

## CME Group Daily Settlement Procedures

**Equity Futures:** For S&P and NASDAQ, the settlement price of the lead month contract is the midpoint of the closing range determined based on pit trading activity between 15:14:30-15:15:00 Central Time (“CT”). For all other equity indices, the Volume Weighted Average Price (VWAP) of trades executed on Globex between 15:14:30-15:15:00 CT is used to determine the settlement prices for the lead month contracts. Back month contract months are settled to traded or quoted spread relationships.

**Equity Options:** Exchange staff identifies “seed strikes” that include the at-the-money straddle and several out-of-the-money calls/puts. The midpoints of the bid/ask quotes in the seed strikes on Globex are used to create an implied volatility skew. The skew is adjusted based upon the underlying settlement price to automatically generate the out-of-the money settlement prices, and the in-the-money options are settled automatically, using the method referenced on page 4 of this document. For longer dated options for which no Globex data exists, market participants provide bid/ask data for the seed strikes. Adjustments may be made to incorporate relevant pit data.

**Non-Treasury Interest Rate Futures:** Settlement prices in the front 12 quarterly Eurodollar contract months are based on Globex bid/ask activity between 13:59:00-14:00:00 CT. Settlement prices may be adjusted within the bid/ask range to accommodate calendar spreads and butterflies. Back month contract months are settled by Exchange officials based on market participant input, taking into account a CME-conducted survey for the last 5-year bundle as well as the additional Eurodollar futures settlement guidelines referenced on page 3 of this document. The Serial contract months settle to the VWAP of the prices on Globex between 13:59:00-14:00:00 CT or the midpoint of the bid/ask, with adjustments made to incorporate relevant spread activity. All other Non-Treasury Interest Rate contracts are settled using Globex trades and bid/ask activity between 13:59:00 – 14:00:00 CT.

**Non-Treasury Interest Rate Options:** Similar to the procedure used in equity options, settlements in the front year of expirations are generated based on the skew derived from taking the midpoint of the bid/ask quotes in Exchange-designated seed strikes from the pit and from Globex. The skew is adjusted based upon the underlying settlement price. The additional guidelines referenced on page 3 of this document are also utilized. All other contract months are settled by Exchange officials based upon input from market participants.

**Treasury Futures:** Globex trades in the lead month between 13:59:30-14:00:00 CT are used to derive the VWAP; back months are settled based on traded/quoted spread relationships.

**Treasury Options:** Same as Equity Options

**FX Futures:** For liquid currencies, Globex trades in the lead month between 13:59:30-14:00:00 CT are used to derive the VWAP; back months are settled based on traded/quoted spread relationships. Less liquid FX futures are settled based on cash market or other relevant information taking into account the forward rate.

**FX Options:** Same as Equity Options

**Agricultural Futures:** Livestock products are settled to the midpoint of the trades or the last valid price in the pit (including trades, higher bids, lower offers, or nominal close based on prior settle if no activity) between 12:59:30-13:00:00 CT. Dairy products are settled to the VWAP of the trades or the last valid price on Globex between 13:09:30-13:10:00 CT. The lead contract month in Corn, Soybean, Meal, Oil, and Oat futures is settled at the price at which the Pit Committee, in consultation with Exchange staff determines traded the preponderance of the volume in the closing range and the back contract months are settled to keep the spread relationships in line. The lead contract month in Wheat and Rice futures settle to the VWAP of trades on Globex between 13:14:00-13:15:00 CT and the next 4 contract months in Wheat and all deferred months in Rice are settled based on Globex spread data. Wheat futures beyond the fifth month are settled by the Pit Committee in consultation with Exchange staff based upon spread relationships.

**Agricultural Options:** Market participants provide quotes in Exchange-designated seed strikes which are used to generate the implied volatility skew and the skew is adjusted to the underlying futures settlement price. Dairy products are settled using a flat volatility determined by the at-the-money straddle.

**Weather Futures:** For outright monthly contract months, a combination of the last sale, higher bid, lower offer or midpoint of the bid/ask is used to derive settlements. For strips, if there is a Globex trade or a block trade, such trades are taken into account; if no such trades exist, the sum of the individual component months will determine the settlement. OTC market information is also referenced where appropriate.

**Weather Options:** Option trades are converted to “standard deviations” using a model based on Stephen Jewson’s model for pricing Weather. This standard deviation creates prices in the entire options series which is then applied to the open strikes.

**Housing Futures and Options:** The futures are settled to the last trade or better bid/offer on Globex. Absent a trade or better bid/offer, the prior day settlement is used. The options are settled using volatility skews derived from the midpoints of the bid/ask in a given strike, tied to a futures level.

**Energy Futures:** The front month in NYMEX WTI Crude Oil, Natural Gas, Heating Oil, and RBOB futures is settled at the VWAP of trades occurring on Globex between 14:28:00-14:30:00 Eastern Time (“ET”). The settlements of the 2<sup>nd</sup> through 6<sup>th</sup> contract months are determined based on Globex spread data. All other contract months are settled by Exchange staff, in consultation with market participants, based upon traded/quoted spread relationships.

**Energy Options:** Exchange staff, in consultation with market participants, establish the at-the-money volatility and create the volatility surface for the out-of-the money puts and calls for all option series based on traded/quoted outrights and spreads, which is input into an options pricing model to determine the settlements for all strikes. Settlements may be adjusted to accommodate relevant orders.

**Metal Futures:** The lead contract month in all metal futures (with the exception of Copper) are settled to the midpoint of the trades executed on Globex during the closing range. All other contract months are settled based on traded/quoted spread relationships, as determined by Exchange officials, in consultation with market participants. The nearby Copper contract month with the largest open interest is settled based on the VWAP of all trades occurring on Globex and in the pit during the closing range. All other contract months are settled based on traded/quoted spread relationships, as determined by Exchange officials in consultation with market participants.

**Metal Options:** Exchange officials, in consultation with market participants, establish the at-the-money volatility and create the volatility surface for the out-of-the money puts and calls for all option series based on traded/quoted outrights and spreads, which is entered into an options pricing model to determine the settlements for all strikes. Settlements may be adjusted in accommodate relevant orders.

**ClearPort Clearing:** Unless otherwise specified in the contract terms or settled pursuant to one of the methods set forth above, Exchange staff will determine settlement prices based on relevant market data including, but not limited to, cleared prices, pricing data from market participants, the settlement prices of related products and any other pricing data from sources deemed reliable by staff.

Notwithstanding the foregoing, in the event the aforementioned calculations described in this advisory cannot be made or if staff, in its sole discretion, determines that anomalous activity yields results that are not representative of the fair value of the contract, staff may determine an alternative settlement price.

Questions regarding settlements should be directed to Tom Lord, Director, Settlements, at 312.341.3116 or, for questions relating to settlements in Energy and Metals products, to William Doherty, Director, Settlements, at 212.299.2925.

### **Eurodollar Futures: Back-Month Settlement Guidelines**

The first twelve quarterly contract months are settled based on the bid/ask of both outright and spread trades, with all other quarterly months settling based on the following guidelines.

1. Outright Orders (including both single months and strips)
2. Packs (Years 4-10 Blues through Coppers)
3. 3-month Calendar Spreads
4. 6-month Calendar Spreads
5. Pack vs. Pack Spreads
6. 12-month Calendar Spreads
7. Calendar Spreads Beyond 12 months
8. Butterfly Spreads (monthlies)\*
9. Bundles
10. Butterfly Strip Spreads

#### Notes:

- All orders must be actively bid or offered to the market in the Blues and Golds (years four and five) at least **2 minutes** prior to the close. Orders in the Purples through Coppers (years six through ten) must be actively bid or offered to the market at least **10 minutes** prior to the close.
- A daily survey of the pit community will be utilized to assist in the determination of the last five-year bundle settlement. The settlement price for the last five years will be based upon the average price levels obtained from three surveys conducted in the last 10 minutes prior 14:00 CT.
- In the event that the above guidelines are not followed for any reason, written documentation will be required, which will include information on who was involved and what orders went into the decision.
- \*All Butterfly Spreads will be considered, with 3-months having higher priority than 6-months, 6-months more than 9-months, etc.

### **Eurodollar Options Settlement Guidelines**

#### Orders Eligible for Settlement Consideration

1. Outright Options (out-of-the-money only)
2. Straddles (at-the-money only, no contingent futures)
3. Strangles (equidistant from the at-the-money only)
4. Call and Put Spreads (out-of-the-money and at-the-money only)
5. Butterflies/Iron Butterflies/Ratios (1X2 only)
6. Condors/Christmas Trees
7. Outright Options vs. Futures (market delta only)
8. Intermonth Straddle (at-the-money only) and Call/Put Spreads (out-of-the-money only)

#### Notes:

- Orders not part of these Settlement Guidelines will not be considered in the daily settlement process.
- Outright markets on EOS will be considered for settlement purposes.
- No spreads with 2 or more legs that are in-the-money will be considered.
- No spreads that include a leg that is CAB offered will be considered.
- Put-Call parity will not be violated but the cost of carry may be adjusted when appropriate.
- Customers are reminded that orders must be openly bid or offered at least two minutes prior to the close to be eligible for consideration.
- Daily settlements cannot be changed after 3:00 P.M. CT unless under consideration prior to that time.
- Settlements should reflect mid-market prices whenever possible.
- In-the-money options are settled automatically at parity as described below.

**In-the-Money Options Put-Call Parity Equation (Excludes legacy NYMEX Products)**

In-the-money options are settled automatically by the Exchange in accordance with the put-call parity equation, taking into account the appropriate cost of carry.

**In-the-money options settlement = (Out-of-the-money settlement + Intrinsic Value) – Cost of Carry**

**Cost of carry =  $\frac{\text{Intrinsic Value} \times \text{Interest Rate} \times \text{Days to Expiration}}{360}$  - Risk of Early Exercise**

The cost of carry is rounded to the nearest minimum increment of the underlying futures contract.

For all products except Eurodollar options, the interest rate used is the average of the Broker Loan Rate and the Fed Fund Target Rate. In Eurodollar options, the interest rate is the rate implied by the daily settlement of the expiring quarterly Eurodollar future month.