

Overview of CME Group Listed Interest Rate Products

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Disclaimer

Futures trading is not suitable for all investors, and involves the risk of loss. Futures are a leveraged investment, and because only a percentage of a contract's value is required to trade, it is possible to lose more than the amount of money deposited for a futures position. Therefore, traders should only use funds that they can afford to lose without affecting their lifestyles. And only a portion of those funds should be devoted to any one trade because they cannot expect to profit on every trade.

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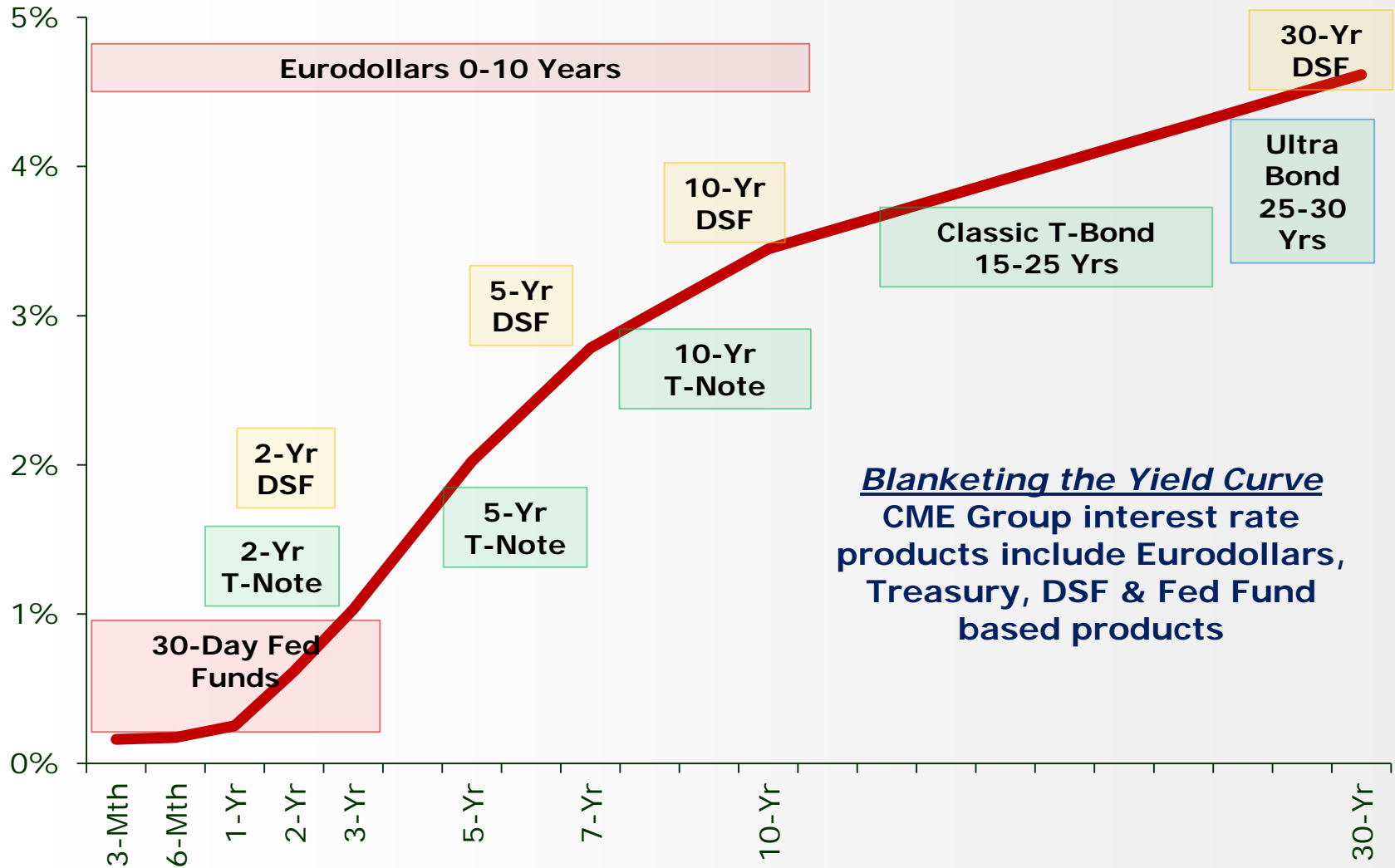
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All matters pertaining to rules and specifications herein are made subject to and are superseded by official CME, CBOT, NYMEX and CME Group rules. Current rules should be consulted in all cases concerning contract specifications.

Outline

- **Interest Rate Futures—Key Maturities and Durations**
- **Fed Funds Futures Basics and Applications**
- **Eurodollar Futures Basics and Applications**
- **Treasury Futures Basics and Applications**
- **Interest Rate Options Overview**
- **Recent Trends in Options**

Interest Rate Products-Futures

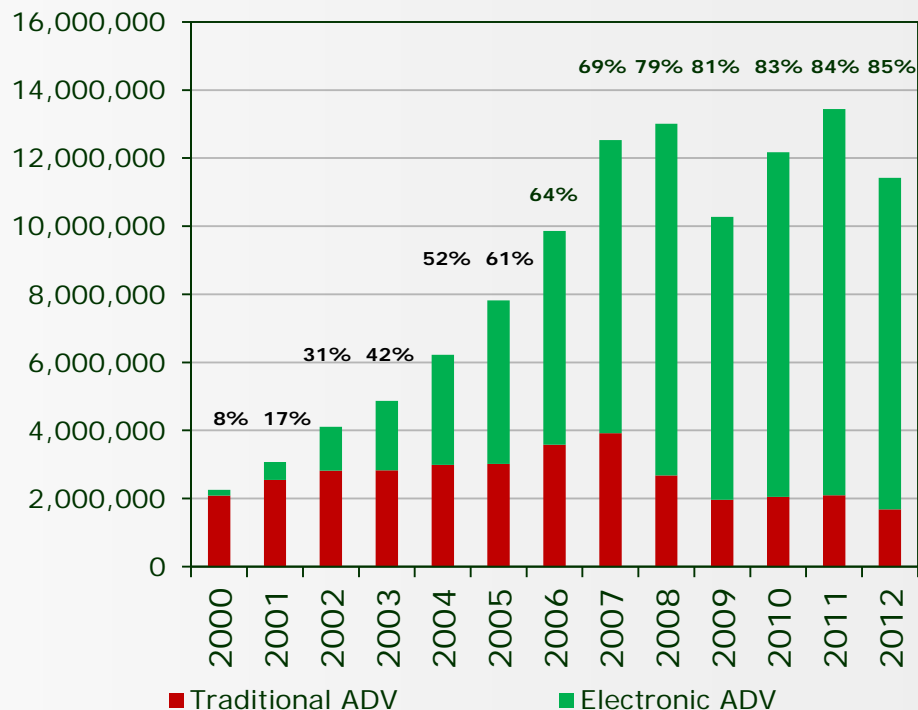


Fostering Market Liquidity

Electronic trading

- **CME Globex® introduced in 1992 to facilitate after-hours trading**
- **“Open access” policy introduced in 2000 allows any customer to trade directly on system**
- **Growth during past decade largely attributable to enhanced liquidity fostered by electronic technologies**

Traditional vs. Electronic ADV



Fed Fund Futures Fundamentals

30-Day Fed Fund futures contract specifications ...

Unit	\$5 million notional value
Cash Settlement	Cash settled to average daily Fed Funds overnight (O/N) as reported by Federal Reserve Bank of New York
Quote	In terms of "IMM index" or 100 less yield, e.g., yield of 0.35% quoted as 99.65
Tick Size	Nearby month quoted to ¼ basis point (0.0025) = \$10.4175 rounded up to nearest cent; all other contract months quoted to ½ basis point (0.005) = \$20.835
Months	First 36 consecutive contract months
Hours of Trade	Floor trading 7:20 am-2:00 pm Monday-Friday. CME Globex® trading platform Mondays-Thursdays from 5:30 pm to 4:00 pm Sunday-Friday
Final Trading Day	Last business day of delivery month when trading closes at 4:00 pm

Fed Fund Futures Fundamentals

30-Day Fed Fund Futures (4/26/11)

Fed Fund futures pricing ...

- Prices quoted as 100 – Yield, e.g., quote of 99.64 implies yield of 0.36% (= 100.00 – 99.64)
- One basis point (0.01%) equates to \$41.67

$$\begin{aligned}
 \text{BPV} &= \$5,000,000 \times (\text{days}/360) \times 0.01\% \\
 &= \$5,000,000 \times (30/360) \times 0.01\% \\
 &= \$41.67
 \end{aligned}$$

Month	Settle-ment	Yield	Volume	Open Interest
Apr-11	99.9000	0.100%	705	80,450
May-11	99.8900	0.110%	1,085	82,178
Jun-11	99.8800	0.120%	2,499	55,978
Jul-11	99.8600	0.140%	896	47,538
Aug-11	99.8450	0.155%	4,021	43,946
Sep-11	99.8350	0.165%	1,861	35,152
Oct-11	99.8200	0.180%	1,764	47,607
Nov-11	99.7900	0.210%	2,544	47,854
Dec-11	99.7650	0.235%	2,260	47,143
Jan-12	99.7400	0.260%	6,212	53,355
Feb-12	99.6850	0.315%	3,636	52,154
Mar-12	99.6400	0.360%	5,002	22,050
Apr-12	99.5950	0.405%	2,562	16,321
May-12	99.5150	0.485%	2,435	26,646
Jun-12	99.4750	0.525%	285	5,742
...				
Mar-14	97.455	2.545%	-	7
			39,023	695,571

Fed Fund Futures Fundamentals

FOMC meeting schedule ...

- **Federal Open Market Committee (FOMC) generally meets every 6 weeks to determine course of Fed monetary policy**

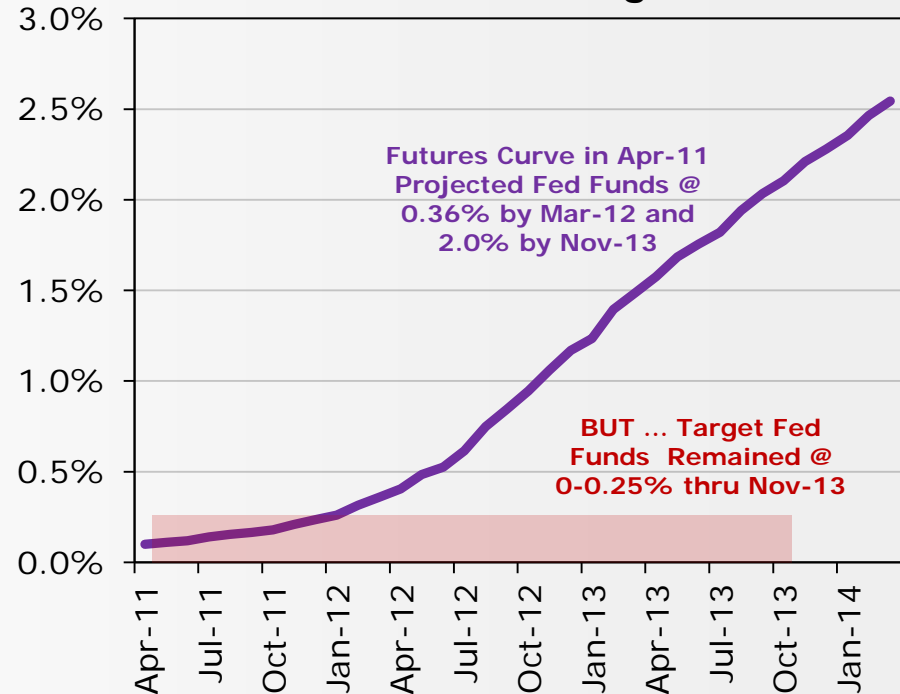
2013
January 29-30
March 19-20
April 30- May 1
June 18-19
July 30-31
September 17-18
October 29-30
December 17-18

Fed Fund Futures Applications

Futures curve ...

- Prediction regarding future course of monetary policy implicit in Fed Fund futures prices
- Fed Fund futures listed in 36 consecutive months ... facilitates matching of month with FOMC meeting
- BUT ... implicit predictions are not necessarily correct
- Hedge short term funding costs

Futures Curve vs. Target Rate



Eurodollar Futures Fundamentals

Contract specifications ...

Unit	\$1 million face value, 90-day Eurodollar Time Deposits
Cash Settlement	Cash settled to British Bankers Association (BBA) 3-month Eurodollar Interbank Time Deposit Rate
Quote	In terms of "IMM index" or 100 less yield, e.g., yield of 0.85% quoted as 99.15
Tick Size	One-half basis point (0.005) = \$12.50; except in nearby month, tick is one-quarter basis point (0.0025) = \$6.25
Months	March quarterly cycle of March, June, September and December; plus 1 st 4 "serial" months not in March quarterly cycle
Hours of Trade	Floor trading 7:20 am-2:00 pm. CME Globex® trading platform Mondays-Thursday from 5:00 pm to 4:00 pm & 2:00 pm to 4:00 pm; Shutdown 4:00 pm to 5:00 pm; Sundays and holidays from 5:00 pm to 4:00 pm
Last Trading Day	2nd London bank business day prior to 3 rd Wednesday of contract month. Trading in expiring contract closes at 11:00 a.m. London Time on Last Trading Day.

Eurodollar Futures Fundamentals

Birth of Eurodollar or LIBOR market ...

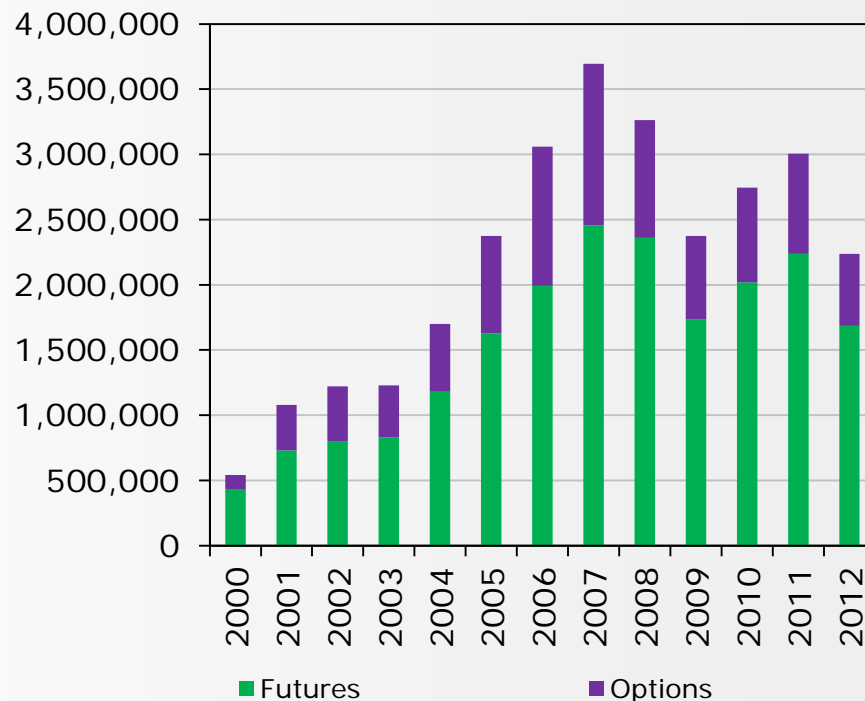
- **USD denominated time deposits held in banks outside U.S.**
 - LIBOR market developed in London in 1950's and 60's because (1) Reg Q limited rates that U.S. banks could offer domestic depositors; (2) Soviets were reluctant to make deposits with U.S. banks for fear of asset seizure during cold war era
 - LIBOR succeeded "Prime Rate" as benchmark rate for corporate funding ... corporations borrow with "floating" rate plus credit spread
- **Most active short-term interest rate futures worldwide**
 - Launched December 1981, market growth facilitated by interplay vs. interest rate swap (IRS) markets
 - Most active users include ... bank asset/liability managers, interest rate swap dealers, proprietary traders, hedge funds
 - Over 95% of Eurodollar futures volume is now electronic

Eurodollar Futures Fundamentals

Eurodollar futures ...

- Based on \$1,000,000 face value 90-day instrument
- Cash settled to British Bankers Association (BBA) 90-day Eurodollar time deposit rate
- Quoted as 100-Yield, e.g., yield of 0.85% quoted as 99.15 (=100.00 – 0.85)

Eurodollar Average Daily Volume

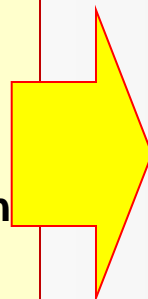


Eurodollar Futures Applications

Multiple uses and users ...

Users

- Commercial & investment banks
 - Swap desks, MM & repo desks, Treasury desks, mortgage desks, corporate/credit desks, asset/liability management
- Central banks & sovereign wealth funds
- Hedge funds & Commodity Trading Advisors (CTAs)
- Proprietary traders
- Asset managers
- Mortgage servicers
- Regional banks



Uses

- Price & hedge interest rate swap (IRS) exposures
- Hedge corporate & commercial paper borrowing rates
- Manage asset/liability mismatches on balance sheet
- Adjust duration of fixed income portfolios
- Basis trading or arbitrage
- Trade shape of yield curve
- Outright interest rate speculation

Treasury Futures Fundamentals

	2-Year T-Note Futures	5-Year T-Note Futures	10-Year T-Note Futures	Classic T-Bond Futures	Ultra T-Bond Futures
Contract Size	\$200,000 value	\$100,000 face-value			
Delivery Grade	Notes with original maturity no greater than 5-1/4 years and remaining maturity of 1 3/4 to 2.0 years	Notes with original maturity no greater than 5-1/4 years and remaining maturity of at least 4 years, 2 months	Notes with original maturity no greater than 10 yrs and remaining maturity of at least 6-1/2 years	Bonds with remaining maturity of at least 15 years, but no more than 25 yrs	Bonds with remaining maturity of at least 25 yrs but no more than 30 yrs
Invoice Price	Invoice price = settlement price x conversion factor (CF) + accrued interest Where CF = hypothetical price to yield 6%				
Price Quote	1/4 th of 1/32 nd (\$15.625)	1/4 th of 1/32 nd (\$7.8125)	1/2 of 1/32 nd (\$15.625)	1/32 nd (\$31.25)	
Symbols GLOBEX Bloomberg	ZT TU	ZF FV	ZN TY	ZB US	UL WN

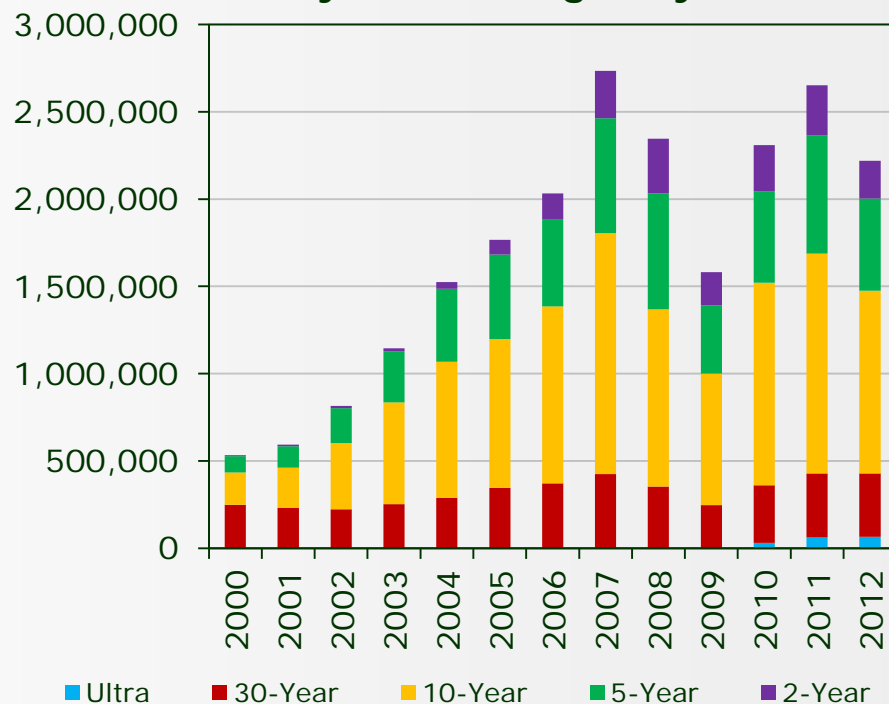
Treasury Futures Fundamentals

Treasury futures ...

- Generally calls for delivery of \$100,000 face value in “maturity window”
- I.e., 10-year futures call for delivery of T-notes with 6-1/2 to 10 years until maturity
- Quoted in % of par to 1/32nd or better, e.g., 99-08 means 99+8/32nds
- Invoice paid from long to short on delivery, where CF = price to yield 6%

$$\text{Invoice} \sim \frac{\text{Futures Price}}{\text{Conversion Factor (CF)}}$$

Treasury Futures Avg Daily Volume



Treasury Futures Fundamentals

Trends contributing to growth ...

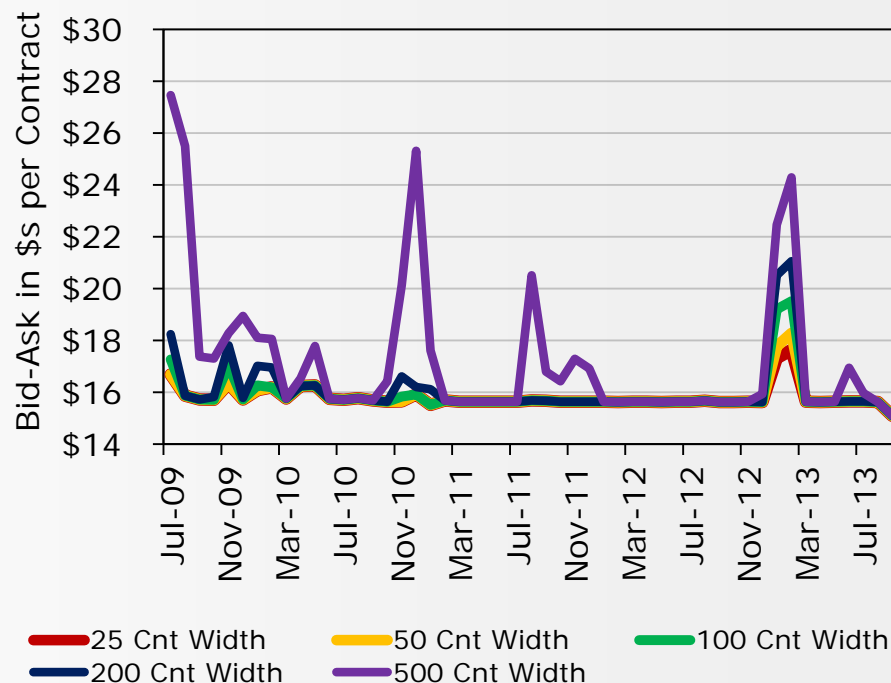
- **Treasuries most actively traded spot interest rate market worldwide**
- **CME Globex® fosters liquidity ... low transaction costs in transparent, competitive electronic trading venue**
 - “Open access” policy offers direct access to Globex on global basis
 - Pricing transparency but participant anonymity
 - Handles > 1 billion orders monthly with average response < 5 milliseconds
- **Financial sureties offered by CME Clearing House**
 - Counterparty credit risk is significant ... particularly after subprime crisis
 - Centralized counterparty (CCP) clearing = financial confidence & capital efficiency
 - Credit incidents, e.g., Subprime mortgage crises, Asian financial crisis, LTCM, dot-com bubble.... Demonstrated superior liquidity and price discovery of exchange traded derivative products

Treasury Futures Fundamentals

Liquidity-Market width...

- Bid-ask spread for 500-lot order averaged \$15.63 in Sep-13
- Minimum tick = \$15.625

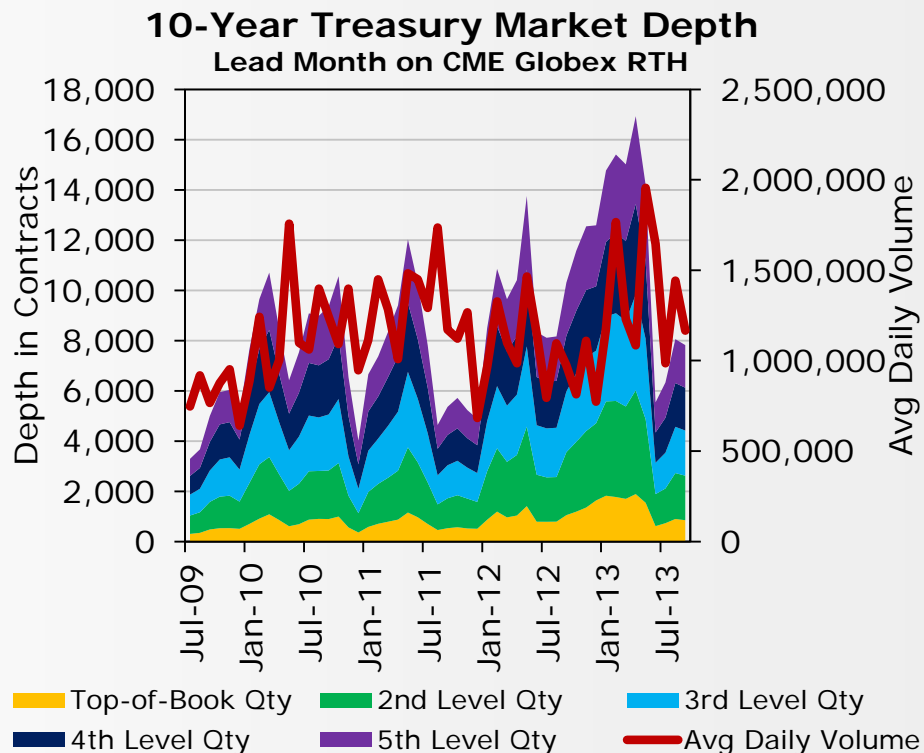
10-Year Treasury Market Width
Lead Month on CME Globex RTH



Treasury Futures Fundamentals

Liquidity-Market depth...

- Top of the book market depth averaged 849 contracts in Sep-13



Treasury Futures Fundamentals

Deliverable baskets vs. Dec-12 contracts ...

Contract	# of Eligible Issues	Face Value of Deliverable Supply
2-Year Note	8	\$293 Billion
3-Year Note	4	\$140 Billion
5-Year Note	7	\$245 Billion
10-Year Note	16	\$902 Billion
Classic Bond	9	\$122 Billion
Ultra Bond	17	\$613 Billion

Treasury Futures Fundamentals

Conversion factor invoicing system ...

- **Conversion Factors (CF) = value of security to yield 6% (futures contract standard) as of 1st day of contract month**
- **Principle Invoice Amount paid from long to short upon delivery**
- **Accrued interest added to Principle Invoice Amount to calculate Total Invoice Amount**

$$\text{Principle Invoice} = \text{Futures Settlement} \times \text{CF} \times \$1,000$$

$$\text{Total Invoice} = \text{Principle Invoice} + \text{Accrued Interest}$$

- **Intent of CF invoicing system is to create basket of deliverable securities that is large, robust, insusceptible to manipulation**

Treasury Futures Fundamentals

Cheapest to Deliver (CTD)

- **Cash factors**

- reinvestment risks
- tax considerations
- shape of yield curve, etc.

- **CF biases**

- dominate when yields depart from 6%

If yields > 6% →

Bias to long duration securities (*i.e.*, low-coupon, long-maturity)

If yields < 6% →

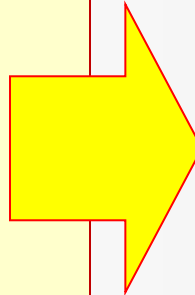
Bias to short duration securities (*i.e.*, high-coupon, short-maturity)

Treasury Futures Applications

Multiple uses and users of Treasury futures ...

Users

- Commercial & investment banks
- Hedge funds and Commodity Trading Advisors (CTAs)
- Proprietary traders
- Asset managers
- Mortgage servicers
- Regional banks
- Central banks and sovereign wealth funds

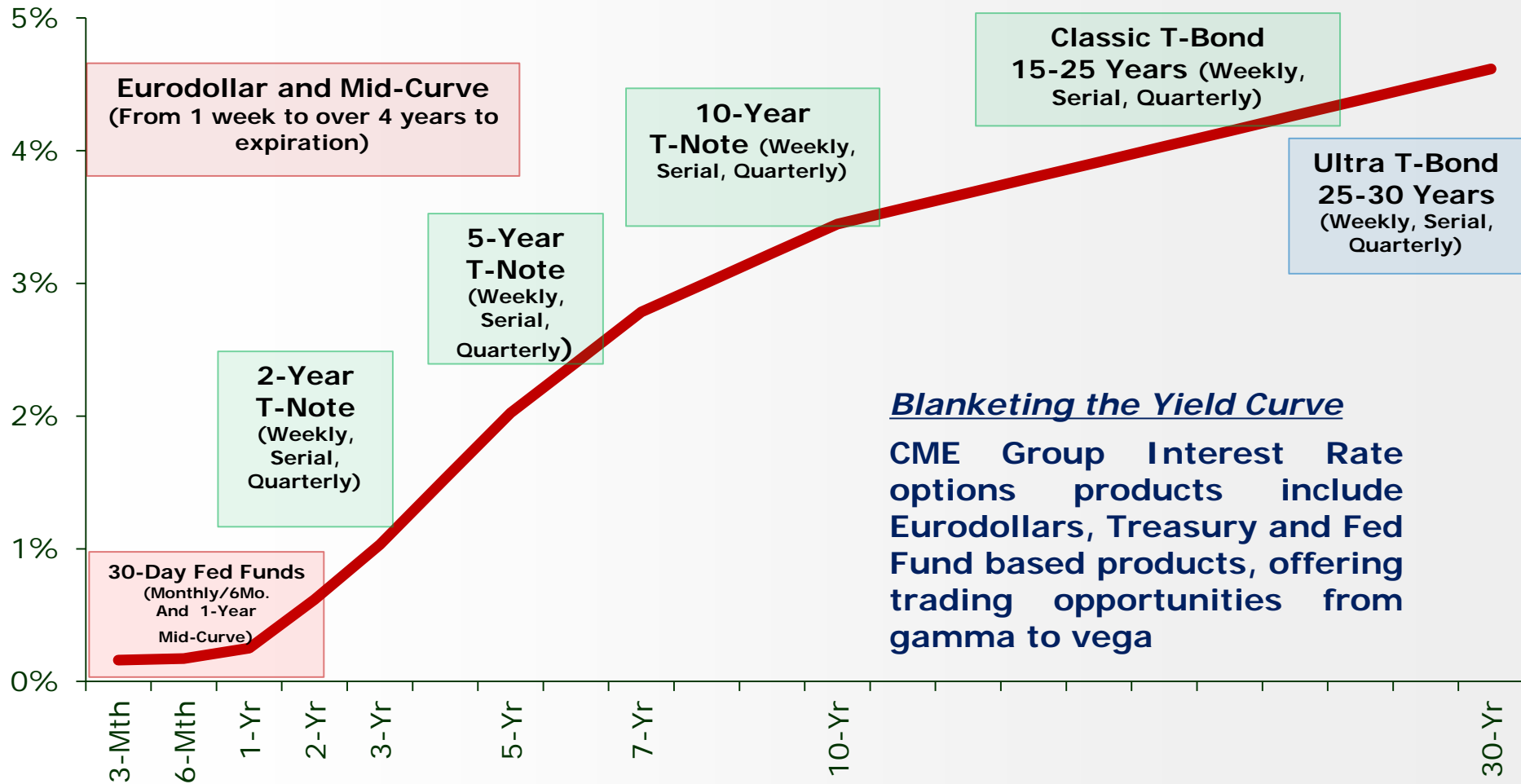


Uses

- **Price & hedge** Treasury and other long- and medium-term note exposures, adjust duration of fixed income portfolios
- Trade shape of yield curve
- Basis trading or **arbitrage**
- Outright **interest rate speculation**

- When used for risk management ... it's not a “zero-sum game”

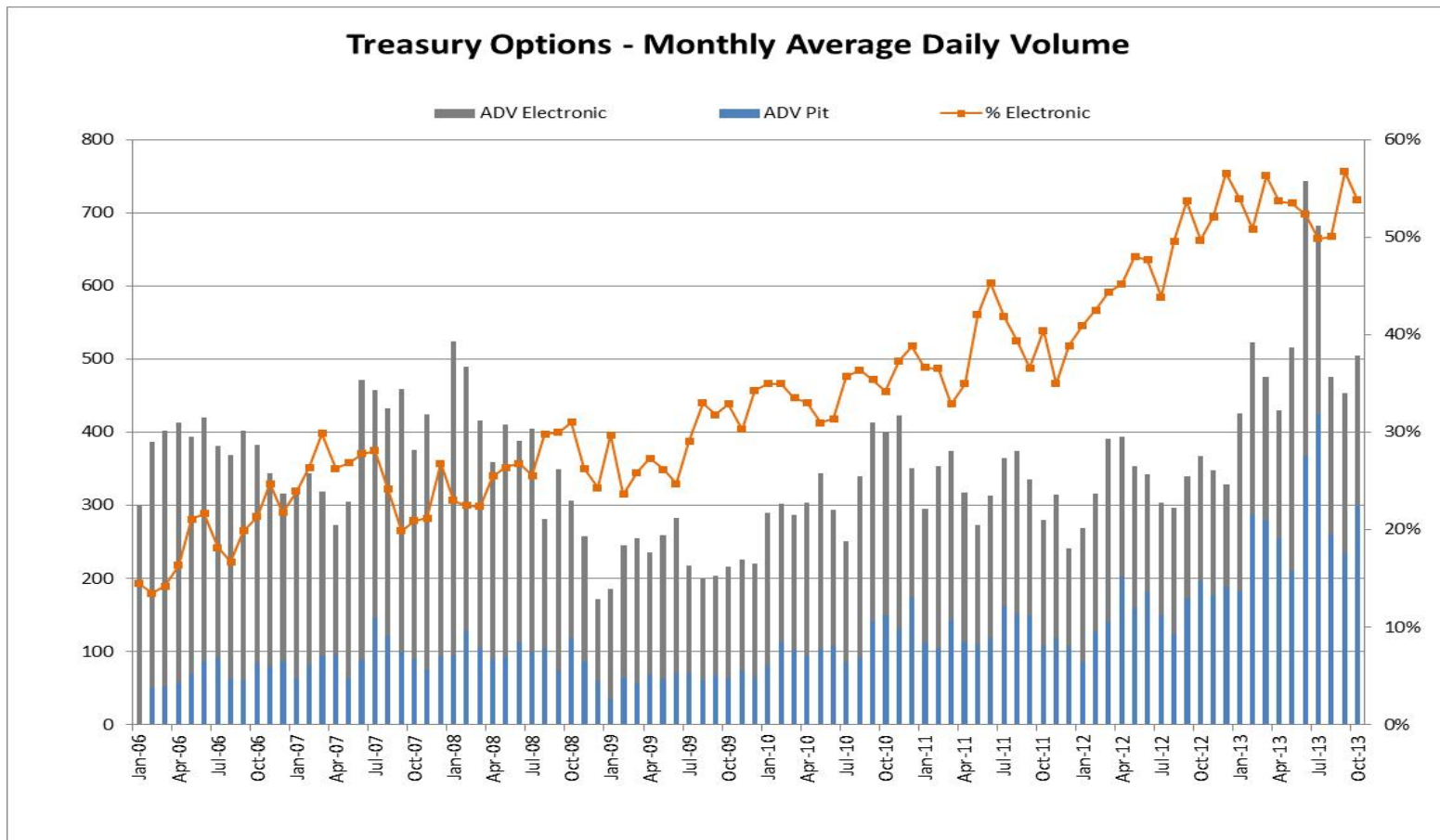
Interest Rate Products- Options



Blanketing the Yield Curve

CME Group Interest Rate options products include Eurodollars, Treasury and Fed Fund based products, offering trading opportunities from gamma to vega

Treasury Options - Monthly Average Daily Volume



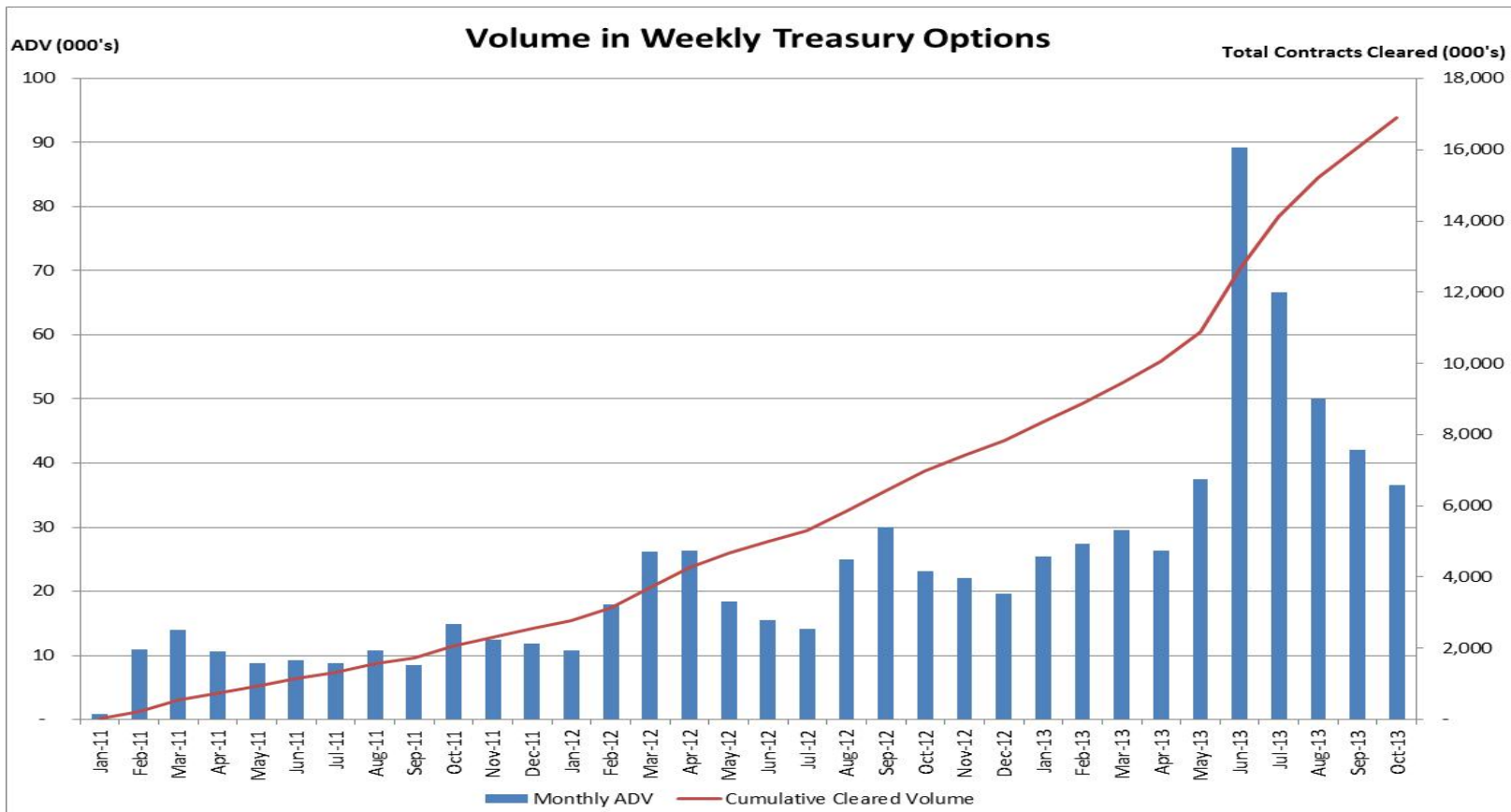
- Treasury Options ADV of 541,000 contracts/day – **up 56% YOY**
- YTD electronic percentage – **54%**, with a **record 57%** traded electronically on CME Globex in September 2013
- June 20 – Record day in Treasury Options of **1.7 Million** with a **record 1.15 Million** contracts trading on CME Globex

Weekly Treasury Options

Expanding the range of standardized, short-dated Treasury Options

Top Weekly Treasury Options Volumes and Events			
Trade Date	Total Volume	Open Interest	Event
Friday, July 05, 2013	310,478	94,837	July 2013 Unemployment
Thursday, June 06, 2013	195,582	336,084	June 2013 Unemployment
Friday, May 31, 2013	163,133	177,711	Japanese Economy
Wednesday, January 30, 2013	150,446	169,515	FOMC Statement
Friday, June 07, 2013	123,161	133,370	June 2013 Unemployment
Wednesday, June 05, 2013	117,917	257,249	June 2013 Unemployment

- Available in all durations (2-Year Notes – Ultra Treasury Bonds)
- High gamma options that complement the standard and flexible options on U.S. Treasury Futures
- Provide users with increased flexibility in managing existing option positions
- Offer unique opportunities to trade high-impact economic events, such as Treasury auctions and unemployment numbers



- Over **17 Million contracts** have traded since January 2011 launch
- YTD ADV of more than 43,000 contracts, up **107% YOY**
- Record day in WTOs on July 5, 2013:
 - **310,478 contracts** traded leading into non-farm payroll report
 - OI surpassed **455,112 contracts** leading into this number

Weekly Treasury Options Leading Up to Economic Events

Submit RFQ	Contract	Bid Qty	Bid Price	Ask Price	Ask Qty
RFQ	10 Yr Note Future JUN13	449	130095	130100	2998
RFQ	Wkly 10 Yr Note MAR13-W3 130 Put	4602	2	4	2123
RFQ	10 Yr Note APR13 130 Put	386	14	15	10299

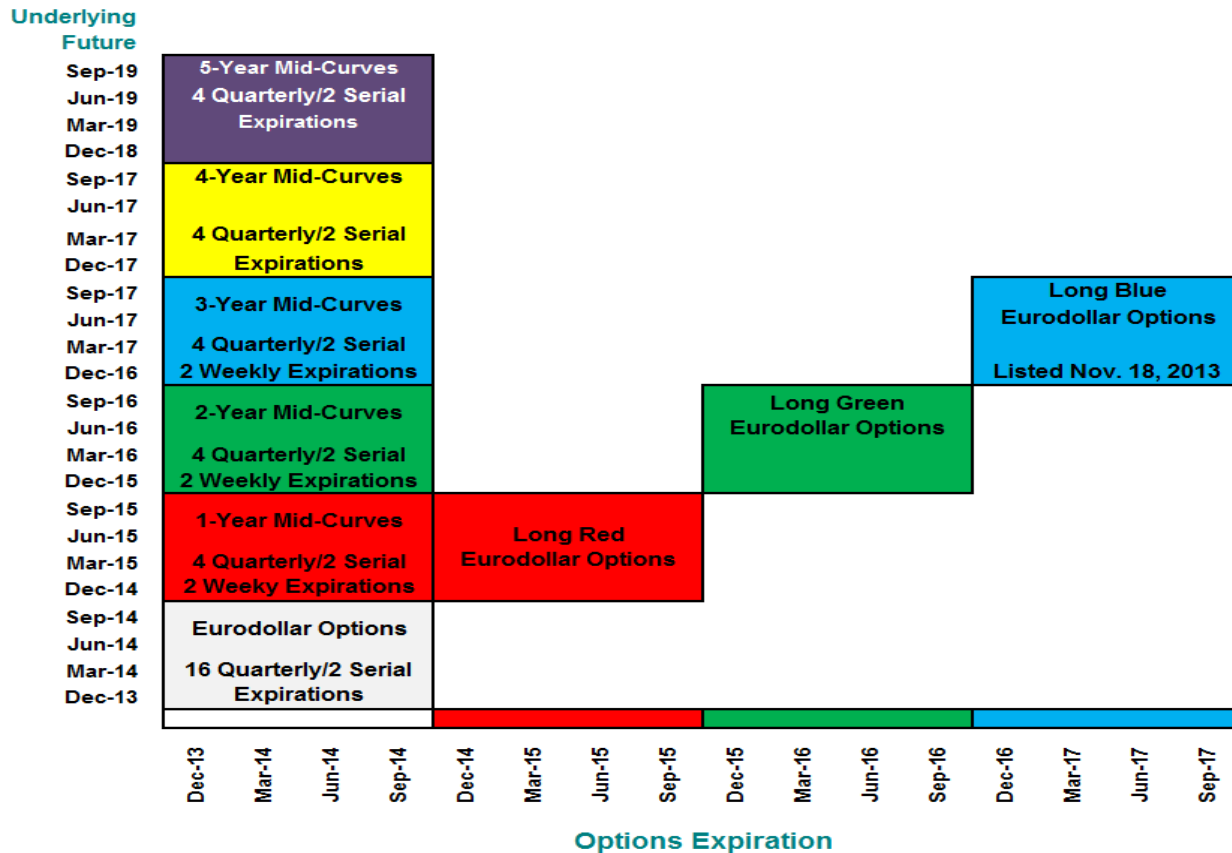
Expires Friday
March 15 (2 days
to expiration)

Expires Friday
March 22 (9 days
to expiration)

- Anticipate increasing yields as a result of March CPI number on March 15, 2013 due to inflationary concerns
- Purchasing 130 puts on a Week 3 Option expiring Friday, March 15 will cost \$46.875 per 1 contract (15.625 x 3) assuming mid market
- Standard Option expiring March 22, 2013 would cost \$234.375 per 1 contract (15.625 x 15)
- Weekly Treasury Options offer a shorter-dated option for 400% less premium, pinpointing the economic event

Eurodollar Options Product Suite

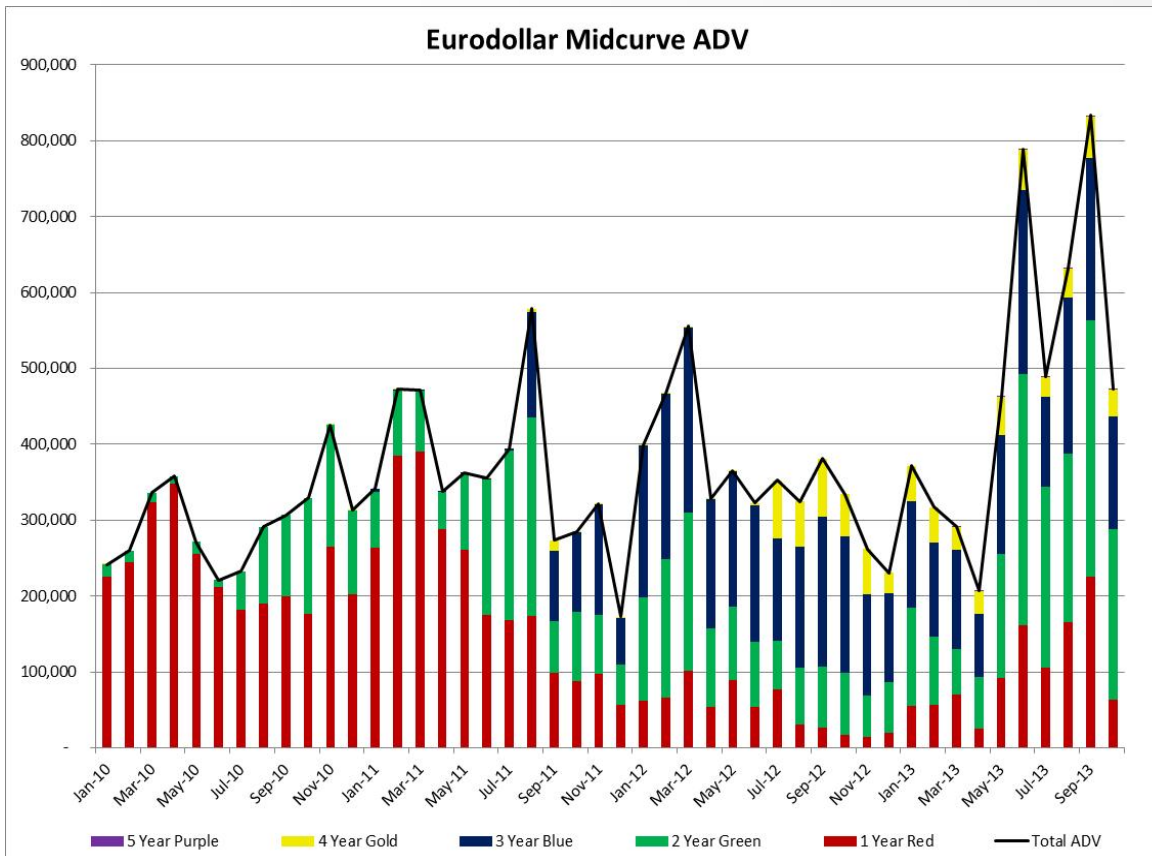
Eurodollar Options Offerings



- Eurodollar Options expanded from 12 to 16 quarterlies on Nov. 18, 2013
- Weekly Options added on 2 and 3-Year Mid-Curves on Nov. 18, 2013
- Expirations ranging from weekly to September 2017, close to 4 years out.

Eurodollar Mid-Curve Options

Short-dated options on deferred Eurodollar futures



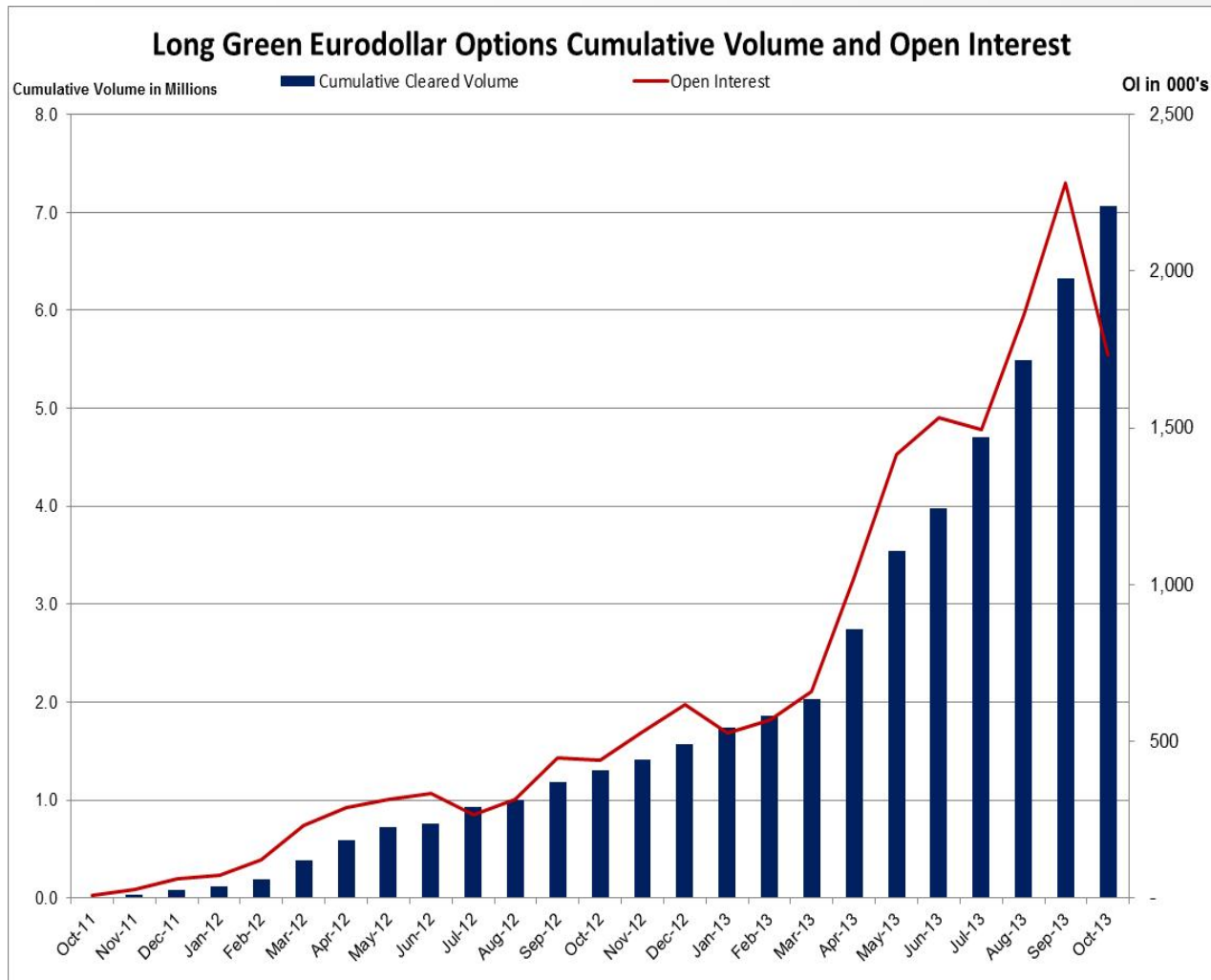
High gamma and theta options for trading out the yield curve – options on futures up to 5 years out the curve. Q3 ADV in Mid-Curve Options of 645K

- 1-year “Red” – e.g., Dec 2013 option on Dec 2014 Eurodollar futures
- 2-Year “Green” – e.g., Dec 2013 option on Dec 2015 Eurodollar futures
- 3-Year “Blue” – e.g., Dec 2013 option on Dec 2016 Eurodollar futures
- 4-year “Gold” – e.g., Dec 2013 option on Dec 2017 Eurodollar futures
- 5-Year “Purple” – e.g., Dec 2013 option on Dec 2018 Eurodollar futures (launched March 11, 2013)

November 18, 2013: 2-Year “Green” and 3-Year “Blue” Weekly Mid-Curve options listed
Learn more at www.cmegroup.com/midcurves

Eurodollar Quarterly Options

Expanded from 12 to 16 Quarterly Eurodollar Expirations



- High vega options with expirations up to 4 years
- Longest-dated Interest Rate Option at CME Group
- Q3 2013 Long Dated Green ADV of \$30 Billion+ in notional
- Traded over \$7 Trillion notional since mid-October 2011 launch, with Open Interest as high as \$2 Trillion notional
- Offer margin efficiencies compared to cleared and un-cleared swaptions

Interest Rate Options Resources

Information and Tools

CME Group Interest Rate Products:

www.cmegroup.com/interestrates

Block Trade Requirements and Vendor Codes:

www.cmegroup.com/irvendorcodes

Interest Rate Options Volume:

www.cmegroup.com/iroptionsvolume

QuikStrike Options Analytics tool:

www.cmegroup.com/quikstrike

Request for Cross (RFC) Information:

www.cmegroup.com/rfc

Block Trade Rules and Procedures:

www.cmegroup.com/block

Interest Rate Options Open Interest Profile Tool:

www.cmegroup.com/iroptionsoi

Weekly Treasury Options:

www.cmegroup.com/wto

Eurodollar Mid-Curve Options:

www.cmegroup.com/midcurves

Resource Papers

Eurodollar Mid-Curves

<http://www.cmegroup.com/education/featured-reports/conflicting-global-signals-complicate-fed-guessing-game.html>

Weekly Treasury Options

<http://www.cmegroup.com/education/featured-reports/itcm-treasury-2013-01-07.html>

Treasury Options and the U.S. Economy

<http://www.cmegroup.com/education/featured-reports/blu-putnam-us-unemployment-poised-to-dip-below-7-percent.html>

Options Fundamentals

<http://www.cmegroup.com/education/featured-reports/option-fundamentals-for-fixed-income-asset-managers.html>

<http://www.cmegroup.com/education/featured-reports/option-strategies-for-fixed-income-asset-managers.html>

Useful CME Group Links

Strategy Papers

- **Treasury Futures:** www.cmegroup.com/education/risk-management-for-fixed-income-asset-managers
- **Eurodollar:** www.cmegroup.com/trading/interest-rates/files/IR-314_EurodollarRiskMgmtTools_SR.pdf
- **Options Basics:** www.cmegroup.com/education/option-fundamentals-for-fixed-income-asset-managers
- **Treasury Options Strategies:** www.cmegroup.com/education/files/Treasury-Option-Strategies.pdf
- **Invoice Swaps:** www.cmegroup.com/education/featured-reports/cme-clearing-invoice-swaps-margin-efficiencies

Products

- **Treasury Futures:** www.cmegroup.com/education/featured-reports/understanding-treasury-futures
- **Ultra Bond Futures:** www.cmegroup.com/ultra
- **Deliverable Swap Futures:** www.cmegroup.com/dsf
- **Mid-Curve Options:** www.cmegroup.com/trading/interest-rates/stir/eurodollar-options.html

Other Useful Links

- **CME Group Yield Center:** www.cmegroup.com/yield
- **Liquidity Tool:** www.cmegroup.com/trading/interest-rates/order-execution/main
- **Treasury Futures Empirical Duration Tool:** www.cmegroup.com/trading/interest-rates/duration
- **Inter-commodity Treasury Spreads:** www.cmegroup.com/trading/interest-rates/intercommodity-spread
- **Pace of the Roll:** www.cmegroup.com/trading/interest-rates/paceoftheroll/index