



CFE Information Circular IC08-04

Date: March 14, 2008

To: All Volatility Index Futures Market Participants

From: Research Department

Re: Volatility Index Futures Settlement

This circular replaces CFE Information Circular IC07-21 and describes the features inherent in the trading of volatility index futures contracts. The following volatility index futures contracts are currently listed for trading on CFE: CBOE DJIA Volatility Index (VXD) futures, CBOE Nasdaq-100 Volatility Index (VXN) futures, CBOE Russell 2000 Volatility Index (RVX) futures, and CBOE Volatility Index (VIX) futures.

I. Settlement Procedure for Volatility Index Futures Contracts

All volatility index 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 contract expires. This means, for example, that the April 2008 VIX futures contract will settle on Wednesday, April 16, 2008, which is thirty days prior to the settlement date of the corresponding May 2008 options on the Standard & Poor's 500 Stock Index (SPX) on Friday, May 16, 2008. If the third Friday of the month subsequent to expiration of the applicable volatility futures index contract is a 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 traded on CFE is equal to the Special Opening Quotation (SOQ) of the volatility index calculated from the sequence of opening prices on CBOE of the constituent options used to calculate the volatility index on the settlement date (Constituent Options). The opening price for any Constituent Options 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.

In the case of 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. Market participants should review CBOE Rule 6.2B.01 and CBOE Regulatory Circular RG08-42 for information regarding the modified HOSS opening procedures on CBOE for the Constituent Options used to calculate the VIX.

In the case of VXD, VXN and RVX futures, the opening prices for the Constituent Options are determined through the normal HOSS opening procedure, which is described in Rule 6.2B.

II. Settlement Methodology for Volatility Index Futures Contracts

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 first bid/ask quote for each eligible option series of the applicable volatility index futures.
- B. Determine the forward index level, F , for each eligible contract month based on at-the-money 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. Sort all of the options in ascending order by strike price. Select call options that have strike prices greater than K_0 and a non-zero bid price, 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 a non-zero bid price, beginning with the strike price closest to K_0 and then moving to the next lower strike prices in 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 volatility index SOQ using the options selected. The price of each option used in the calculation is the opening traded price of that option. In the event that there is no opening traded price for an option, the price used in the calculation is the average of the first bid/ask quote for that option.
- F. The Final Settlement Value for the applicable volatility index futures contract is equal to the respective volatility index SOQ.

III. Risk Inherent in Settlement Procedure

The Final Settlement Value of each volatility index futures contract is calculated from the actual opening prices on CBOE of the Constituent Options on the final settlement date. In contrast, all other volatility index values disseminated during the life of volatility index futures contracts are "indicative" values – namely, values that are calculated using the mid-point of the disseminated bid and offer quotations 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 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 contract and the opening indicative volatility index value on the final settlement date. In fact, such disparities have occurred in the past with respect to VIX and other volatility index futures contracts. Accordingly, because volatility index futures settle based on the trade price 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 contract and the previous day's closing indicative volatility value, or the opening indicative volatility 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 VXD, VXN, and RVX futures.

In order to avoid exposure to such disparities, investors in volatility index futures holding speculative or un-hedged volatility 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.

IV. Dissemination of Related Information

The following information related to volatility index futures is disseminated:

- CFE disseminates updated indicative values for volatility indexes 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 via Bloomberg and ILX. The indicative values provide market participants with more information on the possible range of settlement prices that may occur for volatility index futures contracts. 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 DJIA Volatility Index Indicative Values (VXD):

DDB: based on DJX option bid prices.

DDA: based on DJX option offer prices.

Symbols for CBOE Nasdaq-100 Volatility Index Indicative Values (VXN):

VZB: based on NDX option bid prices.

VZA: based on NDX option offer prices.

Symbols for CBOE Russell Volatility Index Indicative Values (RVX):

RJB: based on RUT option bid prices.

RJA: based on RUT option offer prices.

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 for VIX futures approximately once per minute beginning at 8:00 a.m. (Chicago time) and up through the opening.

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Any questions regarding this circular may be directed to Andrew Lowenthal at 312-786-7180, Jay Caauwe at 312-786-8855, or Michael Mollet at 312-786-7428.