

CFE Information Circular IC12-04

Date:	January 6, 2012
То:	All Volatility Index Futures and Security Futures Market Participants
From:	Research and Product Development Department
Re:	Volatility Index Futures and Security Futures Settlement

This information circular is being issued in connection with the January 9, 2012 product launch of the CBOE Emerging Markets ETF Volatility Index security futures contract on CBOE Futures Exchange, LLC (CFE) and describes the calculation of the Final Settlement Value for all Volatility Index futures and security futures traded on CFE. This circular is also applicable to any additional Individual Stock Based and Exchange-Traded Fund Based Volatility Index security futures or other Volatility Index futures that CFE may list in the future. Specifically, this circular describes the opening and order entry procedures for the Constituent Options in Volatility Indexes on the Final Settlement Dates for Volatility Index futures and security futures. This circular supplements CFE Information Circulars IC08-04 (Volatility Index Futures Settlement) and IC11-28 (CBOE Gold ETF Volatility Index (GVZ) Options and Security Futures Settlement).

I. <u>Settlement Procedure for Volatility Index Futures and Security Futures Contracts</u>

All Volatility Index futures and security futures contracts settle on the Wednesday that is thirty days prior to the third Friday of the calendar month immediately following the month in which the applicable Volatility Index futures and security futures contract expires. This means, for example, that the July 2012 CBOE Volatility Index (VIX) futures contract will settle on Wednesday, July 18, 2012, which is thirty days prior to the settlement date of the corresponding August 2012 options on the Standard & Poor's 500 Stock Index (SPX) on Friday, August 17, 2012. If the third Friday of the month subsequent to expiration of the applicable Volatility Index futures or security futures contract is a Chicago Board Options Exchange, Incorporated (CBOE) holiday, the Final Settlement Date for the contract shall be thirty days prior to the CBOE business day immediately preceding that Friday.

The Final Settlement Value for Volatility Index futures and security futures traded on CFE is a Special Opening Quotation (SOQ) of the respective Volatility Index calculated from the sequence of opening prices, as traded on CBOE, of a single strip of the Constituent Options used to calculate the Volatility Index on the Final Settlement Date. The opening price for any Constituent Option series in which there is no trade on CBOE will be the average of that option's bid price and ask price as determined at the opening of trading.

II. Opening Procedures for Constituent Options on Volatility Index Settlement Days

In the case of VIX futures and Mini VIX futures, the opening prices for the Constituent Options used in calculating the SOQ are determined through an automated auction mechanism (modified Hybrid Opening System (HOSS) procedure) that matches buy and sell orders residing on the electronic order book prior to the opening of trading in the Constituent Options. Immediately after the opening trade match, but prior to dissemination of an opening bid/ask quote, the mechanism automatically cancels all

un-executed broker dealer orders. Market participants should review CBOE Rule 6.2B.01 and CBOE Regulatory Circulars <u>RG08-42</u> and <u>RG08-43</u> for information regarding the modified HOSS opening procedures on CBOE for the Constituent Options used to calculate the VIX.

In the case of Volatility Index security futures and any other Volatility Index futures that may be listed for trading on CFE, other than VIX futures and Mini VIX futures, the opening prices for the Constituent Options are determined through the normal HOSS opening procedure, which is described in CBOE Rule 6.2B and is briefly summarized below. For any Constituent Options classes in which HAL on the Open (HAL-O) functionality has been activated, the HAL-O functionality will be disabled on the Final Settlement Date for any Volatility Index calculated using those Constituent Options and HOSS will be used as the opening method of trading on Final Settlement Dates. Currently, there are no designated cut-off times for orders in these Constituent Options on the Final Settlement Date. Trading Permit Holders may submit orders and quotes at any time prior to the opening.

Prior to the opening, Expected Opening Price/Size ("EOP/S") messages will be disseminated through the API to inform quoters of trading conditions in individual Constituent option series. EOP/S updates will be disseminated at 30-second intervals from 8:00 a.m. until the start of rotation, as long as at least one Trading Permit Holder has submitted a quote for the series. EOP/S messages are disseminated for series that have 1) quantity to trade on the open or 2) order imbalances that require additional liquidity or re-pricing by quoters.

Series may open if there are no contracts traded, or if there are contracts to trade and there is sufficient liquidity to open within a valid opening price range. If an option series cannot open, the system sends updated EOP/S messages, requesting additional liquidity for that series. Each series that does not open is re-checked at subsequent 1-second intervals, until opened.

III. <u>Settlement Methodology for Volatility Index Futures and Security Futures Contracts</u>

The CBOE Research Department calculates the SOQ for Volatility Indexes using the following procedure:

- A. Collect the following information for each eligible option series of the applicable Volatility Index from CBOE's Time & Sales:
 - (i) The opening traded price, if any; and
 - (ii) The best bid and best ask prices of quotes and orders remaining in the electronic order book following the completion of the opening trade match for each eligible option series of the applicable Volatility Index futures or security futures. In the case of VIX futures and Mini VIX futures, the best bid and best ask prices reflect broker dealer orders prior to the automatic cancellation of all broker dealer orders by the modified HOSS procedure.
- B. Determine the 30-day forward index level, (F), for each eligible contract month based on at-themoney put and call option prices. The at-the-money strike is the strike price at which the difference between the call and put mid-quote prices is smallest.
- C. Determine K_0 the strike price immediately below the forward index level.
- D. Select the Constituent Options Sort all of the options in ascending order by strike price. Select call options that have strike prices greater than K_0 and have bid prices greater than zero, beginning with the strike price closest to K_0 and moving to the next higher strike prices in succession. After encountering two consecutive calls with a bid price of zero, do not select any other calls. Next, select put options that have strike prices less than K_0 and have bid prices greater than zero, beginning with the strike price closest to K_0 and then moving to the next lower strike prices in succession.

succession. After encountering two consecutive puts with a bid price of zero, do not select any other puts. Select both the put and call with strike price K_0 .

- E. Calculate the Volatility Index SOQ using the options selected.¹ The price of each option used in the calculation is the opening traded price of that option. For Volatility Indexes that are composed of multiply listed Constituent Options, <u>the Volatility Index SOQ uses only the opening prices of the Constituent Options traded on CBOE</u>. In the event that there is no opening traded price for an option, the price used in the SOQ calculation is the average of the first bid/ask quote for that option immediately following the opening trade match, but before any OPG orders are cancelled.
- F. The "time to expiration" used to calculate the SOQ for Volatility Indexes varies depending on the settlement type (A.M.-settlement, P.M.-settlement) of the Constituent Options and the trading hours of the Constituent Options.
 - (i) The "time to expiration" used to calculate the SOQ for VIX based on A.M.-settled SPX options is exactly 30 days.
 - (ii) The "time to expiration" used to calculate the SOQ for Volatility Indexes based on P.M.-settled stock or exchange-traded fund (ETF) options that close trading at 3:00 p.m. (Chicago time) is 30 days, *plus* 390 minutes in order to reflect the extra time to trade the Constituent Options until 3:00 p.m. (Chicago time).²
 - (iii) The "time to expiration" used to calculate the SOQ for Volatility Indexes based on P.M.settled ETF options that close trading at 3:15 p.m. (Chicago time) is 30 days, *plus* 405 minutes in order to reflect the extra time to trade the Constituent Options until 3:15 p.m. (Chicago time).³
- G. The Final Settlement Value for the applicable Volatility Index futures or security futures contract is equal to the respective Volatility Index SOQ.

The Final Settlement Value is rounded to the nearest \$0.01. If the Final Settlement Value is not available or the normal settlement procedure cannot be utilized due to a trading disruption or other unusual circumstance, the Final Settlement Value will be determined in accordance with the rules and bylaws of The Options Clearing Corporation.

III. <u>Risk Inherent in Settlement Procedure</u>

The Final Settlement Value of each Volatility Index futures and security contract is calculated from the actual opening <u>premium prices</u> on CBOE of the Constituent Options on the Final Settlement Date, unless there is no opening trade in a series, in which case the mid-point of the bid and offer <u>premium quotations</u> for that series as determined at the opening of trading is used. In contrast, all other Volatility Index values disseminated during the life of a Volatility Index futures or security futures contracts are "indicative" values – namely, values that are calculated using the mid-point of the

¹ For a more detailed description of the VIX formulas and methodology, please refer to the VIX White Paper, which may be found on the CBOE website at the following link: <u>http://www.cboe.com/micro/vix/vixwhite.pdf</u>.

 $^{^{2}}$ An example of this type of Volatility Index is the CBOE Gold ETF Volatility Index. The Constituent Options of the GVZ Index are CBOE listed options on the SPDR Gold Shares (GLD) which close trading at 3:00 p.m. (Chicago).

³ An example of this type of Volatility Index is the CBOE Emerging Markets ETF Volatility Index (VXEEM). The Constituent Options of the VXEEM Index are CBOE listed options on the iShares MSCI Emerging Markets Index Fund (EEM) which close trading at 3:15 p.m. (Chicago).

disseminated bid and offer <u>premium quotations</u> on CBOE of each of the Constituent Options at a particular time.

Because actual prices are used to compute the Final Settlement Value of Volatility Index futures and security futures while mid-market options quotes are used to compute indicative Volatility Index values, there is an inherent risk of a significant disparity between the Final Settlement Value of an expiring Volatility Index futures or security futures contract and the opening indicative Volatility Index value on the Final Settlement Date. It is to be expected that there will be at least some divergence between the Final Settlement Value for an expiring Volatility Index futures or security futures contract and the opening indicative Volatility Index value on the Final Settlement Date, because the opening price for each of the options series that is used to calculate the Final Settlement Value will typically be at or near either the bid or the ask quotation, depending on the forces of supply and demand for that series, and not at the mid-point between the bid and ask quotations. In fact, such disparities have occurred in the past with respect to VIX and other Volatility Index futures contracts. Accordingly, because Volatility Index futures and security futures settle based on the trade prices of the Constituent Options established during the opening, rather than on quotes, investors should be aware that the possibility exists, as occurred in the past, that there could be a significant difference between the Final Settlement Value for a Volatility Index futures or security futures contract and the previous day's closing indicative Volatility Index value, or the opening indicative Volatility Index value on the Final Settlement Date.

For example, one type of hedge for VIX futures involves holding a portfolio of the SPX options that will be used to calculate VIX on the Final Settlement Date. Traders holding hedged VIX futures positions to settlement can be expected to trade out of their SPX options on that date. Traders who hold short, hedged VIX futures would liquidate that hedge by selling their SPX options, while traders holding long, hedged VIX positions would liquidate their hedge by buying SPX options. In order to seek convergence with the VIX Final Settlement Value, these traders would be expected to liquidate their hedges by submitting orders in the appropriate SPX option series during the SPX opening on the Final Settlement Date of the VIX futures contract. To the extent (1) traders who are liquidating hedges predominately are on one side of the market (e.g., seek to buy the particular SPX options) and (2) those traders' orders predominate over other orders during the SPX opening on the Final Settlement Date for the VIX futures contract, trades to liquidate hedges may contribute to an order imbalance during the SPX opening on that date. If there are order imbalances significantly weighted on the same side of the market in SPX option series used in the final settlement, there will be a disparity between the Final Settlement Value and the VIX index values that are reported after the SPX opening. In fact, these factors did occur, and did lead to this type of imbalance and disparity during past SPX openings for VIX futures settlement days. The same is equally applicable with respect to other Volatility Index futures and security futures.

In order to avoid exposure to such disparities, investors in Volatility Index futures and security futures holding speculative or un-hedged Volatility Index futures or security futures may wish to either close out their positions or roll to another contract month prior to settlement. Market participants should consult their CFE Trading Privilege Holder (TPH) for specific roll market information.

Volatility Index security futures investors should refer to the Risk Disclosure Statement for Security Futures Contracts⁴ for further security futures risk disclosure information.

⁴ The Risk Disclosure Statement for Security Futures may be found on the CFE website at the following link: <u>http://cfe.cboe.com/AboutCFE/RiskDisclosureFutures.aspx</u>

IV. Dissemination of Related Information

The following information related to VIX futures and Mini VIX futures is disseminated:

• CFE disseminates additional indicative values for VIX based largely on option bid and offer prices four times per minute throughout the trading day (8:30 a.m. – 3:15 p.m. (Chicago time)). The indicative values are disseminated via the CBOE Financial Network and CFE to data vendors. The indicative values provide market participants with more information on the possible range of settlement prices that may occur for VIX futures and Mini VIX futures. However, market participants should be aware that the Final Settlement Value may be outside of the previous day's range of the applicable indicative values.

Symbols for CBOE Volatility Index Indicative Values (VIX): VWB: based on SPX option bid prices. VWA: based on SPX option offer prices.

• Dissemination of Imbalance Information: CFE disseminates on its website information regarding imbalances that may be present on the Electronic Book in the Constituent Options of the VIX SOQ calculation approximately once per minute beginning at 8:00 a.m. (Chicago time) and up through the opening.

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Contact Information

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