Volatility-Quoted FX Options (VQO)

Liquidity, Expanded

cmegroup.com/vqo

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Volatility-Quoted Options (VQO)

VQO enables clients to trade an option in terms of volatility instead of price with an "auto-hedge" into the corresponding underlying futures contract.

Volatility-Quoted Options Product Overview

- ✓ Quote the standard CME expiration contracts in annualized implied volatility terms
- ✓ Participants exchange a standard option in premium and a delta hedge in the standard underlying future
- ✓ Six major currency pairs listed:
  EUR/USD, GBP/USD JPY/USD, AUD/USD, CAD/USD, CHF/USD
- ✓ Delta-hedged transaction reduces execution risk allowing for deeper and more stable liquidity.
- ✓ Separate liquidity pools from the premium-quoted options(PQO) with unique contract identifiers, until Triangulation launches on AUD/USD on February 27 2017

How Volatility-Quoted Options Work

Client submits a minimum trade order of 20 contracts with a specified volatility to trade the option via CME Globex. Following a match, CME Globex performs pricing and hedge quantity assignment as follows:

1. Determines mid-market price of underlying futures contract

2. Plugs following inputs into option pricing model:
   I. Matched implied volatility *> from trade match*
   II. Underlying futures price *> mid-market input from futures book*
   III. Time to expiration *> day count to expiration day (365 basis)*
   IV. Option strike *> as per instrument selection*
   V. Interest rate *> fixed daily input (available on cmegroup.com)*

3. Determines option premium and creates option tickets

4. Determines delta and creates offsetting futures delta hedge

5. Option and future fills sent to participants

Why Trade Volatility-Quoted Options

Delta-hedged transaction reduces execution risk

- Significantly reduces price changes created by futures price volatility
- Leads to deeper, more stable option liquidity
- Requires fewer trade tickets
- Lower execution fees for hedged positions as option and futures hedge done through a single trade

Margin efficiencies across futures and options

- Trading in volatility or premium is one and the same contract. A contract can be traded in volatility can subsequently be traded in premium and vice versa
- Liquid FX market offering over $85 billion ADV allows for optimal cross-margining

Triangulation Support available Q1 2017

- Allows access to large volume traded in premium-quoted options through implied execution with no legging risk
- Alignment of liquidity books

Triangulation Functionality

Launching February 27 2017

Links the Volatility-Quoted Options (VQO), Premium-Quoted Options (PQO) and futures books via implied calculations to find match opportunities between three books.

Triangulation Overview

- ✓ Launch will only include AUD/USD to start and will be extended to all currencies by the close of Q2 2017
- ✓ The VQO, PQO, and futures book are moved to a single match engine and linked via implied triangulation
- ✓ Initially will only trigger triangulation at price where PQO liquidity is 20+ and there is a full hedge quantity available in the futures
- ✓ Allows access to large volume traded in premium-quoted options through implied execution with no legging risk
- ✓ VQO orders leverage speed of engine to work triangulation opportunities

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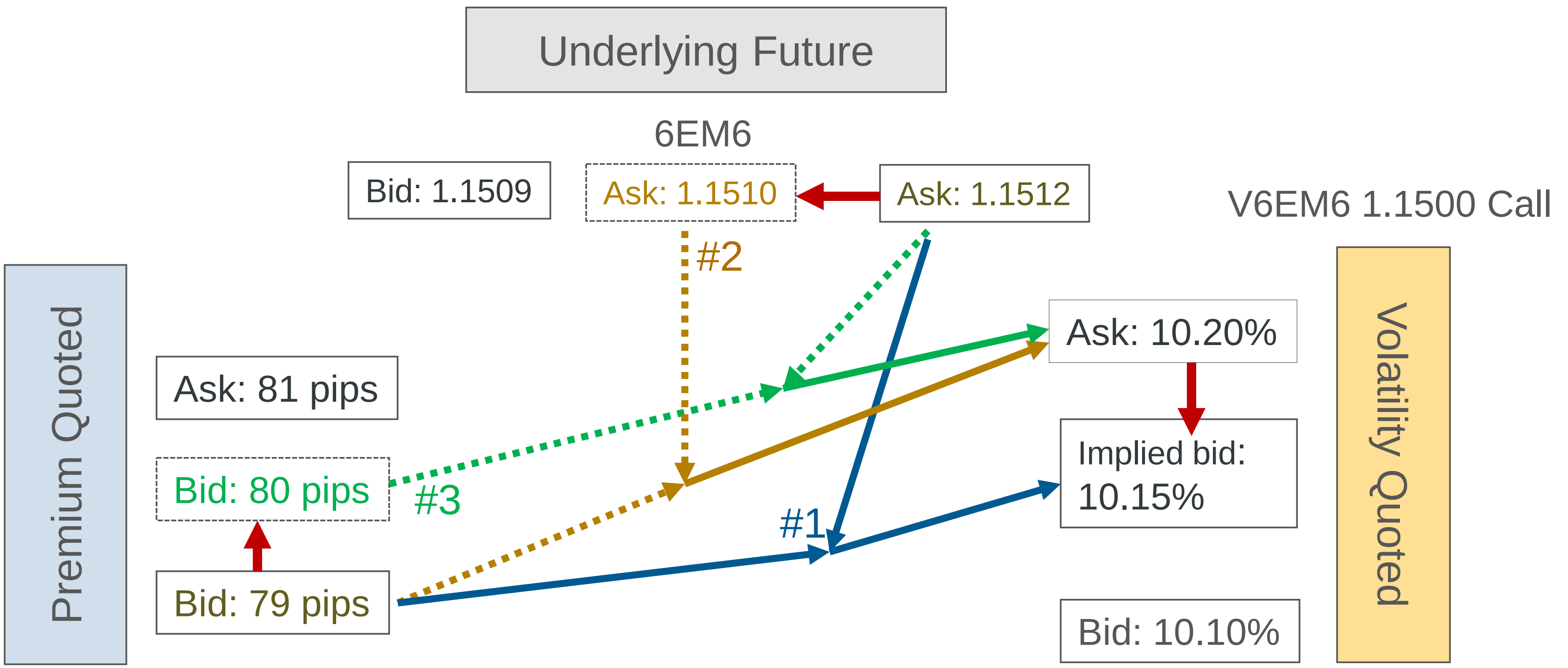
Triangulation example: PQO+FUT aggress VQO



#1) PQO 79 bid + FUT 1.1512 ask implies a VQO 10.15% bid

#2) FUT ask drops to 1.1510 + PQO 79 bid implies a VOQ 10.20% bid and aggress VQO offer

#3) PQO bid rises to 80 + FUT ask 1.1512 implies a VQO 10.20% bid and aggress VQO offer

Triangulation Rules

These initial rules have been implemented to manage the impact of the implied calculation process on market data and engine performance. The rules also reduce probability of having crossed books, and maximize actionable liquidity

- ✓ Triangulation will only post implied prices into VQO book.
- ✓ Triangulation based on minimum order quantity of 20 PQO at a futures price where full hedge quantity is available.
- ✓ For matching purposes, engine will look at multiple levels of the PQO and Futures book, and use price at the worst case level.
- ✓ For market data purposes, only prices driven by top 3 levels of PQO and top level of Futures book will be disseminated.
- ✓ Hidden implied orders in PQO and Futures book anticipate possible matches.
- ✓ Priority given to real orders over implied orders at same price levels in all three books.

Options Contract Specifications Example: EUR/USD

Volatility-Quoted Options	
CME Group Symbols	• CME Globex: European Style 3E. Symbols VXT, VTA-VTE
Reuters Code	• TR RICs: European style Monthly – 0#1UVV+ ; European Style Weekly – 0#1UVVW+
Listed	• Same as underlying premium options; four months in the quarterly cycle (March, June, September, December), three serial months, and 4 weeklies.
Underlying Contract	• Corresponding quarterly EUR/USD Futures contract
Minimum Price Increment	• 0.01 (0.01% Implied Volatility Increment)
Strike Increment	• As per premium option rules: +/- 24 strikes at intervals of $0.005, e.g. $1.1000, $1.1050, $1.1100, etc..
Last Trading Day	• 4:00 pm CT one business day before LTD of underlying premium option (normally a Thursday). Important to note that the underlying option can only trade in premium on its LTD.
Exercise	• As per exercise rule of underlying premium option (auto-exercise against Fix with no contrary instructions).
Trading Hours	• CME Globex: 5:00 PM to 4:00PM, Sun-Fri
Block Thresholds	• N/A

Note: These contracts will be listed with, and subject to, the rules and regulations of the CBOT, pending certification of contract terms and conditions with the CFTC and completion of all applicable regulatory review periods.

Get involved: Join our Market Development Program

A little bit of ADV, will get you a lot of discount: Up to 60% off until the end of 2018.

- Open to all participants, program begins March 1st.
- Trade for free for the next 6 months and earn a discount factor for each month you achieve average daily volume of 100 lots for Level 1 or 300 lots for Level 2 per the table below.
- We will sum the discount factors you earned each month and apply the cumulative discount to your VQO fees from August 31 to December 31, 2018.
- The more you participate, the more discount you can achieve: Aim for 60%.

Level	ADV	Month 1 Discount Percentage	Month 2 Discount Percentage	Month 3 Discount Percentage	Month 4 Discount Percentage	Month 5 Discount Percentage	Month 6 Discount Percentage
1	100	+7.5%	+7.5%	+5%	+5%	+2.5%	+2.5%
2	300	+12.5%	+12.5%	+10%	+10%	+7.5%	+7.5%

Note: If the combined volume of all Program participants reaches 3,000,000 sides, the Exchange may, at its discretion and upon notice to participants, terminate the Program.

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Contacts

The latest information can always be found at cmegroup.com/vqo or fxteam@cmegroup.com

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