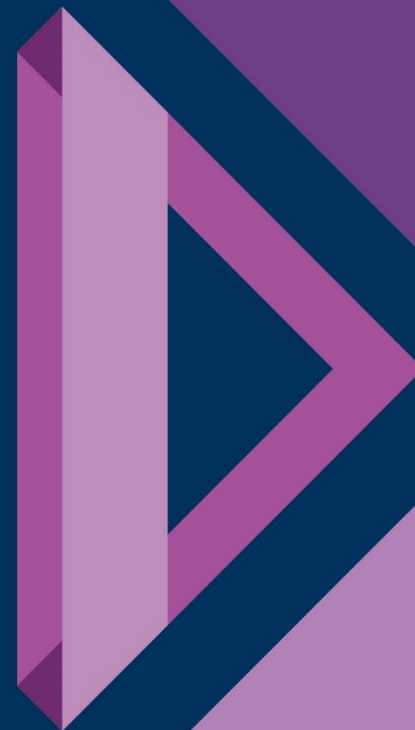




Swaptions Clearing Overview

Security. Neutrality. Transparency.

CLEARING THE WAY FORWARD



CME Group Swaptions Clearing

Launched based on strong client demand on April 11, 2016 with trades already cleared across dealer-to-dealer and dealer-to client

Clearing Swaptions Amplifies our Unparalleled Capital Efficiencies

- ✓ 9 participants have cleared swaptions to date, including 4 buy-side customers and 5 liquidity providers
- ✓ Voluntary clearing allows market participants the flexibility to reduce the risk of their cleared IRS portfolios
- ✓ Margin offsets of up to 91% possible by adding swaptions to CME cleared IRS portfolios
- ✓ Portfolio margining with our cleared IRS and Eurodollar, Treasury, and Deliverable Swap Futures
- ✓ Reduces bilateral counterparty credit risk and frees up credit lines
- ✓ Improves capital ratios, lowering capital charges that could ultimately be passed onto end users

"With uncleared margin rules coming into greater focus for our clients, Credit Suisse is excited to facilitate voluntary swaptions clearing at CME Group. Clearing swaptions enables our clients to obtain the greatest operational and capital efficiencies from clearing, while reducing the risks in their portfolios."

**John Dabbs, Global Head of Prime
Derivatives Services at Credit Suisse**

"Barclays is proud to collaborate with CME Group as one of the banks to execute the first cleared swaption trade. Clearing through CME will allow both Barclays as well as our clients to significantly improve the capital consumption and risk management of our swaptions portfolios."

**Sabri El Jailani, Global Head of Rates
Options Trading at Barclays**

Cleared OTC IRS Swaptions Product Scope

Current Product Offering

Currency		Max Expiry			Final Settlement	Underlying Tenor		Index			
Type	Years	Method	Years (up to)		Months						
	≤ 2	≤ 5	≥ 10	Physical	30	50	1	3	6		
USD	European	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LIBOR

- USD vanilla swaptions
- Includes Straddles, cleared as a single trade or separate payer/receiver
- All enumerations for USD-denominated 3 month LIBOR vanilla interest rate swaps supported, with the exception of:
 - Compounding
 - Forward starting swaps
 - Spreads and stubs

USD Swaptions Product Characteristics

- Straddles, the simultaneous right to pay and receive at the same strike & maturity, are supported & can be cleared as a single trade
- Both upfront and forward premiums are supported
 - Premiums may be settled on spot (T+1) through the expiration date +2 of the swaption
- Physical delivery into a cleared CME OTC interest rate swap transaction
 - Effective date equals exercise date +2
 - Trade date & cleared date of the underlying swap equals swaption exercise date
- CME performs three validations at the time a trade is submitted to clearing, same as current workflows
 - Account ID must be valid
 - Trade must pass credit limits and CME risk filters
 - Must meet supported product attributes
- At exercise, the underlying swap transaction bypasses validations (account, credit and product) & is automatically cleared

Swaptions Initial Margin Methodology

Methodology

For margining swaptions with IRS, CME has extended the current historical VaR framework

Historical VaR

- Margins built to provide **99%** coverage over a 5-day closeout period
- Historical scenarios are:
 - Generated using a 5-year look back period
 - Synchronized across all observed tenors on the zero curve, across all currencies
 - Scaled using Exponentially Weighted Moving Average (EWMA) based volatility forecasts
- Margin is currently the **99.7th** % of portfolio changes (loss) across all scenarios
- The liquidity/concentration model has been enhanced to compute liquidity risk at the individual Greek (Delta, Gamma, Vega) and skew level, then aggregate the sum to determine the portfolio liquidity cost
- Time decay on portfolios is captured to make the model consistent between swaps and swaptions

Margin Tools

CME CORE & the Margin API now support initial margin calculations for swaptions as well as portfolios containing IRS and swaptions

The Most Capital Efficient Solution

Savings Analysis For 8 Portfolios of Swaptions and Swaps

Portfolio	Margin Savings*
1Y5Y Long Payer ATM Swaption Delta Hedged using Swap	89%
1Y5Y Short Payer ATM Swaption Delta Hedged using Swap	81%
1Y5Y Long Receiver ATM Swaption Delta Hedged using Swap	87%
1Y5Y Short Receiver ATM Swaption Delta Hedged using Swap	81%
2Y30Y Long Payer ATM Swaption Delta Hedged using Swap	88%
2Y30Y Short Payer ATM Swaption Delta Hedged using Swap	82%
2Y30Y Long Receiver ATM Swaption Delta Hedged using Swap	91%
2Y30Y Short Receiver ATM Swaption Delta Hedged using Swap	86%

* Savings = $1 - \text{Portfolio Margin} / (\text{Swaption Margin} + \text{Swap Margin})$.

** Results are calculated as of September 2015. Values do not include transaction costs and are subject to change, depending on market volatility.

Counterparty Netting with Swaptions

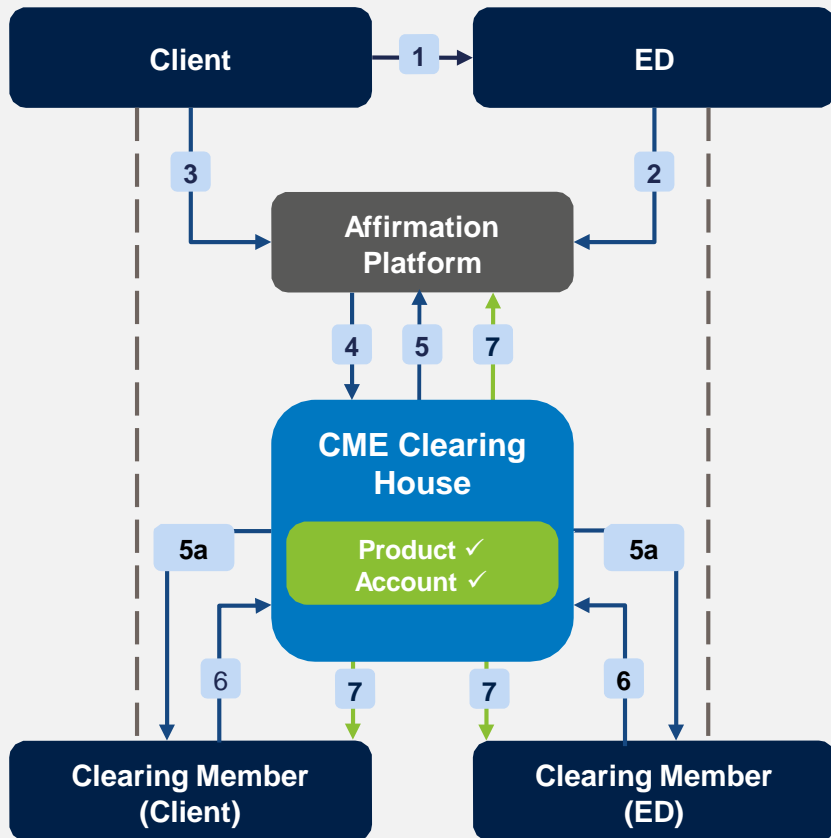
Clearing enables counterparties to net down exposures that otherwise would be held against each bilateral counterparty, which creates significant margin efficiencies

Portfolio	# of Trades	Margin
Uncleared Counterparty 1	235	\$182,489,622
Uncleared Counterparty 2	430	\$64,758,273
Uncleared Counterparty 3	159	\$421,680,284
Uncleared Counterparty 4	130	\$225,687,930
Uncleared Counterparty 5	469	\$320,184,602
Uncleared Counterparty 6	476	\$31,007,151
Uncleared Counterparty 7	112	\$33,604,900
Uncleared Counterparty 8	501	\$165,404,511
Uncleared Counterparty 9	464	\$148,804,368
Uncleared Counterparty 10	330	\$130,585,625
Total	3,306	\$1,706,207,267

Portfolio	# of Trades	Margin
Single Cleared Portfolio	3,306	\$375,959,781

Counterparty netting alone generates margin efficiencies of 78%

Swaption Claim Workflow



- 1 | Client executes swaption with Executing Dealer (ED)
- 2 | ED alleges swaption to Client
- 3 | Client selects Clearing Member and affirms swaption
- 4 | Affirmation Platform sends matched trade to CME for Clearing
- 5 | CME sends “Pending DCM Approval” notification to Affirmation Platform
- 5a | “Clearing Consent” notifications sent to Clearing Member (Client) & Clearing Member (ED)
- 6 | Clearing Members of both parties accept the swaption
- 7 | CME sends a Clearing Confirmation to Clearing Member(s)
- 7 | CME sends “Cleared” notification to Affirmation Platform which displays trade status to principals

Swaptions Netting

In support of swaptions, Clearing Members will specify whether a client or house account is eligible for gross, netting or explicit netting within a gross account.

Netting Options

Gross - Trades will *not* net.

Explicit Netting

- Within an account set to gross, firms have the ability to select individual trades to net
- This process can be performed in bulk and firms can view the gross notional and line item reduction prior to netting

Net - Automatically nets eligible trades based solely on trade attributes.

Netting Attributes

For swaptions to be eligible for netting at CME, the following trade attributes must match:

- Position Account
- Notional (remainder allowed for **partial netting**)
- Direction (Payer, Receive or Straddle) of the underlying swap
- Exercise Type (European)
- Exercise Date
- Settlement Type (Physical)
- Economics of the underlying swap transaction

Swaptions Cash Flows

Following cash flows will be applicable to CME cleared swaptions

- Variation Margin = Adjusted NPV (Close) – Adjusted NPV (Previous close)
- PAI = -Adjusted NPV (prev bus. day) x Latest Overnight Funding Rate x (Days/360)
- Premium (price) of the swaption



KEY POINTS

- Cash flows are analogous to CME Group cleared vanilla IRS
- The NPV of the premium will offset the NPV of the swaption
- Premiums may be settled on spot (T+1) through the Expiration Date +2

Swaptions Cash Flows

Example: Party L and S structured a very deep ITM swaption on day 1 which expires on day 5, and was exercised into a deep in the money swap (of tenor 3M).

Party L: Long side

Day	Asset	NPV of Swaption	NPV of Swap	NPV of Premium	Discount Factor	NPV of all assets	VM	Cash Payment	Net Cash Flow
1	Long Swaption + Premium	956,000		-960,000	0.96	-4,000	-4,000	0	-4,000
2	Long Swaption + Premium	972,000		-970,000	0.97	2,000	6,000	0	6,000
3	Long Swaption + Premium	979,000		-980,000	0.98	-1,000	-3,000	0	-3,000
4	Long Swaption + Premium	995,000		-990,000	0.99	5,000	6,000	0	6,000
5	ITM Swap		995,000	0	1.00	995,000	990,000	-1,000,000	-10,000
6	ITM Swap		995,000			995,000	0	0	
...
3M later -1	ITM Swap		995,000			995,000	0	0	0
3M later			0			0	-995,000	995,000	0
								TOTAL	-5,000

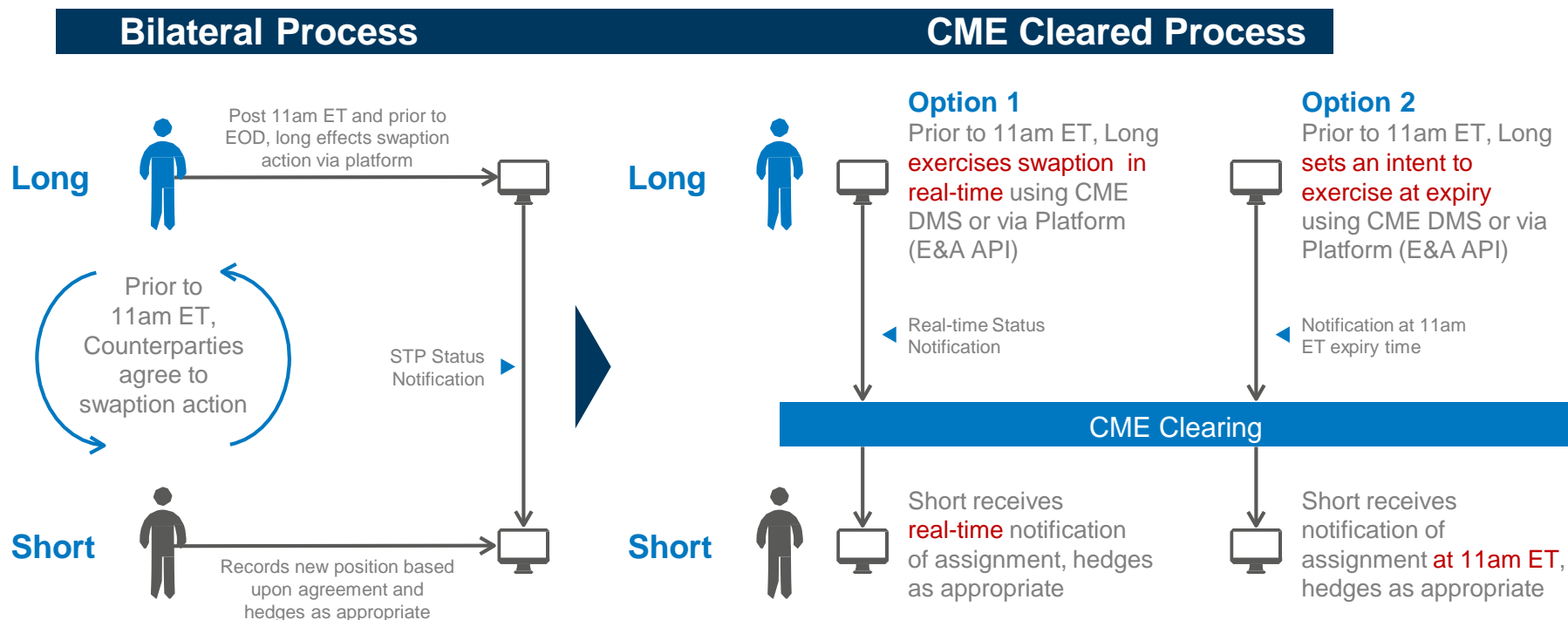
Party S: Short side

Day	Asset	NPV of Swaption	NPV of Swap	NPV of Premium	Discount Factor	NPV of all assets	VM	Cash Payment	Net Cash Flow
1	Short Swaption + Premium	-956,000		960,000	0.96	4,000	4,000	0	4,000
2	Short Swaption + Premium	-972,000		970,000	0.97	-2,000	-6,000	0	-6,000
3	Short Swaption + Premium	-979,000		980,000	0.98	1,000	3,000	0	3,000
4	Short Swaption + Premium	-995,000		990,000	0.99	-5,000	-6,000	0	-6,000
5	OTM Swap		-995,000	0	1.00	-995,000	-990,000	1,000,000	10,000
6	OTM Swap		-995,000			-995,000	0	0	0
...
3M later -1	OTM Swap		-995,000			-995,000	0	0	0
3M later			0			0	995,000	-995,000	0
								TOTAL	5,000

*Assumption: Premium payment occurs at expiry

Swaptions Exercise Process

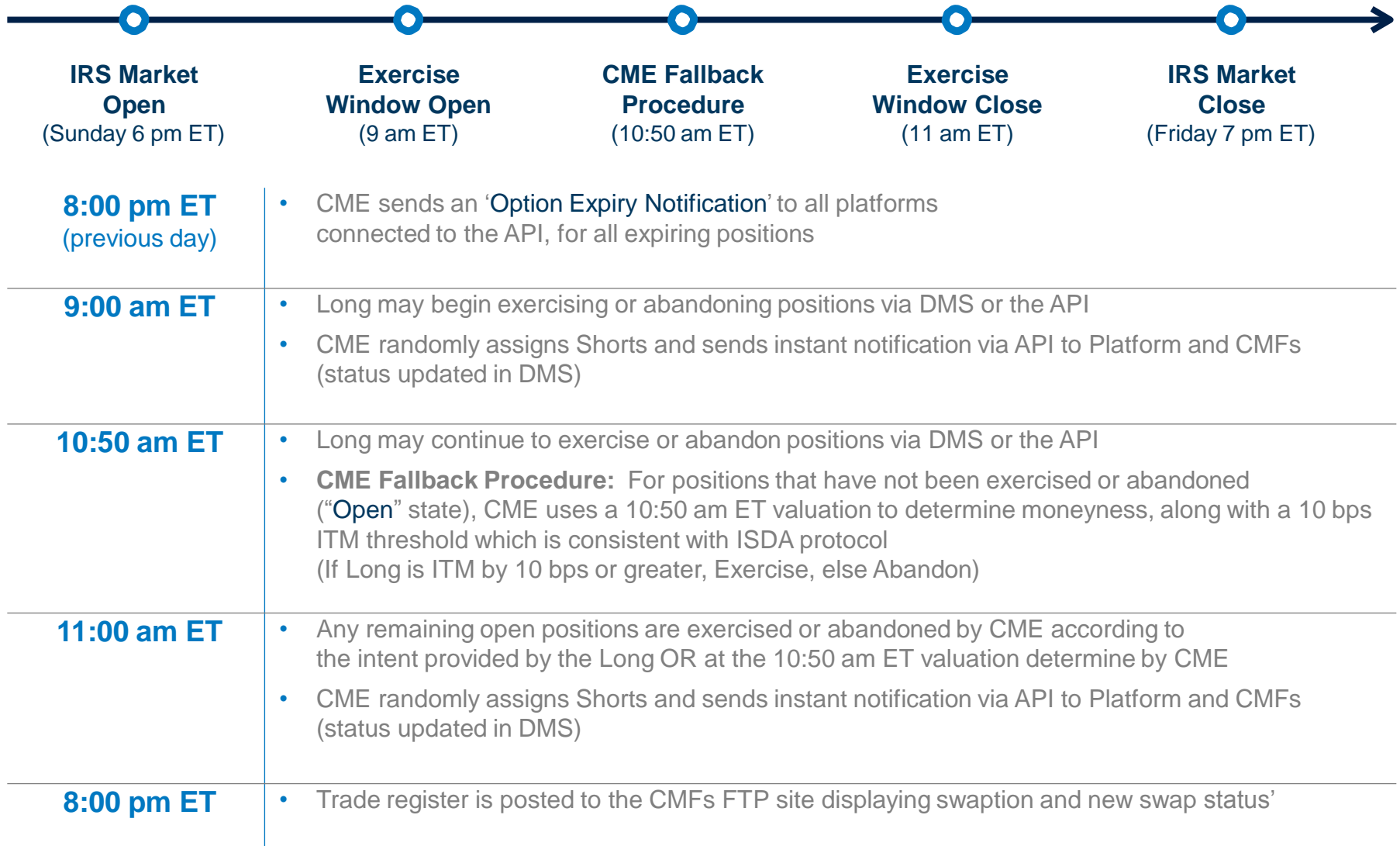
With CME as the swaptions counterparty to every trade, both the long and short benefit from a streamlined exercise and assignment process



Long has the opportunity to take the desired action on the swaptions up until 11am ET, & may use the CME Deal Management System or send instructions via API rather than calling each counterparty.

- If the Long exercises in real-time, prior to 11 am ET cutoff, the Short will be notified in real-time.
- If the Long sets an intent to exercise at expiry, the Short will not be notified until the 11 am ET cutoff.

Daily Exercise Window



CME E&A Module – Long Positions

- Swaptions expiring on the current day will be displayed under a new Options E&A tab
- Permissioned users may directly exercise or abandon long positions
 - Full or partial notional amounts may be exercised or abandoned

The screenshot displays the CME Group Deal Management System interface. At the top left is the CME Group logo and the text "A CME/Chicago Board of Trade/NYMEX Company". The main title is "Deal Management System". Below this, there are navigation tabs: "Upload Transfers", "Upload Client ID", and "Logout (E17)". A secondary set of tabs includes "Search", "Set Limits", "Limit Usage", "Limits Group", "Limit Audits", and "Option Exercise & Assignment". Under "Option Exercise & Assignment", there are two sub-tabs: "Options Exercise & Assignment Long" (selected) and "Options Exercise & Assignment Short".


The main content is a table with the following columns: ent ID, Source, Firm, Account, Origin, Trade, Cleared, Effective, End, Expiry, Template, Buy/Sell, Side, Rate, Notional, Upfront Fee, Status, E&A Amount, Exercise, Abandon, and Now. The table contains 10 rows of data, each representing a different long position. Each row includes a "Fee Detail" link and checkboxes for "Exercise", "Abandon", and "Now".

ent ID	Source	Firm	Account	Origin	Trade	Cleared	Effective	End	Expiry	Template	Buy/Sell	Side	Rate	Notional	Upfront Fee	Status	E&A Amount	Exercise	Abandon	Now
idle_3_1	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	Straddle - P	2.25	10,000,000.00	Fee Detail	Open	10,000,000.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
idle_3_1	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	Straddle - R	2.25	10,000,000.00	Fee Detail	Open	10,000,000.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
idle_2_1	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	Straddle - P	2.25	10,000,000.00	Fee Detail	Open	10,000,000.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
idle_2_1	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	Straddle - R	2.25	10,000,000.00	Fee Detail	Open	10,000,000.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ario6-10_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	R	2500	50,000,000.00	Fee Detail	Open	50,000,000.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
omp-justed_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	R	2.25	20,000,000.00	Fee Detail	Open	20,000,000.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
l-rate_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	R	2.25	1,000,000.00	Fee Detail	Open	1,000,000.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ontfee-1_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	R	2.25	10,000,000.00	Fee Detail	Open	10,000,000.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ario2-x4_1	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	P	3.6	5,000,000.00	Fee Detail	Open	5,000,000.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ctional-mium_1	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Buy	P	2.25	10,000,000.00	Fee Detail	Open	10,000,000.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

At the bottom right of the table area, there is a "Submit Instructions" button.

CME E&A Module – Short Positions

- If the Long exercises in real-time, prior to 11 am ET cutoff, the Short will be notified in real-time
- If the Long sets an intent to exercise at expiry, the Short will not be notified until the 11 am ET cutoff



Deal Management System

Upload Transfers Upload Client ID
Logout (E1725)

Search
Set Limits
Limit Usage
Limits Group
Limit Audits
Option Exercise & Assignment

Options Exercise & Assignment Long

Options Exercise & Assignment Short

Cleared ID	Platform ID	Client ID	Source	Firm	Account	Origin	Trade	Cleared	Effective	End	Expiry	Template	Buy/Sell	Side	Rate	Notional	Upfront Fee	Status	Exercised Notional
2543876	straddle_3	straddle_3_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	Straddle - P	2.25	10,000,000.00	Fee Detail	Open	
2543876	straddle_3	straddle_3_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	Straddle - R	2.25	10,000,000.00	Fee Detail	Open	
2543874	straddle_2	straddle_2_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	Straddle - P	2.25	10,000,000.00	Fee Detail	Open	
2543874	straddle_2	straddle_2_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	Straddle - R	2.25	10,000,000.00	Fee Detail	Open	
2543872	scenario2-ex4	scenario2-ex4_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	P	3.6	5,000,000.00	Fee Detail	Open	
2543870	fractional-premium	fractional-premium_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	P	2.25	10,000,000.00	Fee Detail	Open	
2543868	Mat-unadjusted	Mat-unadjusted_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	P	2.25	10,000,000.00	Fee Detail	Open	
2543867	fractional-notional	fractional-notional_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	P	2.25	25,000,000.00	Fee Detail	Open	
2543865	different-first-fixing	different-first-fixing_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	P	5.67	8,000,000.00	Fee Detail	Open	
2543864	negative-fixed-rate	negative-fixed-rate_2	CME	010	010S	C	08/21/2013	09/29/2014	10/02/2014	10/02/2016	09/30/2014	SWOPTUSD	Sell	P	-1.5	8,000,000.00	Fee Detail	Open	


Showing 1 - 10 of 30
1 2 3

Swaptions Valuation Methodology

CME Settlement Methodology

- Clearing Members participating in the Swaptions offering will be required to provide daily vol cube submissions as the primary input into the pricing model
- Data submissions include normal/log-normal volatility, DV01, Price and Forwards
- CME calibrates pricing parameters based on the submitted prices. Outputs from the calibration process include:
 - CME volatility cube
 - CME swaptions price and annuity
 - Average and standard deviation across dealer submissions

USD Swaptions End of Day Settlements Process



Daily submission is between 4pm to 5pm ET

CME settlement process is run between 5pm to 5:45pm ET

CME publishes blended vol cube at 5:45pm ET

Data Distribution

CME will report a subset of swaptions settlement data

- CME website: At-the-money strikes only
- Public FTP folder: ATM strikes in addition to strike increments ranging between +/- 25-200 bps

	Website	Public FTP
Data Included	Option Price	Limited CME Blended Data
Strikes Published	ATMs only	+/- 0, 25, 50, 100, 200
Expiry	1M, 3M, 6M, 1Y, 2Y	1M, 3M, 6M, 1Y, 2Y
Tenor	1Y, 2Y, 5Y, 10Y, 15Y, 20Y, 30Y	1Y, 2Y, 5Y, 10Y, 15Y, 20Y, 30Y

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- | | | |
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