	139.50 05-Aug-02	101.46	18.30

- The spread looks wide given the current level of 5y OTR yields



Legend	First	Last	R-Square	Std Err	Last Error
—	02-Jan-02	14-Feb-03	0.24	15.97	21.05
Legend					
Best Fit					
$y = 149.441123 + -13.046536x$					

Accounting Considerations

Accounting Considerations

Accounting Considerations

- ◆ Futures contracts may be designated in hedge relationships under FAS 133 in a similar capacity to swaps, options and other derivative products
- ◆ In the context of hedging interest rate risks, futures contracts may be used in the following accounting hedge relationships
 - Fair value hedges of fixed rate assets/liabilities (swap to floating)
 - Cash flow hedges of floating rate assets/liabilities (swap to fixed)
 - Cash flow hedges of refinancing risks on existing debt
 - Cash flow hedges of future financing costs or interest earnings on future debt issuances or asset origination

Please Note: Clients are advised to make an independent review regarding the economic benefits and risks of proposed transactions and reach their own conclusions regarding the legal, tax accounting and other aspects of such transactions in relation to their particular circumstances.

Part B: Lehman Brothers Integrated Futures Product Capabilities

Introduction

Lehman Brothers Futures Capabilities

Introduction

Lehman Brothers offers the industry-leading integrated Futures product, components of which include:

Research and Strategy

Analytical Tools

Specialized Sales Coverage

Upstairs Sales Desk

Exchange Floors

Execution

*Open Outcry
Electronic*

Clearing

*Institutional Investor
#1 Ranked Fixed Income Research in 2002*

*Euromoney
“Best Site for Rates Research” in 2002*

*Euromoney
“Best Site for Exchange Traded Derivatives Trading” in 2002*

*Euromoney
“Best Analytical Tools [including LehmanLive]” in 2002*

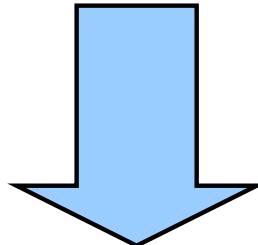


Lehman Futures Strategy and Research

Lehman Futures Strategy and Research

Lehman Futures Strategy and Research

Lehman Brothers' Global Fixed Income Research covers the full range of economic, quantitative, strategic, credit, relative value, index and portfolio analyses. The Group consists of more than 300 professionals, including many of the industry's top-ranked analysts



Futures coverage is an integral part of the Research and Strategy Group focus

Lehman Futures Strategy and Research

Lehman Futures Strategy and Research

Lehman Brothers' award-winning strategy and research team provides incisive and timely Futures trade ideas and market commentary

LEHMAN BROTHERS Interest Rate Strategies

Interest Rate Strategy Group Relative Value Trade Recommendation: EDZ3-EDZ4 Curve Flattener, may hedge with EDM5

SUMMARY:

We recommended a 1- to 2-year Eurodollar yield flattener last week, and the trade did well as the market began pushing out the Fed tightening cycle. The EDZ3 contract is no longer pricing in Fed tightening, while EDZ4 is pricing in ~125 bp of tightening. Over the past 1 1/2 weeks, the spread between the forward yields implied by EDZ3 and EDZ4 contracts compressed by 8 bp, and we think this can continue, especially given historical behavior. **This spread compressed more than 40 bp during the course of 1993, while the Fed remained on hold.** We do not think 125 bp of tightening will be realized by the end of '04, but we recognize that this trade is highly rate directional in the near-term. If you intend to hold the position to maturity, we recommend this EDZ3-EDZ4 trade as originally described. If your investment horizon is three months or so, your position Z3-Z4 may be hurt by a further rate cut (which our econ team calls for) or a rapid sell-off after the Iraq situation is resolved. In that case, we recommend hedging directionality with a short EDM5 position.

VIEW EXPRESSED:

- Our Economics group expects a lower GDP profile this year, has shifted out the time of the first Fed tightening to early 2004, and believes that the high unemployment rate and declining inflation will keep the Fed on hold for the rest of the year.
- Although the Fed may tighten in 2004, the tightening may not proceed as rapidly as it did during the '94 tightening cycle. We believe that the Fed will worry about pushing the economy back into recession and will tighten more cautiously than they have historically.
- A 1- to 2-year forward LIBOR flattener expresses this view. Figure 1 plots the rolling spread between the 1 year and 2 year Eurodollars, and even though the spread has come off its highs of early 2002, it is still fairly steep. The last recession in the early 1990s implies that this spread has about 40-50 bp of compression in it over the next year



RECOMMENDED TRADE WEIGHTS FOR EDM5-HEDGED POSITION:

To hedge up the mark-to-market risk of the EDZ4-EDZ3 Eurodollar flattener with a short EDM5 position, buy 100 EDZ4 (notional

Note: this trade review is for illustrative purposes only and does not necessarily serve as a current Lehman Brothers recommendation

Lehman Futures Analytics

Lehman Futures Analytics

Lehman Futures Analytics

- ◆ Reports: easily accessible daily reports published on *LehmanLive* include
 - U.S. Treasury Basis reports
 - CBOT Calendar spreads: rich/cheap report
 - Eurodollar and U.S. Treasury Futures ATM Option Volatility reports
 - Futures “Packet”, which includes the reports shown above as well as other relevant materials
- ◆ Analytics: powerful tools to assess relative value
 - Treasury Futures Price Sensitivity
 - Deliverable Information and Bond Bases Scenario Calculator
 - Time series analysis for convenient historical price graphs
 - Calendar Spread tool for rich/cheap analysis according to historical cycle data and Lehman models
- ◆ Strategic Client Services: sophisticated Lehman Brothers trading and clearing systems

Lehman Futures Technical Analysis

Lehman Futures Analytics

LehmanLive - Microsoft Internet Explorer provided by Lehman Brothers

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Commentary and Publications

Daily Reports

- Daily US FI Technical Perspectives
- Daily Global FI Technical Perspectives
- Intraday Table

Archive

Intraday Commentary

Latest messages.

Technical Analysis Date: Jun 17, 2003 12:15 PM
Subject: USD/CHF

USD/CHF saw another grind overnight, holding above tre. Momentum measures offer little directional support for Tu 1.3065, followed by 1.3095 and 1...

(More...)

Technical Analysis Date: Jun 17, 2003 12:14 PM
Subject: AUD/USD

AUD/USD failed to sustain early gains, failing against .67 new correction from Tuesday and look to re-challenge key

Archive

Broader Market Outlook

Weekly Table
Broader Market Outlook
Technical Analysis Monthly

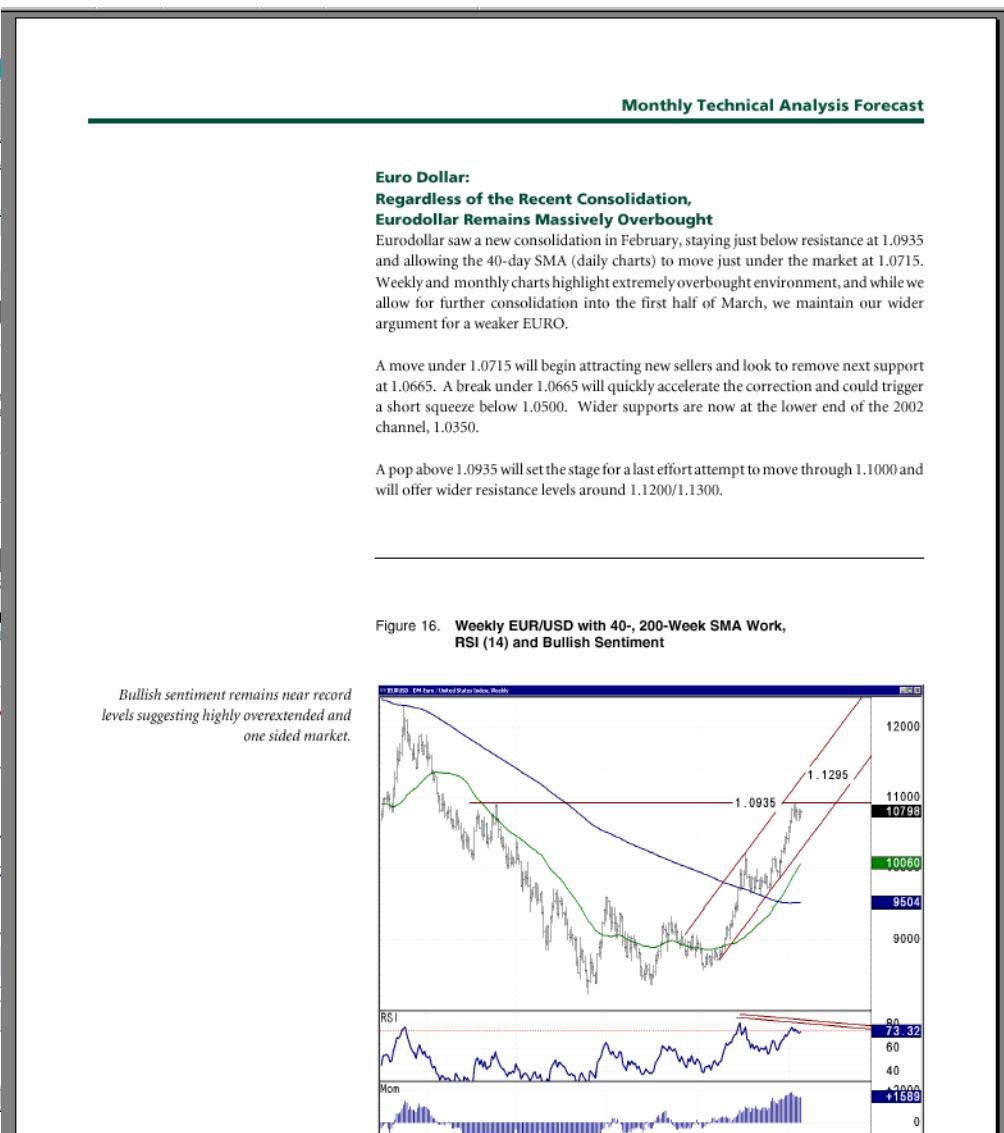
Other Links

Other FI Related Markets
Other Charts
Educational
Time Series Plotter
Current Positions
Current Recommendations

Contact Information

Michael Trefel, CMT
Technical Analysis
Global Technical Strategy
Biography
212-526-9009
Michael.Trefel@lehman.com

http://my.lehman.com/CCM/ecommerce/isp/GS_Team_TECH_FI.jsp#



Note: this overview is for illustrative purposes only and does not necessarily serve as a current Lehman Brothers recommendation

Lehman Futures Sales Coverage

Coordinated Sales Coverage

Lehman Futures Sales Coverage

Upstairs Coverage



Lehman Sales Desk coverage provides incisive market commentary and trade ideas that draw from the full spectrum of Fixed Income markets and resources. Coverage integrates the Futures, Cash and OTC Derivatives markets

Exchange Floor Coverage



Lehman Sales professionals leverage firsthand market experience and knowledge for outstanding trade execution and market information

Lehman Electronic Execution and Clearing Capabilities Overview

Lehman Electronic Capabilities

Lehman Electronic Execution and Clearing Capabilities Overview

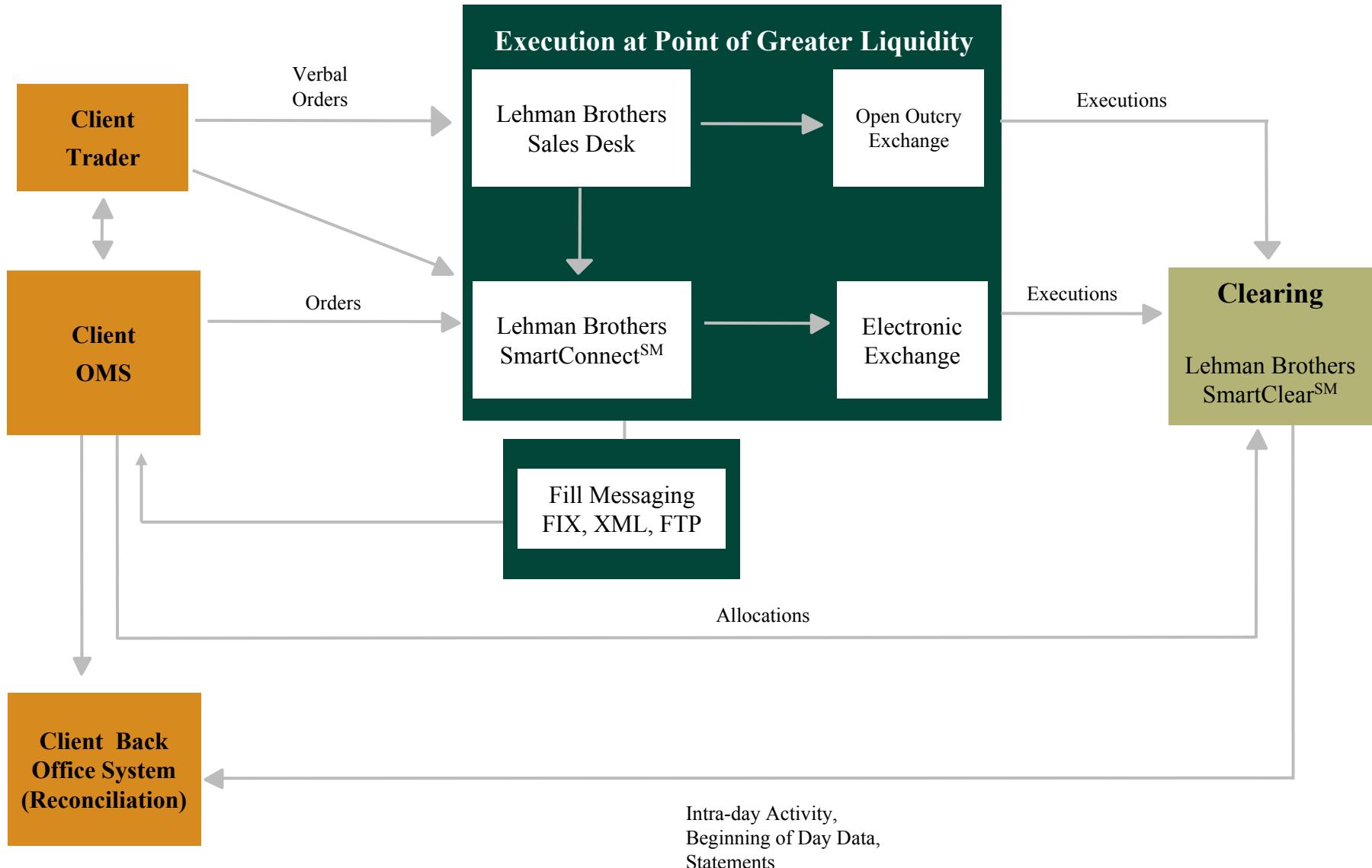
- ◆ Technology Integration
- ◆ SmartConnectSM – Electronic Futures Execution
- ◆ SmartClearSM – Futures Clearing
- ◆ SmartClearSM – Offline Reports
- ◆ SmartTicketSM – Electronic Ticketing system for Lehman Prime Brokerage clients

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"...Lehman Brothers managed to differentiate itself from an extremely close field because its SmartConnectSM system is more flexible and better-designed than any other bank. It can be customized almost endlessly; it lets users choose from many different ways to trade; it is well designed and clear to use, and it makes it easier than any other system to trade complex strategies across several markets."

Technology Integration

Lehman Electronic Execution and Clearing

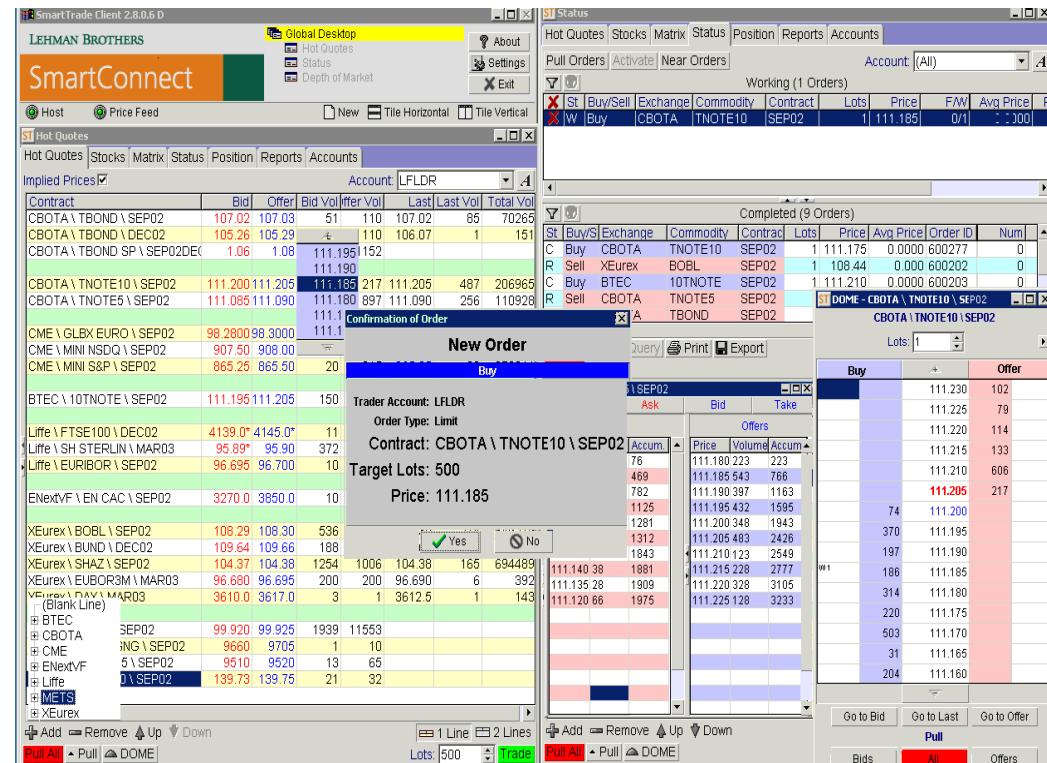


Lehman Electronic Execution

SmartConnectSM – Electronic Futures Execution

Lehman Electronic Execution

- ◆ SmartConnectSM is connected to 18 electronic futures exchanges globally (as of Aug. 2003)
- ◆ SmartConnectSM Trade Volume
 - Over 75 million contracts traded in past 3 years (Client and House business)
 - Current Average Daily Volume: 138,000 Contracts
- ◆ 83 Active Client Institutions
- ◆ 280 Active Client Traders
- ◆ 177 Internal Traders
- ◆ Total of Over 450 Traders in Active User Group
- ◆ 24 Hour Dedicated Support Team



Lehman Brothers is the recipient of Euromoney's "Best Site for Exchange Traded Derivatives Trading" award - 2002



SmartConnectSM

Capital Markets Futures Execution

Euromoney™ award winner for **Best Site for Exchange Traded Derivatives Trading**



Americas



Europe

Asia

LEHMAN BROTHERS

Electronic Order Routing

Flexible access to an ever increasing

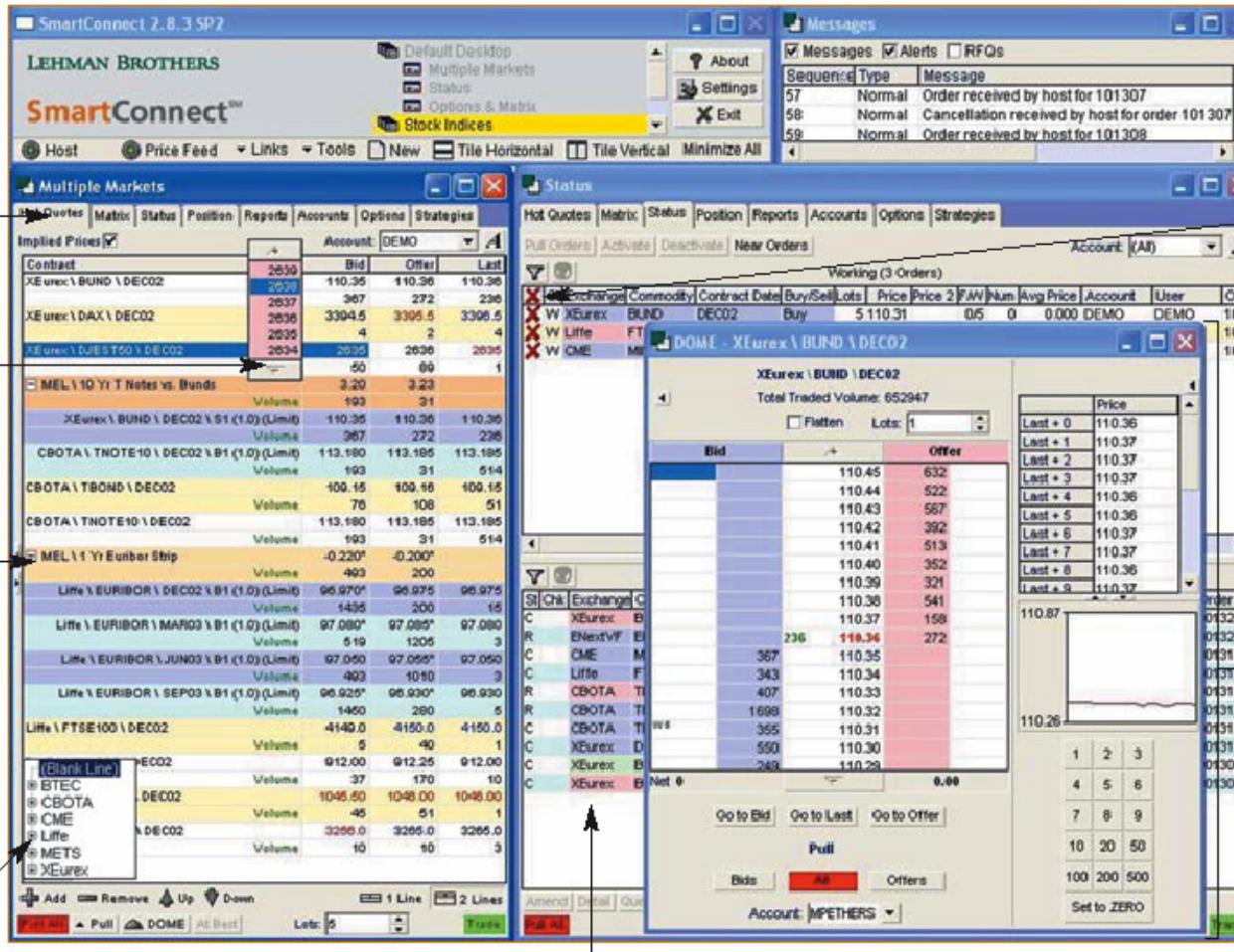
Hot Quotes

User customized window for trading across global markets

Pop up tick bar to place limit orders away from the market

Trade synthetic strategies using the Multi Exchange Legging (MEL) tool taking account of tick size and foreign exchange differences as well as trading ratios

Ability to easily add products to trading window



Status

Real-time order book displaying status of working and completed orders with Intra-day P&L

One click cancel to quickly pull working order and ability to pull all orders at once

Depth of Market

Ability to see bids and offers above and below the market, while tracking working orders

Accumulated market depth

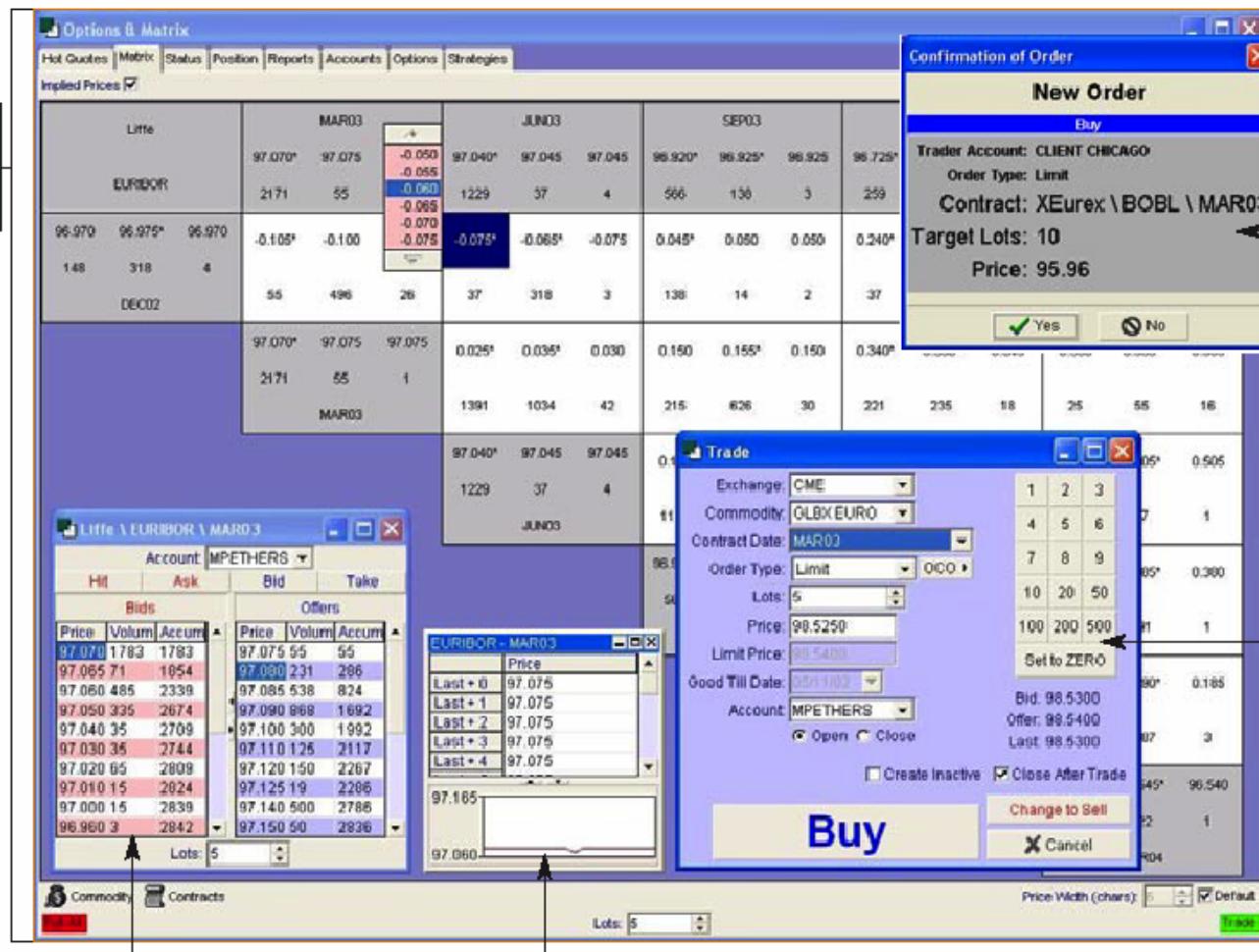
'One Click' trading from Depth of Market (DOMe) screen with user definable order size keypad and trade history

User defined sort order and filtering in order status windows

"...Lehman Brothers managed to differentiate itself from an extremely close field because its SmartConnect system is more flexible and better designed than any other bank's. It can be customized almost endlessly; it lets users choose from many different ways to trade; it is well designed and clear to use, and it makes it easier than any other system to trade complex strategies across several markets." – *Euromoney*™

number of the world's major markets supported 24 hours globally.

Ability to view implied or only explicit prices



Multiple order types
from Depth of Market
window

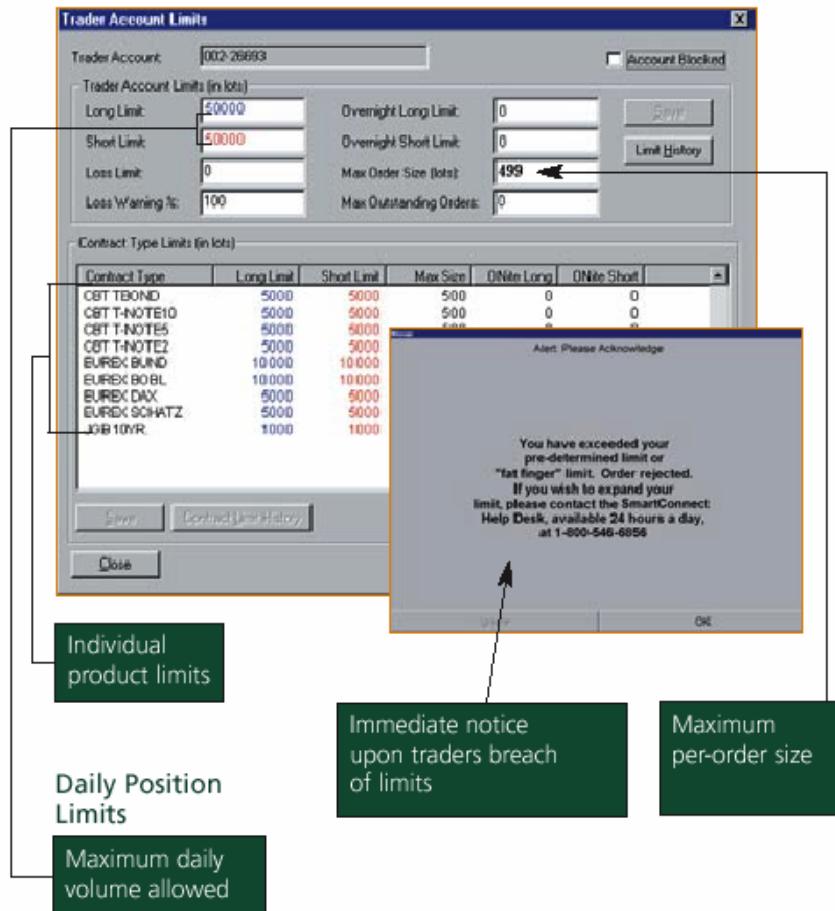
View last
twenty trades

Optional
confirmation
box appears
prompting a
final check of
order prior to
being sent to
the exchange

Trade order
entry ticket with
user definable
order types and
order size
keypad

Account Risk Management

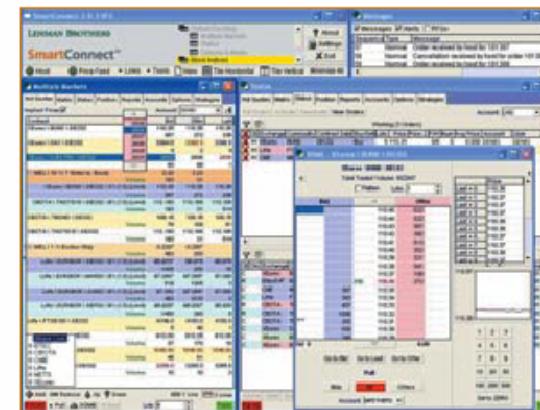
Risk limits are incorporated within SmartConnect for your protection.



Straight Through Processing (STP)

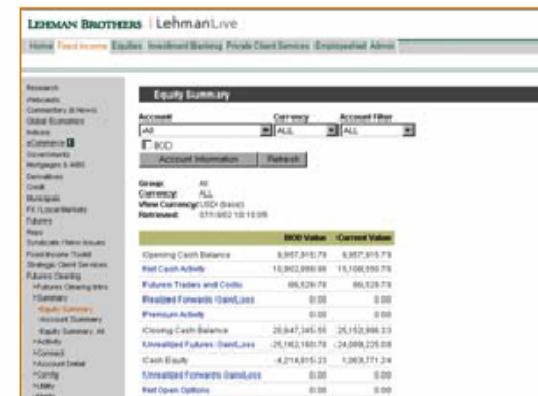
Front End to Back End Online Service

Electronic Ordering Routing > SmartConnect



- Global online trading with market depth and flexible screen customization
- Risk management capabilities
- Straight Through Processing (STP) of executed trades to SmartClear
- 24 hour support

Clearing > SmartClear



- Real-time, 24 hour global clearing and execution management system
- Automatic trade and position reconciliation
- Immediate update of profit/loss on all futures, options and FX positions
- Customized reporting capabilities
- Adaptable to client system integration

Contact details:

212.526.6876 NEW YORK
207.260.3170 LONDON
capitalmarketsfutures@lehman.com

The foregoing has been prepared solely for informational purposes and is not an offer to buy or sell or a solicitation of an offer to buy or sell any instrument or to participate in any particular trading strategy. Lehman Brothers and others associated with it may have positions in, and may effect transactions in, related securities and instruments. Additional information is available upon request. ©2002 Lehman Brothers Inc. All Rights Reserved. Member SIPC. LBB055

Lehman Clearing

SmartClearSM

Lehman Clearing

SmartClearSM: Lehman Brothers' global clearing and execution management system

LehmanLive - Microsoft Internet Explorer

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- Fixed Income Indices
- Fixed Income Toolkit
- Webcasts

Products

- Interest Rates
- Credit
- Mortgages & ABS
- Municipals
- FX / Local Markets

Services

- Strategic Client Services
 - SmartTicket.
 - Release Notes
 - Trade Portfolio
 - Risk Analysis
 - Reports
 - Margin Summary
 - >Admin
- Futures Clearing
 - >Futures Clearing Intro
 - >Summary
 - Equity Summary**
 - Account Summary
 - Equity Summary All
 - >Activity
 - >Connect
 - >Account Detail
 - >Config
 - >Utility
 - Alerts
 - Admin
- Institute of Finance

111-111-1111 ABC CORPORATION BOD

Account Information Refresh

Account: 111-111-1111
Currency: ALL
View Currency: USD (base)
Retrieved: 07/26/02 14:11:59

	BOD Value	Current Value
Opening Cash Balance	4,112,155.73	4,112,155.73
Net Cash Activity	6,778.14	6,778.14
Futures Trades and Costs	-60,651.06	-60,651.06
Realized Forwards Gain/Loss	0.00	0.00
Premium Activity	0.00	0.00
Closing Cash Balance	4,058,282.81	4,058,282.81
Unrealized Futures Gain/Loss	-434,195.62	-414,314.16
Cash Equity	3,624,087.18	3,643,968.65
Unrealized Forwards Gain/Loss	0.00	0.00
Net Open Options	0.00	0.00
Closing Equity	3,624,087.18	3,643,968.65
Collateral Margin Value	0.00	0.00
Closing Combined Equity	3,624,087.18	3,643,968.65
Margin Requirements	-811,355.11	-560,693.10
Collateral Market Value	0.00	0.00
Daily P/L	Unrealized 19,881.47	Forwards 0.00
	Realized 0.00	0.00
	Total 19,881.47	0.00
	Unrealized -414,314.16	0.00
Month to Date P/L	Realized -60,651.06	0.00

Lagardere (MMB.PA, 3-Market Perform) Reducing price target to EUR 50.00.

BCP (BCPN.JN, 3-Market Perform) Reducing price target to EUR 3.20.

WebCast Friday's European Morning Meeting

Devon Energy (DVN) Upgrading to 1-Strong

Local In

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- Futures Clearing
 - >Futures Clearing Intro
 - >Summary
 - Trade Confirmations**
 - Trades and Adjs
 - Itemized Cash

111-111-1111 ABC CORPORATION

Account: 111-111-1111
Retrieved: 07/26/02 14:11:59

Currency	Instrument	Quantity/Price
EUR	SEP02 DTB DAX IDX E	Buy 4, Average 3585.25
JPY	SEP02 OSAK NIKKEI 225	Buy 25, Average 9776
USD (REG)	SEP02 CBOT US TBONDS	* Buy 250
		Sell 125, Average 105.844
USD (REG)	SEP02 CBOT 10YR TNOTE	Buy 80, Average 110.828

SmartClearSM Offline Reports

Lehman Clearing

Trade details and position information is available for download from LehmanLive intraday and automatically at scheduled times

- ◆ Cash Activity
- ◆ Collateral
- ◆ Commissions and Fees
- ◆ Consolidated Closed Forwards
- ◆ Consolidated Closed Futures
- ◆ Consolidated Closed Options
- ◆ Consolidated Trade Activity
- ◆ Detailed Trade Activity
- ◆ Equity
- ◆ Forward Positions
- ◆ Futures Positions Totals
- ◆ FX Rates
- ◆ Margin Report per Account
- ◆ Margin Report per Currency
- ◆ Margin Requirements
- ◆ Options Positions Totals
- ◆ Positions to Reconcile (breaks)
- ◆ Position Reconciliation (full report)
- ◆ Settlement Prices and Contract Dates
- ◆ Trades to Reconcile (breaks)
- ◆ Trade Reconciliation (full report)

SmartClearSM Offline Reports

Lehman Clearing

Unreconciled Trades (BOD) For Lehman

Account	System	Bought	Sold	Exchange	Contract	Price	Expiry Date	C/P	Strike	T. Date
TST-TST-XX015	Lehman Client	0	0	EUREX	P0	108.9	Mar-03			12/5/02
		0	1							
TST-TST-XX014	Lehman Client	0	0	EUREX	P0	108.97	Mar-03			12/5/02
		0	3							
TST-TST-XX015	Lehman Client	0	4	EUREX	P0	108.97	Mar-03			12/5/02
		0	0							
TST-TST-XX015	Lehman Client	3	0	EUREX	P0	109.26	Dec-02			12/5/02
		2	0							
TST-TST-XX015	Lehman Client	0	4	EUREX	00	111.37	Dec-02			12/5/02
		4	0							

End Of Report

The Lehman-BrokerTec Advantage

BrokerTec Overview

The Lehman-BrokerTec Advantage

- ◆ BrokerTec (BTEX) was formed by a consortium of many of the world's largest financial services companies, including Lehman Brothers. Its objective was to provide a financial futures exchange with:
 - Lower cost
 - Greater functionality
 - Effective governance
- ◆ BTEX was approved by the Commodity Futures Trading Commission (CFTC) on June 18, 2001 and commenced trading on November 30, 2001
- ◆ BTEX is a fully electronic futures exchange currently offering 5, 10 and 30 year US Treasury Futures contracts
- ◆ BTEX was created to provide an efficient, inexpensive market for US Treasury futures, including block trades that do not exist on other UST futures contracts.
- ◆ BTEX innovative block trading rules allow Lehman Brothers to provide significantly better liquidity than the CBOT

BrokerTec Clearing Corporation

The Lehman-BrokerTec Advantage

- ◆ BrokerTec Clearing Corporation (BCC) backs all trades with a \$70 million guaranty fund and has \$160 million of binding assessment power
- ◆ BCC has a \$50 million minimum adjusted net capital requirement for its 17 clearing members

Conclusion

Conclusion

Conclusion

- ◆ Futures are an integral component of many investor strategies because of their unique product strengths:
 - Price Transparency
 - Highest Credit Quality
 - Liquidity
 - Leverage
 - Portfolio Diversification
- ◆ Lehman Brothers provides premiere access to the Futures marketplace:
 - #1 Research product (*Institutional Investor*)
 - #1 Electronic trading platform (*Euromoney*)
 - Access to Lehman Brothers' broad market liquidity and customer-oriented sales team
 - Customer-friendly, professional and experienced CBOT/CME direct floor coverage available to all futures accounts

Additional Resources

Whom to Contact

Additional Resources

- ◆ Upstairs Sales Desk: 1-866-321-9748 (toll-free)
 - Donald Swift
 - Kevin Duffy-Acevedo
 - Lorraine Barrack
 - Elizabeth Haynes
 - Charles Carson
- ◆ Trading
 - James Golden (BTEX)
- ◆ Research
 - Ben Martens
- ◆ Exchange Floor Coverage
 - CBOT
 - David Andrew
 - Steve Zwick (floor manager)
 - CME
 - Ben O'Connor
 - Michael Portincaso (floor manager)
- ◆ 24 Hour Desk
- ◆ SmartConnect/SmartClear Technology Sales
 - Don Regan
 - Amy Marsh

Part C: Appendices

The Lehman Brothers Multi-Factor Model

The Lehman Brothers Multifactor Futures Model

The Lehman Brothers Multi-Factor Model

Need for a model

- ◆ Non-parallel yield shifts
 - The CTD can change due to both changes in levels and slope
- ◆ Moving parts
 - Repo
 - Volatility
- ◆ Scenario analysis

If we can price all these factors correctly, we can correctly value the futures contracts and hence the net bases.



Relative Value Opportunities!

Model Output

The Lehman Brothers Multi-Factor Model

→ Model Price - Rich/cheap

→ Option Value

→ For each deliverable:

- Gross/Net basis (Market and Model)
- Hedge Ratios (Parallel shift and Factor based)
- Delivery Probabilities

→ Risk Measures

- Duration (modified, PV01)
- Convexity
- Sensitivity to repo
- Sensitivity to vol

→ Scenario Analysis

What distinguishes our model

The Lehman Brothers Multi-Factor Model

- ◆ Two factor diffusion of deliverable yields
- ◆ Risk-neutral, no arbitrage framework
- ◆ Uses the actual term structure of repo rates
- ◆ Calibrated to OTC option prices
- ◆ Multiple time slices to capture the timing option

Futures

Reports Analytic Tools

Daily Reports

Closing Date:

(MM/DD/YY Blank for most recent report.)

CBOT US Treasury Futures

- Individual Basis Reports
- All Basis Sections Combined
- Calendar Spreads
- Futures/Cash Weightings 

CBOT US Agency Futures

- Individual Basis Reports
- All Basis Sections Combined

CBOT US Municipal Futures

- Daily Analysis

Futures Options

- Eurodollar Futures ATM Option Volatility
- U.S. Treasury Futures ATM Option Volatility
- Exchange Traded Options
- All Sections Combined
- European Futures ATM Option Volatility

Research Publications

- Special Reports
- Technical Analysis
- Global Relative Value
- Equity Futures
 - Daily Packet
 - The Outlook
 - Forecasting the S&P 500 Calendar Spread
- Accounting Issues 

 - SFAS 133's Impact on Insurance Industry
 - FAS133: Corporate Applications

Quantitative Strategies

- Liquid Markets Research Quarterly

Interest Rate Strategies

- Calendar Talk
- Futures Commentary

Conferences

- All Webcasts
- Yield Curve and Volatility Conference

Futures Product Information

- BTEX Block Trading and Reporting 

US Treasuries

Market Monitor Reports Analytic Tools Offerings 

LEHMAN BROTHERS

USZ2 Basis Report

Government Strategy

Pricing: 12/13/02	First Delivery: 12/02/02	Model Price: 111-096	Historical CTD Vol (bp): 101.2	Change per +1.0% in:	Repo/Yield Beta: 0%
Trade: 12/13/02	Last Trade: 12/19/02	Market Price: 111-120	Implied CTD Vol (bp): 91.3	Repo: 1.5 32nds	Dur Sensitivity: 0.033
Settle: 12/16/02	Last Delivery: 12/31/02	Difference: -0.022	Option Value: 0-022	Yield Vol: -0.2 32nds	PV01 Sensitivity: 0.221

Coupon	Maturity	Delivery			Forward Price	Forward Yield	Forward Val 01	Conversion	Gross Basis	Net Basis	Model		Implied Repo	Implied Repo	Yield Beta
		Probability	Price	Yield							Net Basis	Repo	Repo		
9.125	05/15/18	-	146-306	4.783	140.4	146-210	4.799	139.8	1.3092	36.8	27.0	29.9	1.20	-12.51	1.205
9.000	11/15/18	-	146-001	4.825	142.6	145-22+	4.840	142.0	1.3028	28.9	19.3	22.2	1.20	-8.68	1.193
8.875	02/15/19	-	144-252	4.846	143.2	144-161	4.861	142.6	1.2931	24.7	15.5	18.4	1.20	-6.66	1.188
8.125	08/15/19	-	136-173	4.892	139.8	136-090	4.907	139.2	1.2206	19.1	10.8	13.5	1.20	-4.59	1.174
8.500	02/15/20	-	141-090	4.912	146.0	141-002	4.926	145.4	1.2641	15.7	7.0	9.8	1.20	-2.42	1.166
8.750	05/15/20	-	144-180	4.912	149.8	144-085	4.927	149.2	1.2929	18.1	8.8	11.7	1.20	-3.33	1.162
8.750	08/15/20	1.6	144-226	4.929	151.3	144-136	4.944	150.7	1.2954	14.0	4.9	7.8	1.20	-1.30	1.157
7.875	02/15/21	9.4	134-143	4.972	145.6	134-062	4.986	145.1	1.2047	8.8	0.7	3.4	1.20	0.80	1.143
8.125	05/15/21	-	137-220	4.975	149.4	137-13+	4.990	148.9	1.2336	9.5	0.9	3.7	1.20	0.70	1.140
8.125	08/15/21	34.4	137-277	4.984	150.8	137-19+	4.998	150.3	1.2355	8.5	0.1	2.9	1.20	1.12	1.135
8.000	11/15/21	-	136-161	4.994	150.9	136-076	5.008	150.3	1.2232	8.7	0.2	3.0	1.20	1.07	1.130
7.250	08/15/22	3.1	127-155	5.031	146.8	127-082	5.045	146.3	1.1426	7.4	0.0	2.6	1.20	1.18	1.113
7.625	11/15/22	12.5	132-12+	5.031	152.0	132-045	5.044	151.5	1.1864	8.2	0.2	2.9	1.20	1.06	1.111
7.125	02/15/23	-	126-027	5.047	147.7	125-275	5.061	147.2	1.1300	7.5	0.3	2.8	1.20	1.05	1.104
6.250	08/15/23	37.5	114-295	5.075	140.0	114-233	5.088	139.5	1.0293	9.2	2.9	5.2	1.20	-0.68	1.090
7.500	11/15/24	-	131-315	5.066	160.3	131-237	5.079	159.7	1.1808	15.3	7.5	10.1	1.20	-3.03	1.079
7.625	02/15/25	1.6	133-243	5.071	163.0	133-165	5.084	162.4	1.1971	14.0	6.2	8.9	1.20	-2.21	1.077
6.875	08/15/25	-	123-23+	5.097	155.5	123-16+	5.109	154.9	1.1073	13.0	6.1	8.6	1.20	-2.42	1.065
6.000	02/15/26	-	112-033	5.103	146.4	111-293	5.115	145.9	1.0000	23.4	17.4	19.6	1.20	-10.22	1.052
6.750	08/15/26	-	122-146	5.104	158.0	122-080	5.116	157.4	1.0938	20.5	13.7	16.1	1.20	-7.03	1.052
6.500	11/15/26	-	119-03+	5.107	155.6	118-287	5.119	155.1	1.0627	24.1	17.4	19.7	1.20	-9.69	1.047
6.625	02/15/27	-	120-293	5.108	158.2	120-226	5.120	157.7	1.0790	23.8	17.2	19.6	1.20	-9.25	1.045
6.375	08/15/27	-	117-193	5.111	156.7	117-130	5.123	156.2	1.0478	29.0	22.6	25.0	1.20	-12.98	1.038
6.125	11/15/27	-	114-077	5.108	154.2	114-01+	5.119	153.7	1.0159	35.2	28.9	31.1	1.20	-17.67	1.033
5.500	08/15/28	-	105-186	5.107	147.8	105-132	5.118	147.4	0.9351	46.0	40.6	42.6	1.20	-27.11	1.021
5.250	11/15/28	-	102-00+	5.109	144.9	101-271	5.120	144.4	0.9022	49.0	43.7	45.7	1.20	-30.79	1.016
5.250	02/15/29	-	102-030	5.104	145.7	101-297	5.115	145.3	0.9019	52.6	47.5	49.5	1.20	-33.07	1.014
6.125	08/15/29	-	114-265	5.101	160.4	114-20+	5.112	159.9	1.0165	51.8	45.7	48.0	1.20	-28.14	1.018
6.250	05/15/30	-	117-030	5.087	165.2	116-28+	5.098	164.7	1.0332	64.6	58.2	60.5	1.20	-35.93	1.013
5.375	02/15/31	-	106-200	4.937	158.5	106-146	4.947	158.1	0.9157	148.4	143.2	145.2	1.20	-97.84	1.000

BrokerTec Background

Lehman-BTEX Advantage

BrokerTec Background

- ◆ The BTEX block trading facility provided by Lehman Brothers can reduce US Treasury Futures transaction costs by drastically reducing slippage

Projected Bid-Ask Spreads for BTEX vs. CBOT*

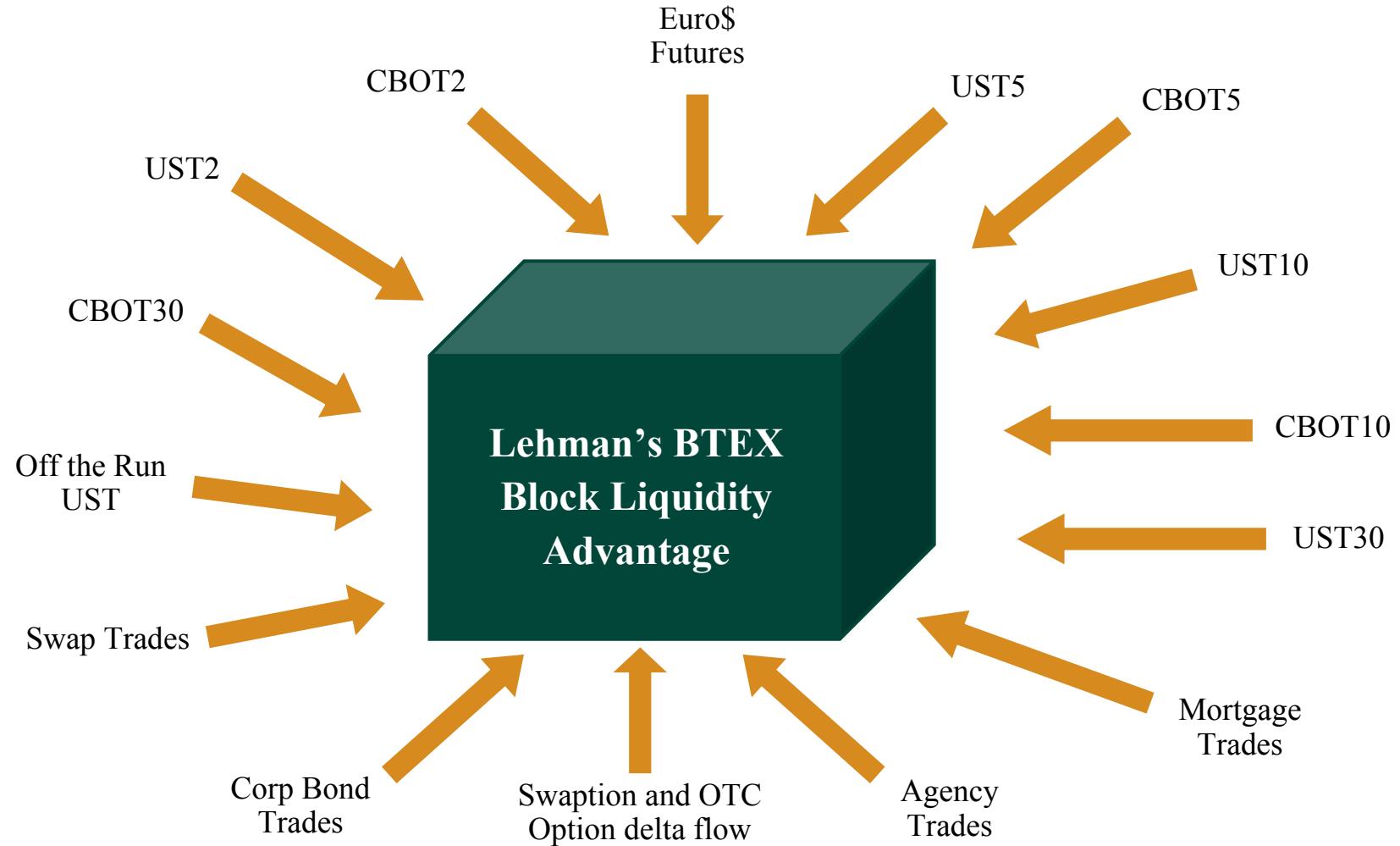
No. of Contracts	Expected BTEX 5yr	Estimated CBOT 5yr	Price Differential	Expected BTEX 10Y	Estimated CBOT 10Y	Price Differential	Expected BTEX 30Y	Estimated CBOT 30Y	Price Differential
500	0.25	0.5	100%	0.25	0.5	100%	0.75	1	25%
1,000	0.50	1	100%	1	1.5-2.0	75%	1.5	3	100%
2,000	1	2	100%	1.5	2.0-4.0	100%	2	3.0-6.0	125%
3,000	1	2.0-3.0	150%	2	2.0-5.0	75%	3	4.0-10.0	133%

*Lehman Brothers Estimates under "normal market conditions"

Lehman-BTEX Advantage

BrokerTec Background

- ◆ The depth of Lehman's fixed income franchise is organized to funnel liquidity towards optimal block trading



BTEX Block Trading

BrokerTec Background

- ◆ The BTEX block trading facility is designed to accommodate large transactions between market makers such as Lehman Brothers and their customers
- ◆ BTEX block trades on US Treasury 5yr, 10yr and 30yr futures have a 250 contract minimum
- ◆ Predetermined single price execution
- ◆ Anonymity enhanced by deferred reporting as follows:

<u>Number of Contracts:</u>	<u>Reporting Time:</u>
250-999	15 minutes
1,000-2,499	30 minutes
2,500-4,999	60 minutes
5,000-9,999	120 minutes
10,000 +	240 minutes

BTEX Block Trading is Significant

BrokerTec Background



Market Data & Info

- Settlement Prices
- Market Data Vendors
- Deliveries
- Calendars
- SPAN Files
- Volume & Open Interest
- Time & Sales
- Block Trades

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BTEX > Market Data >

July 2003						
Description	Quantity	Month	Year	Price	SPD	TimeStamp
10 YR US TREASURY NOTE FUTURE	600	SEP	2003	110.2350		2003-07-31 01:51 PM
5 YR US TREASURY NOTE FUTURE	268	SEP	2003	111.2550		2003-07-30 10:06 AM
5 YR US TREASURY NOTE FUTURE	300	SEP	2003	111.2400		2003-07-30 08:02 AM
5 YR US TREASURY NOTE FUTURE	260	SEP	2003	112.0000		2003-07-29 12:11 PM
10 YR US TREASURY NOTE FUTURE	260	SEP	2003	112.2100		2003-07-29 10:20 AM
10 YR US TREASURY NOTE FUTURE	250	SEP	2003	112.1700		2003-07-28 11:44 AM
30 YR US TREASURY BOND FUTURE	300	SEP	2003	109.0500		2003-07-28 08:56 AM
5 YR US TREASURY NOTE FUTURE	550	SEP	2003	112.2100		2003-07-28 08:37 AM
5 YR US TREASURY NOTE FUTURE	256	SEP	2003	112.1900		2003-07-28 07:44 AM
5 YR US TREASURY NOTE FUTURE	250	SEP	2003	113.0600		2003-07-25 10:58 AM
10 YR US TREASURY NOTE FUTURE	300	SEP	2003	113.2300		2003-07-25 10:11 AM
5 YR US TREASURY NOTE FUTURE	250	SEP	2003	112.3150		2003-07-25 10:02 AM
10 YR US TREASURY NOTE FUTURE	250	SEP	2003	113.1000		2003-07-25 09:35 AM
5 YR US TREASURY NOTE FUTURE	250	SEP	2003	112.2350		2003-07-25 08:37 AM
5 YR US TREASURY NOTE FUTURE	263	SEP	2003	112.2700		2003-07-25 07:42 AM
10 YR US TREASURY NOTE FUTURE	300	SEP	2003	113.0300		2003-07-24 11:06 AM
5 YR US TREASURY NOTE FUTURE	400	SEP	2003	112.2050		2003-07-24 10:16 AM
5 YR US TREASURY NOTE FUTURE	250	SEP	2003	112.2400		2003-07-24 08:40 AM
30 YR US TREASURY BOND FUTURE	300	SEP	2003	110.2000		2003-07-24 08:26 AM
5 YR US TREASURY NOTE FUTURE	283	SEP	2003	113.0000		2003-07-24 07:39 AM
10 YR US TREASURY NOTE FUTURE	300	SEP	2003	114.0150		2003-07-23 11:04 AM
30 YR US TREASURY BOND FUTURE	250	SEP	2003	111.0700		2003-07-23 09:56 AM
5 YR US TREASURY NOTE FUTURE	600	SEP	2003	113.0000		2003-07-23 09:22 AM
10 YR US TREASURY NOTE FUTURE	350	SEP	2003	113.1750		2003-07-23 08:45 AM
30 YR US TREASURY BOND FUTURE	250	SEP	2003	110.2300		2003-07-23 08:28 AM
5 YR US TREASURY NOTE FUTURE	283	SEP	2003	112.2950		2003-07-23 07:34 AM
5 YR US TREASURY NOTE FUTURE	400	SEP	2003	112.2000		2003-07-22 10:56 AM
10 YR US TREASURY NOTE FUTURE	400	SEP	2003	113.0700		2003-07-22 10:23 AM
30 YR US TREASURY BOND FUTURE	300	SEP	2003	110.0500		2003-07-22 09:39 AM
5 YR US TREASURY NOTE FUTURE	450	SEP	2003	112.1550		2003-07-22 09:30 AM
5 YR US TREASURY NOTE FUTURE	280	SEP	2003	112.1850		2003-07-22 07:38 AM
10 YR US TREASURY NOTE FUTURE	313	SEP	2003	113.1000		2003-07-22 07:28 AM
5 YR US TREASURY NOTE FUTURE	600	SEP	2003	113.0000		2003-07-22 07:28 AM

BLOCK TRADES		
Historical Record		
2003	2002	2001
Aug	Dec	Dec
Jul	Nov	
Jun	Oct	
May	Sep	
Apr	Aug	
Mar	Jul	
Feb	Jun	
Jan	May	
	Apr	
	Mar	
	Feb	
	Jan	
YTD	Total	Total
	All Trades	

- ◆ Total July block trades thru BTEX= 53
- ◆ Average block trade size= 350 contracts
- ◆ Largest trade= 900 contracts
- ◆ More information at www.btecfutures.com

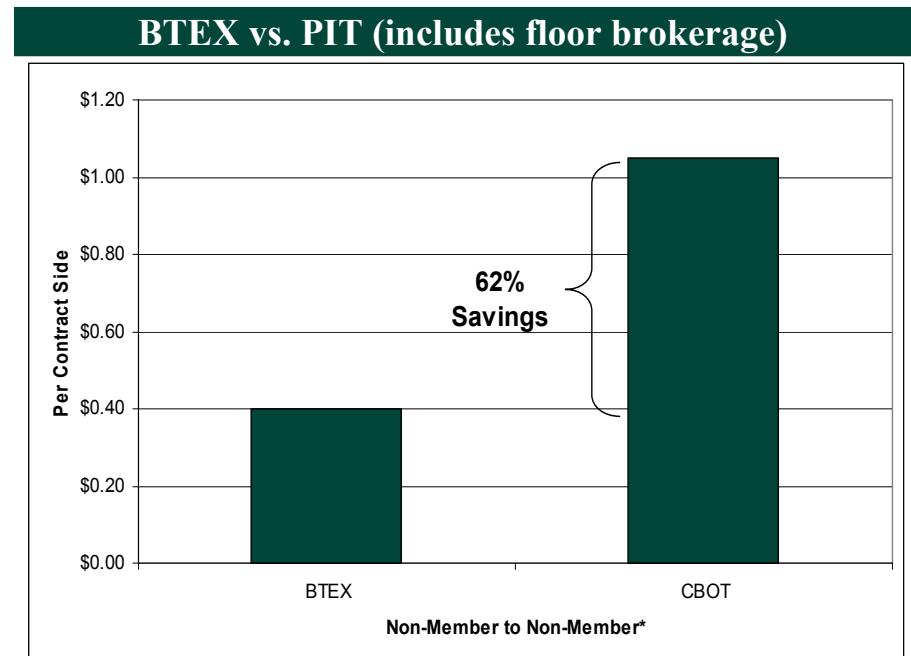
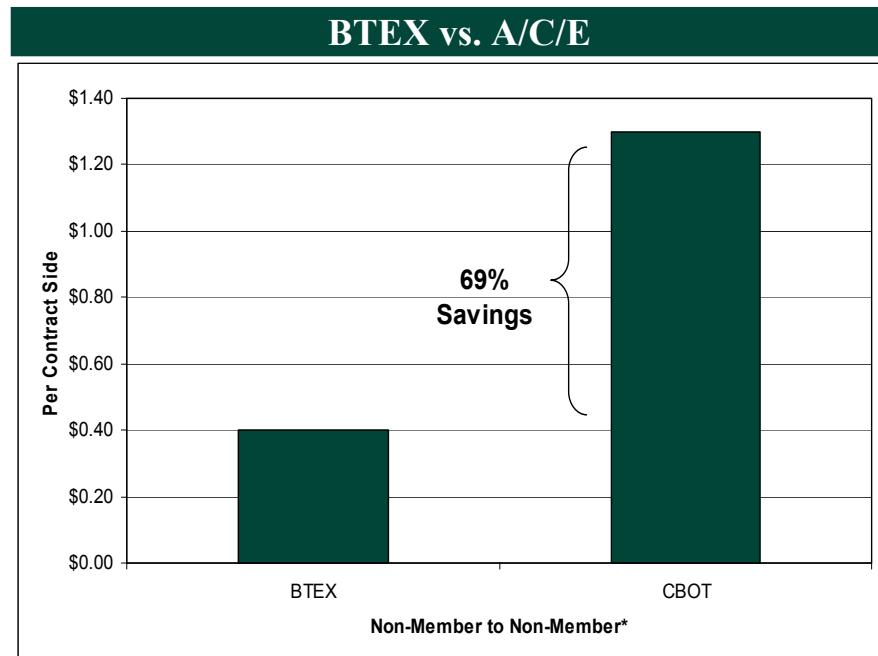
Lehman-BTEX Advantage

BrokerTec Background

- ◆ BTEX fees are 62%-69% lower than A/C/E and CBOT Fees

Non-Member Firms

(Inclusive of Clearing and Exclusive of Volume Discount)



Source: CBOT website, www.cbot.com

*Fees as of 11/1/02

Non-Block BTEX Trades via SmartConnect

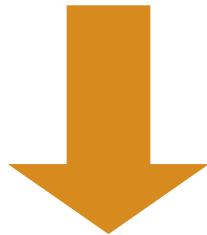
BrokerTec Background 

- ◆ Non-Block BTEX futures trades are efficiently executed via Lehman's SmartConnect electronic execution product
- ◆ SmartConnect was ranked #1 by Euromoney for the "Best Site for Exchange Traded Derivatives Trading" in 2002
- ◆ Lehman has the industry's leading clearing technology, known as SmartClear
- ◆ SmartConnect futures trades are subject to straight-through processing into SmartClear for trades cleared at Lehman

Why BTEX and Lehman?- Summary

BrokerTec Background

- ◆ Reduced transaction costs
- ◆ Superior liquidity
 - Lehman franchise
 - Block trading
- ◆ Enhanced anonymity



BTEX is an efficient and effective trading platform that Lehman Brothers encourages you to utilize

BrokerTec Membership

[BrokerTec Background](#)

Members of BrokerTec Clearing Company, L.L.C.

ABN Amro Incorporated.
Bear Stearns Securities Corp.
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Rosenthal Collins Group, L.L.C.
Salomon Smith Barney Inc.
Transmarket Group, L.L.C.
UBS Warburg L.L.C.
Z-Marc Partners

*Market Maker

Source: BrokerTec website

Glossary

Glossary

Glossary

Basis

- ◆ The price differential of a financial futures contract and its underlying asset

Bundles

- ◆ A Eurodollar bundle is the simultaneous sale or purchase of equal numbers of lots of a series of consecutive Eurodollar Futures contracts. The first contract in any bundle is generally the first quarterly contract in the Eurodollar strip

Electronic Exchange

- ◆ Networked matching of buy and sell orders

Exchange for Physical (EFP)

- ◆ An EFP is a transaction in which one party buys the cash market and sells the futures market while the opposite party sells the cash market and buys the futures market. The terms of such transactions are privately negotiated.

Futures Contract

- ◆ A legally binding agreement, made on a Futures exchange, to buy or sell a financial instrument or commodity at some time in the future. Futures contracts are standardized according to the quality, quantity, and delivery time and location for each commodity. The key variable is price and, in some cases, deliverable grade

Open Outcry

- ◆ Auction-like form of exchange when traders shout their buy and sell orders. When one trader shouts a buy order and another trader responds to that buy order, or shouts a sell order for the same commodity, a contract is made

Packs

- ◆ A pack is the simultaneous purchase or sale of an equally-weighted, consecutive series of four quarterly EuroDollar futures contracts, quoted on an average net change basis from the previous day's settlement price. Packs provide a readily available, widely accepted method for executing multiple futures contracts with a single transaction.