

SECURITIES AND EXCHANGE COMMISSION  
(Release No. 34-65725; File No. SR-CBOE-2011-007)

November 10, 2011

Self-Regulatory Organizations; Chicago Board Options Exchange, Incorporated; Notice of Filing of Proposed Rule Change to Adopt Rules in Connection with S&P 500 Option Variance Basket Trades

Pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 (“Act”)<sup>1</sup> and Rule 19b-4 thereunder,<sup>2</sup> notice is hereby given that on October 26, 2011, Chicago Board Options Exchange, Incorporated (the “Exchange” or “CBOE”) filed with the Securities and Exchange Commission (“Commission”) the proposed rule change as described in Items I and II below, which Items have been prepared by the Exchange. The Commission is publishing this notice to solicit comments on the proposed rule change from interested persons.

I. Self-Regulatory Organization’s Statement of the Terms of Substance of the Proposed Rule Change

The filing proposes to adopt rules in connection with S&P 500 option variance basket trades. The text of the proposed rule change is available on the Exchange’s website

(<http://www.cboe.org/legal>), at the Exchange’s Office of the Secretary, and at the Commission.

II. Self-Regulatory Organization’s Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

In its filing with the Commission, the self-regulatory organization included statements concerning the purpose of and basis for the proposed rule change and discussed any comments it received on the proposed rule change. The text of those statements may be examined at the places specified in Item IV below. The Exchange has prepared summaries, set forth in sections A, B, and C below, of the most significant parts of such statements.

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<sup>1</sup> 15 U.S.C. 78s(b)(1).

<sup>2</sup> 17 CFR 240.19b-4.

A. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

1. Purpose

The Exchange is proposing a new offering, called S&P 500 variance trades, which will allow investors to electronically trade a portfolio of S&P 500 Index options (SPX options) in a single transaction. An S&P 500 variance trade (also referred to as the “basket” or “variance trade basket”), is intended to replicate S&P 500 implied variance<sup>3</sup>. Demand for volatility products has increased dramatically in recent years, and variance baskets will provide investors with another way to efficiently trade S&P 500 volatility.<sup>4</sup>

As an initial matter, S&P 500 variance trades will only trade electronically on CBOE (open-outcry S&P 500 variance trades will not be possible); each day, one or more new S&P 500 variance trade baskets will be available for trading, and transactions in each basket will occur on that day only; and, no market orders will be accepted. Each basket will consist of a portfolio of SPX options defined by the Exchange the day before it is available for trading. All of the constituent options of the basket will have the same expiration date and will be centered around an at-the-money strike price. It is expected that a full “strip” consisting of all series in the strike

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<sup>3</sup> “Implied Variance” refers to the market’s expectation of daily price changes of a reference asset that is implied by the price of an option or a portfolio of options overlying that reference asset. Implied variance is related to the more commonly-used term, “implied volatility,” which is the square root of implied variance. The reference asset for S&P 500 variance trades is the S&P 500 Index. The portfolio of options intended to replicate S&P 500 implied variance is comprised of S&P 500 Index (SPX) options.

<sup>4</sup> The Exchange notes that S&P 500 variance trades do not replicate variance swaps.

range would be offered every day.<sup>5</sup> Each basket will also have a unique ticker symbol. Market prices for S&P 500 variance trades will be expressed and quoted in volatility terms (e.g. 21.24). Trade quantities will be expressed in contracts. Each contract will have a multiplier of \$10,000 or more, as determined and published by the Exchange (the Exchange would not change the multiplier intraday).<sup>6</sup> The multiplier for S&P 500 variance trades represents the aggregate “vega” exposure of the SPX option series that comprise the S&P 500 variance trade portfolio. Vega is a term frequently used by volatility traders to describe the change in value of a contract corresponding to a one-point change in volatility. For example, assuming a vega exposure of \$50,000, an investor would expect to pay approximately \$50,000 more for a variance basket portfolio with a trade price of 21.00 than he/she would if the trade price was 20.00.

The display and trading of S&P 500 variance trades will be handled very much like the display and trading of typical listed options. That is, Trading Permit Holders may submit orders in S&P 500 variance trades for interaction with resting S&P 500 variance trade orders. These orders will be submitted to the System electronically like orders in other products. Thus, once an S&P 500 variance trade basket has been announced and established by the Exchange (after the close of trading), users may submit pre-opening orders in that basket for execution the following day. The same opening process utilized for other listed options will be used for S&P 500

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<sup>5</sup> The Exchange notes that the proposed rule allows the Exchange to determine the days on which S&P 500 variance trades will be allowed, and that the Exchange will make publicly available a detailed description of the formulas and methodology used to deconstruct S&P 500 variance trades into constituent SPX option series. Further, for each day on which S&P 500 variance trades are allowed, the Exchange will publish, after the close of trading on the previous day, the options comprising the portfolio for the next day.

<sup>6</sup> The Exchange expects to typically use a higher multiplier, but seeks to establish a \$10,000 minimum to allow investors greater flexibility to fine-tune their investment objectives for short-dated options and / or low volatility levels.

variance trades, and trading in the S&P 500 variance trade basket will continue throughout the day just like other products traded on the Exchange.

S&P 500 variance trade processing will be different from other listed options in several respects. First, trading interest in the disseminated quote for an S&P 500 variance trade shall be ranked pursuant to one of the matching algorithms set forth in Rule 6.45A which may be different from the matching algorithm in place for other option products, including SPX. The Exchange would announce via Regulatory Circular the applicable matching algorithm. Second, once a match occurs, the Exchange will use a formula to deconstruct the match into individual trades in the constituent SPX options that comprise the basket, and those individual trades will each print concurrently.

The algorithm used to deconstruct S&P 500 variance trades into constituent SPX option legs is a two step process. The first step assigns the number of contracts traded for each SPX option series. The number of SPX contracts is a function of the S&P 500 variance trade price and trade quantity, as well as time to expiration, interest rates and the strike prices of constituent SPX option legs. The following formula defines the trade quantity for each series in the S&P 500 variance trade basket:

$$N_i = \frac{2}{T} \left[ \frac{\Delta K_i}{K_i^2} \right] e^{RT} \times \left[ \frac{\text{vega notional}}{2 \times \sigma} \right] \times 100$$

$N_i$	Trade quantity of $i^{th}$ option in portfolio
$\sigma$	Variance basket trade price (expressed in volatility terms)
T	Time to expiration
$K_i$	Strike price of $i^{th}$ option in portfolio
$\Delta K_i$	Interval between strike prices
R	Risk-free interest rate to expiration
“vega notional”	Variance basket quantity times contract multiplier (e.g., \$50,000)

The second step assigns trade prices for each SPX option in the S&P 500 variance trade. The System (1) calculates a baseline implied volatility for each constituent SPX option. The System performs this calculation by using a Black Model and backing out implied volatility levels based on the mid-quote prices of constituent SPX options prevailing at the time of the variance basket trade execution. The System then (2) calculates an initial “interim volatility” value using the mid-quote SPX option prices as input values to the VIX formula (the VIX formula is presented in Example 1 below; a detailed description of the VIX formula may be found in the [VIX White Paper](#), which is available on the CBOE website at [www.cboe.com/micro/vix/vixwhite.pdf](http://www.cboe.com/micro/vix/vixwhite.pdf)). Next, the System (3) compares the variance basket trade price with the interim volatility value. If the variance basket trade price is less (greater) than the interim volatility value, the System (4) decreases (increases) the implied volatilities of all of the constituent SPX options by the same amount and then calculates a set of simulated option prices using the Black Model and the adjusted implied volatilities. The System then (5) uses the simulated option prices as input values to the VIX formula; the resulting output of the

VIX formula serves as a new interim volatility value. The System then continues to repeat Steps 3 through 5 until the interim volatility value matches the S&P 500 option variance basket trade price. Finally, the System (6) creates a series of matched trades for all of the constituent SPX option series using, as trade prices, the simulated option prices that cause the interim volatility value to match the S&P 500 option variance basket trade price.

Once trade prices are determined for each constituent series, the System executes and reports the constituent trades. The execution prices are unrelated to the existing market for the applicable series, therefore, pursuant to paragraph (c) of proposed Rule 6.53B, constituent trades are executed and reported without regard for existing bids and offers on the Exchange. This is appropriate because S&P 500 variance trades involve the execution of an investment strategy across numerous series. Prevailing bids and offers in each such series cannot satisfy the overall execution strategy of an S&P 500 variance trade particularly when considering that the execution prices reflect pricing that is not based (directly or indirectly) on the quoted prices at the time of execution. To highlight to users that executions of S&P 500 variance trades are not associated with the quoted prices in the respective SPX series at the time of execution, each constituent execution will be reported with the “benchmark” indicator. This indicator was created to facilitate the execution of benchmark orders as contemplated by the Options Order Protection and Locked/Crossed Market Plan (the “Linkage Plan”). A benchmark order is an order for which the price is not based, directly or indirectly, on the quoted price of the option at the time of the order’s execution and for which the material terms were not reasonably determinable at the time a commitment to trade the order was made.<sup>7</sup> While the benchmark indicator was created for the reporting of multiply listed option executions that meet the benchmark definition, the

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<sup>7</sup> CBOE does not currently offer functionality or order types that can utilize the benchmark exception to the Linkage Plan.

Exchange believes it will be useful to append the indicator to the execution of constituent series of an S&P 500 variance trade so SPX traders know that the executions were not related to the quoted price at the time of the print. Thus, the use of the indicator in this context is for informational purposes and the constituent executions are not actually benchmark trades pursuant to the Linkage Plan.

To summarize, users will submit S&P 500 variance trade orders with limit prices that will execute when marketable against other limit orders resident in the book. Once the execution occurs, the System will “deconstruct” the match and calculate executions in the applicable individual SPX series that comprise the S&P 500 variance trade basket. The System will then print each constituent series execution. Only these constituent executions will be sent to the Options Clearing Corporation for clearing. Once the process is completed, the S&P 500 variance trade transaction will cease to exist but each party to the transaction will have traded the constituent series. In essence, the S&P 500 variance trade process allows Trading Permit Holders to trade a basket of SPX options (across different series) in one transaction (i.e. one basket trade explodes into numerous SPX executions). To illustrate the process, three examples are provided below.

#### Example 1

On the day before the trade date and after the close, CBOE publishes, through its website or in some other format, a set of parameters for an S&P 500 variance trade that will be available for trading the following business day. This information identifies the individual SPX option series comprising the variance trade portfolio. This example uses the DEC 2011 variance trade and is highlighted in the following table:

SPX Expiration	Strike Range	$K_0$	Min. Strike Interval	Contract Multiplier (\$vega / contract)
<i>DEC 2011</i>	<i>500 - 1500</i>	<i>1125</i>	<i>25</i>	<i>\$50,000</i>

In addition, the following values need to be known as of trade date:

Time to DEC 2011 Expiration (T): 0.34795 years (127 days)  
Risk-Free Interest Rate to DEC 2011 (R): 0.02%<sup>8</sup>

#### Order entry and trade match

- Broker A enters a limit order to sell 2 S&P 500 DEC 2011 variance trade at 33.50.
- Trader B and Trader C each respond by submitting an order to buy one contract at 33.00.
- Broker A eventually cancels the 33.50 offer and replaces it with a 33.00 offer.
- The DEC 2011 variance trade matches at 33.00. Trader B buys 1 contract at 33.00 and Trader C buys 1 contract at 33.00.
- Fill reports for the variance trade executions are sent to Broker A, Trader B and Trader C.
- The variance trades are then “deconstructed” by the System to create a series of matched trades in all of the SPX option series comprising the variance trade.

#### Post trade match processing

The following table shows the bid / ask and mid-quote prices for DEC 2011 SPX options immediately following the execution of the variance trade:

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<sup>8</sup> Interest rate on U.S. Treasury Bill maturing December 15, 2011.



<b>P/C</b>	<b>Strike Price (K)</b>	<b>Bid</b>	<b>Ask</b>	<b>Mid-Quote</b>	<b><math>\Delta K</math></b>
P	500	\$0.55	\$1.50	\$1.03	25
P	525	\$0.75	\$1.55	\$1.15	25
P	550	\$1.10	\$2.05	\$1.58	25
P	575	\$1.50	\$2.45	\$1.98	25
P	600	\$2.00	\$2.95	\$2.48	25
P	625	\$2.35	\$3.48	\$2.91	25
P	650	\$2.70	\$4.00	\$3.35	25
P	675	\$3.50	\$5.00	\$4.25	25
P	700	\$5.00	\$5.90	\$5.45	25
P	725	\$5.20	\$7.10	\$6.15	25
P	750	\$6.40	\$8.30	\$7.35	25
P	775	\$7.80	\$9.70	\$8.75	25
P	800	\$10.50	\$11.30	\$10.90	25
P	825	\$11.40	\$14.20	\$12.80	25
P	850	\$13.30	\$16.10	\$14.70	25
P	875	\$15.70	\$18.50	\$17.10	25
P	900	\$18.70	\$21.60	\$20.15	25
P	925	\$21.60	\$25.30	\$23.45	25
P	950	\$24.90	\$28.60	\$26.75	25
P	975	\$29.20	\$33.10	\$31.15	25
P	1000	\$33.40	\$37.30	\$35.35	25
P	1025	\$39.00	\$42.70	\$40.85	25
P	1050	\$44.50	\$48.40	\$46.45	25
P	1075	\$51.40	\$55.30	\$53.35	25
P	1100	\$59.20	\$63.10	\$61.15	25
P (K <sub>0</sub> )	1125	\$67.60	\$71.50	\$69.55	25
C (K <sub>0</sub> )	1125	\$90.10	\$94.00	\$92.05	25
C	1150	\$74.90	\$78.80	\$76.85	25
C	1175	\$61.30	\$65.20	\$63.25	25
C	1200	\$48.40	\$52.30	\$50.35	25
C	1225	\$37.30	\$41.20	\$39.25	25
C	1250	\$27.80	\$31.70	\$29.75	25
C	1275	\$20.10	\$23.60	\$21.85	25
C	1300	\$13.60	\$16.70	\$15.15	25
C	1325	\$9.20	\$11.10	\$10.15	25
C	1350	\$5.60	\$7.50	\$6.55	25
C	1375	\$3.60	\$5.10	\$4.35	25
C	1400	\$2.00	\$3.60	\$2.80	25
C	1425	\$1.25	\$2.20	\$1.73	25
C	1450	\$0.65	\$1.60	\$1.13	25
C	1475	\$0.45	\$1.05	\$0.75	25
C	1500	\$0.35	\$0.70	\$0.53	25

## Deconstruction Algorithm

The algorithm used to deconstruct S&P 500 variance trades into constituent SPX option series executions is a 2-step process.

Step 1. The System first determines the number of contracts ( $N_i$ ) for each SPX option series comprising the variance trade on a “*per variance trade contract*” basis. As shown below, the number of SPX contracts is a function of the \$vega / contract (e.g., \$50,000) and the trade price for the matched variance trade (volatility -  $\sigma$ ), as well as time to expiration (T), interest rates (R), the strike prices of constituent SPX option legs ( $K_i$ ) and the strike price interval ( $\Delta K_i$ ).

The following formula defines the trade quantity for each series in the variance trade:

$$N_i = \frac{2}{T} \left[ \frac{\Delta K_i}{K_i^2} \right] e^{RT} \times \left[ \frac{\$vega / contract}{2 \times \sigma} \right] \times 100$$

For example, the trade quantity for the SPX DEC 2011 500 put ( $N_{500 \text{ Put}}$ ) is given by:

$$N_{500 \text{ Put}} = \frac{2}{T} \left[ \frac{\Delta K_{500}}{K_{500}^2} \right] e^{RT} \times \left[ \frac{50,000}{2 \times \sigma} \right] \times 100$$

$$N_{500 \text{ Put}} = \frac{2}{0.34795} \left[ \frac{25}{500^2} \right] 1.0000696 \times \left[ \frac{50,000}{2 \times 33.00} \right] \times 100 = 43.54874928$$

Since there are no fractional option contracts, the value for  $N_{500 \text{ Put}}$  is rounded to 44.

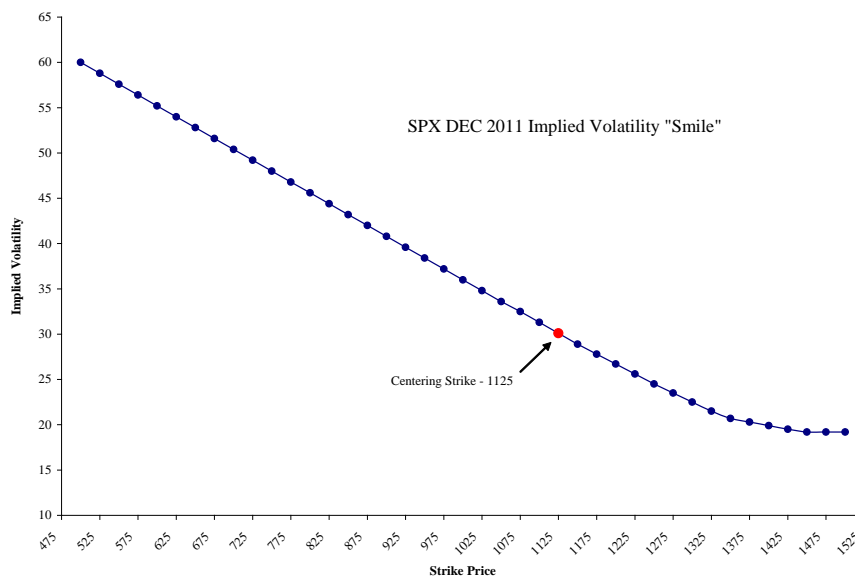
The same calculation is conducted for each SPX option series comprising the variance trade.

The results are shown in the table below. It should be noted that both puts and calls are traded at the  $K_0$  (in this case, 1125) strike.

P/C	Strike Price (K)	$\Delta K$	$\left[ \frac{\text{Svega} / \text{contract}}{2 \times \sigma} \right]$ “Variance Units”	Contracts (N <sub>i</sub> )
P	500	25	757.58	44
P	525	25	757.58	39
P	550	25	757.58	36
P	575	25	757.58	33
P	600	25	757.58	30
P	625	25	757.58	28
P	650	25	757.58	26
P	675	25	757.58	24
P	700	25	757.58	22
P	725	25	757.58	21
P	750	25	757.58	19
P	775	25	757.58	18
P	800	25	757.58	17
P	825	25	757.58	16
P	850	25	757.58	15
P	875	25	757.58	14
P	900	25	757.58	13
P	925	25	757.58	13
P	950	25	757.58	12
P	975	25	757.58	11
P	1000	25	757.58	11
P	1025	25	757.58	10
P	1050	25	757.58	10
P	1075	25	757.58	9
P	1100	25	757.58	9
P (K0)	1125	25	757.58	5
C (K0)	1125	25	757.58	4
C	1150	25	757.58	8
C	1175	25	757.58	8
C	1200	25	757.58	8
C	1225	25	757.58	7
C	1250	25	757.58	7
C	1275	25	757.58	7
C	1300	25	757.58	6
C	1325	25	757.58	6
C	1350	25	757.58	6
C	1375	25	757.58	6
C	1400	25	757.58	6
C	1425	25	757.58	5
C	1450	25	757.58	5
C	1475	25	757.58	5
C	1500	25	757.58	5

Step 2. Next, the System generates trade prices for each SPX option – Q(K<sub>i</sub>) – in the S&P 500 variance trade. The System (1) calculates a baseline implied volatility for each constituent SPX option. The System performs this calculation by using a Black Model and backing out implied volatility levels based on mid-quote prices of constituent SPX options prevailing at the time of the variance basket trade execution. In this example, the baseline

implied volatilities range from a low of about 20 for the 1500 call to a high of about 60 for the 500 put. The implied volatilities of the 1125 put and 1125 call (“centering strike”) are each about 30. The graph below shows the implied volatilities of the SPX options comprising the December 2011 variance basket. A representation of implied volatility as a function of strike price is commonly referred to as a volatility “smile.”



The System then (2) calculates an initial “interim volatility” value using the mid-quote SPX option prices as input values to the VIX formula<sup>9,10</sup>

<sup>9</sup> Please see “More than you ever wanted to know about volatility swaps” by Kresimir Demeterfi, Emanuel Derman, Michael Kamal and Joseph Zou, Goldman Sachs Quantitative Strategies Research Notes, March 1999.

<sup>10</sup> Please see “VIX White Paper” at [www.cboe.com/vixwhite.pdf](http://www.cboe.com/vixwhite.pdf)

$$\sigma^2 = \frac{2}{T} \sum_i \frac{\Delta K_i}{K_i^2} e^{RT} Q(K_i) - \frac{1}{T} \left[ \frac{F}{K_0} - 1 \right]^2$$

$\sigma^2$	Variance (volatility-squared); VIX = $\sigma \times 100$
T	Time to expiration
F	Forward SPX level
$K_0$	Variance strip centering strike price
$K^i$	Strike price of $i^{\text{th}}$ option
$\Delta K_i$	Interval between strike prices
R	Risk-free interest rate to expiration
$Q(K_i)$	Price of option with strike $K_i$ .

In this example, the initial interim volatility value for the SPX options comprising the DEC 2011 variance trade is 33.59. Next, the System (3) compares the variance basket trade price with the interim volatility value. Since in this example, the variance basket trade price of 33.00 is less than the interim volatility value of 33.59, the System (4) would decrease the implied volatilities of all of the constituent SPX options by the same amount and then calculate a set of simulated option prices using the Black Model and the adjusted implied volatilities. The System then (5) uses the simulated option prices as input values to the VIX formula; the resulting output of the VIX formula serves as a new interim volatility value. The System then continues to repeat Steps 3 through 5 until the interim volatility value matches the S&P 500 option variance basket trade price. In this example, the interim volatility value matches the target trade price of 33.00 when the baseline implied volatilities are decreased by 0.46 volatility points. When the simulated option values calculated by reducing the baseline implied volatilities by 0.46 volatility points are

used as input values to the VIX formula, the result - rounded to the nearest hundredth - matches the variance basket trade price<sup>11</sup>.

At this point, the System (6) creates a series of matched trades for all of the constituent SPX option series using, as trade prices, the simulated option prices that cause the interim volatility value to match the S&P 500 option variance basket trade price.

With trade quantities determined and SPX option prices assigned, the System creates the following 42 matched trades in constituent SPX series – a total of 604 SPX options contracts per S&P 500 variance trade contract, with a total portfolio value of just over \$830,000.

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<sup>11</sup> As a practical matter, the minimum increment of change to the baseline volatilities is not limited to 1/100<sup>th</sup> of a volatility point. Rather, the System uses as much precision as it needs in order to calculate an interim volatility value that, when rounded to the nearest hundredth, matches the variance basket trade price.

P/C	Strike Price	Mid-quote Option Price	“Baseline” Implied Volatility	Adjusted Implied Volatility	Trade Price (rounded)	Trade Quantity	Trade Value
P	500	\$1.03	60.00	59.54	\$0.79	44	\$3,476
P	525	\$1.15	58.80	58.34	\$1.05	39	\$4,095
P	550	\$1.58	57.60	57.14	\$1.36	36	\$4,896
P	575	\$1.98	56.40	55.94	\$1.74	33	\$5,742
P	600	\$2.48	55.20	54.74	\$2.20	30	\$6,600
P	625	\$2.91	54.00	53.54	\$2.75	28	\$7,700
P	650	\$3.35	52.80	52.34	\$3.39	26	\$8,814
P	675	\$4.25	51.60	51.14	\$4.15	24	\$9,960
P	700	\$5.45	50.40	49.94	\$5.04	22	\$11,088
P	725	\$6.15	49.20	48.74	\$6.08	21	\$12,768
P	750	\$7.35	48.00	47.54	\$7.27	19	\$13,813
P	775	\$8.75	46.80	46.34	\$8.65	18	\$15,570
P	800	\$10.90	45.60	45.14	\$10.24	17	\$17,408
P	825	\$12.80	44.40	43.94	\$12.06	16	\$19,296
P	850	\$14.70	43.20	42.74	\$14.14	15	\$21,210
P	875	\$17.10	42.00	41.54	\$16.52	14	\$23,128
P	900	\$20.15	40.80	40.34	\$19.23	13	\$24,999
P	925	\$23.45	39.60	39.14	\$22.31	13	\$29,003
P	950	\$26.75	38.40	37.94	\$25.83	12	\$30,996
P	975	\$31.15	37.20	36.74	\$29.82	11	\$32,802
P	1000	\$35.35	36.00	35.54	\$34.35	11	\$37,785
P	1025	\$40.85	34.80	34.34	\$39.51	10	\$39,510
P	1050	\$46.45	33.60	33.14	\$45.35	10	\$45,350
P	1075	\$53.35	32.50	32.04	\$52.23	9	\$47,007
P	1100	\$61.15	31.30	30.84	\$59.76	9	\$53,784
<b>P (K0)</b>	1125	\$69.55	30.10	29.64	\$68.28	5	\$34,140
<b>C (K0)</b>	1125	\$92.05	30.10	29.64	\$91.08	4	\$36,432
C	1150	\$76.85	28.90	28.44	\$75.70	8	\$60,560
C	1175	\$63.25	27.80	27.34	\$61.82	8	\$49,456
C	1200	\$50.35	26.70	26.24	\$49.27	8	\$39,416
C	1225	\$39.25	25.60	25.14	\$38.16	7	\$26,712
C	1250	\$29.75	24.50	24.04	\$28.54	7	\$19,978
C	1275	\$21.85	23.50	23.04	\$20.68	7	\$14,476
C	1300	\$15.15	22.50	22.04	\$14.31	6	\$8,586
C	1325	\$10.15	21.50	21.04	\$9.36	6	\$5,616
C	1350	\$6.55	20.70	20.24	\$5.95	6	\$3,570
C	1375	\$4.35	20.30	19.84	\$3.90	6	\$2,340
C	1400	\$2.80	19.90	19.44	\$2.45	6	\$1,470
C	1425	\$1.73	19.50	19.04	\$1.48	5	\$740
C	1450	\$1.13	19.20	18.74	\$0.89	5	\$445
C	1475	\$0.75	19.20	18.74	\$0.58	5	\$290
C	1500	\$0.53	19.20	18.74	\$0.37	5	\$185

The S&P 500 variance trade seller would see 42 sell transactions totaling 1,208 SPX options with an aggregate value \$1.66 million. Each of the two S&P 500 variance trade buyers would see 42 buy transactions totaling 604 SPX options with an aggregate value of \$830,000.

Example 2

Following is a hypothetical historical example of a MAR 2011 S&P 500 variance trade on December 29, 2010. After the close on December 28, 2010 CBOE publishes the following parameters for the S&P 500 variance trade effective for the next trade date - December 29. The information defining the SPX options effective for MAR 2011 basket is highlighted below:

SPX Expiration	Strike Range	K <sub>0</sub>	Min. Strike Interval	Contract Multiplier (\$vega / contract)
<b>MAR 2011</b>	<b>600 - 1600</b>	<b>1250</b>	<b>25</b>	<b>\$50,000</b>

Order entry and trade match.

- Broker A receives an order to buy 2 SPX MAR 2011 S&P 500 variance trade basket contracts at 20.50.
- Trader B posts an offer to sell 2 contracts at 20.75.
- Broker A eventually cancels the 20.50 bid and replaces it with a 20.75 bid.
- The variance basket trade matches at 20.75.
- The System begins to deconstruct the S&P 500 variance trade basket into a series of matched trades in all of the SPX option series comprising the S&P 500 variance trade basket.

Deconstruction.

As previously described, the algorithm used to deconstruct S&P 500 variance trades into constituent SPX option trades is a 2-step process; the first step assigns the number of contracts traded for each SPX option series comprising the S&P 500 variance trade basket, and the second step assigns trade prices to those SPX option series. The following table shows the SPX option



mid-quote prices prevailing at the time of the S&P 500 variance trade execution, as well as the trade quantities and trade prices assigned by the deconstruction algorithm. In this example, the S&P 500 variance trade was deconstructed into 42 separate matched trades, totaling over 2,400 SPX option contracts (1,206 SPX contracts per variance trade basket) and over \$1 million in option premium (\$521,000 per variance trade basket).

P/C	Strike Price	Mid-quote Option Price	Trade Price (rounded)	Trade Quantity	Trade Value
P	600	\$0.10	\$0.09	155	\$1,395
P	625	\$0.08	\$0.12	143	\$1,716
P	650	\$0.10	\$0.15	132	\$1,980
P	675	\$0.13	\$0.20	122	\$2,440
P	700	\$0.25	\$0.26	114	\$2,964
P	725	\$0.50	\$0.34	106	\$3,604
P	750	\$0.33	\$0.43	99	\$4,257
P	775	\$0.45	\$0.55	93	\$5,115
P	800	\$0.53	\$0.69	87	\$6,003
P	825	\$0.83	\$0.86	82	\$7,052
P	850	\$0.75	\$1.07	77	\$8,239
P	875	\$1.23	\$1.33	73	\$9,709
P	900	\$1.23	\$1.65	69	\$11,385
P	925	\$1.80	\$2.03	65	\$13,195
P	950	\$2.20	\$2.50	62	\$15,500
P	975	\$2.60	\$3.07	59	\$18,113
P	1000	\$3.10	\$3.77	56	\$21,112
P	1025	\$4.05	\$4.65	53	\$24,645
P	1050	\$5.20	\$5.73	51	\$29,223
P	1075	\$6.95	\$7.09	48	\$34,032
P	1100	\$8.40	\$8.80	46	\$40,480
P	1125	\$10.40	\$10.97	44	\$48,268
P	1150	\$13.35	\$13.97	42	\$58,674
P	1175	\$17.20	\$17.84	40	\$71,360
P	1200	\$22.15	\$22.94	39	\$89,466
P	1225	\$28.75	\$29.73	37	\$110,001
<b>P (K0)</b>	1250	\$37.45	\$38.51	17	\$65,467
<b>C (K0)</b>	1250	\$44.00	\$45.06	19	\$85,614
C	1275	\$29.70	\$30.77	34	\$104,618
C	1300	\$19.05	\$19.98	33	\$65,934
C	1325	\$11.20	\$12.03	32	\$38,496
C	1350	\$5.90	\$6.53	31	\$20,243
C	1375	\$3.10	\$3.48	29	\$10,092
C	1400	\$1.43	\$1.70	28	\$4,760
C	1425	\$0.78	\$0.90	27	\$2,430
C	1450	\$0.45	\$0.49	26	\$1,274
C	1475	\$0.48	\$0.40	26	\$1,040
C	1500	\$0.18	\$0.33	25	\$825
C	1525	\$0.50	\$0.29	24	\$696
C	1550	\$0.20	\$0.26	23	\$598
C	1575	\$0.15	\$0.23	22	\$506
C	1600	\$0.15	\$0.22	22	\$484

### Example 3

Following is a hypothetical historical example of a JUN 2012 S&P 500 variance trade on April 29, 2011.

After the close on April 28, 2011 CBOE publishes the following parameters for the S&P 500 variance trade effective for the next trade date - April 29, 2011. The information defining the SPX options effective for JUN 2012 basket is highlighted below:

SPX Expiration	Strike Range	$K_0$	Min. Strike Interval	Contract Multiplier (\$vega / contract)
<b><i>JUN 2012</i></b>	<b><i>400 - 1800</i></b>	<b><i>1325</i></b>	<b><i>25</i></b>	<b><i>\$50,000</i></b>

### Order entry and trade match.

- Broker A receives an order to buy 2 SPX JUN 2012 baskets at 22.50.
- Trader B responds with an offer to sell 2 contracts at 22.75.
- Broker A eventually cancels the 22.50 bid and replaces it with a 22.75 bid.
- The S&P 500 variance trade matches at 22.75.
- The System begins to deconstruct the trade into a series of matched trades in all of the SPX option series comprising the S&P 500 variance trade.

### Deconstruction

As previously described, the algorithm used to deconstruct variance trades into constituent SPX option trades is a 2-step process; the first step assigns the number of contracts traded for each SPX option series comprising the S&P 500 variance trade and the second step assigns trade prices to those SPX option series. The following table shows the SPX option mid-quote prices prevailing at the time of the S&P 500 variance trade execution, as well as the trade quantities and trade prices assigned by the deconstruction algorithm. In this example, the S&P

500 variance trade was deconstructed into 46 separate matched trades, totaling over 800 SPX option contracts (412 SPX contracts per variance trade basket) and over \$1.1 million in option premium (\$567,000 per variance trade basket).

P/C	Strike Price	Mid-quote Option Price	Trade Price (rounded)	Trade Quantity	Trade Value
P	400	\$0.73	\$0.40	122	\$4,880
P	450	\$1.08	\$0.75	96	\$7,200
P	500	\$1.65	\$1.29	78	\$10,062
P	550	\$2.45	\$2.07	64	\$13,248
P	600	\$3.35	\$3.15	54	\$17,010
P	650	\$4.55	\$4.57	46	\$21,022
P	700	\$6.15	\$6.46	30	\$19,380
P	725	\$7.05	\$7.41	19	\$14,079
P	750	\$8.15	\$8.45	17	\$14,365
P	775	\$9.30	\$9.59	16	\$15,344
P	800	\$10.45	\$10.83	15	\$16,245
P	825	\$11.90	\$12.26	14	\$17,164
P	850	\$13.45	\$13.84	13	\$17,992
P	875	\$15.25	\$15.65	13	\$20,345
P	900	\$17.15	\$17.64	12	\$21,168
P	925	\$19.25	\$19.82	11	\$21,802
P	950	\$21.55	\$22.20	11	\$24,420
P	975	\$24.10	\$24.81	10	\$24,810
P	1000	\$27.05	\$27.65	10	\$27,650
P	1025	\$30.10	\$30.76	9	\$27,684
P	1050	\$33.45	\$34.15	9	\$30,735
P	1075	\$37.20	\$38.03	8	\$30,424
P	1100	\$41.20	\$42.07	8	\$33,656
P	1125	\$45.65	\$46.68	8	\$37,344
P	1150	\$50.50	\$51.51	7	\$36,057
P	1175	\$55.85	\$56.86	7	\$39,802
P	1200	\$61.70	\$62.74	7	\$43,918
P	1225	\$68.20	\$69.27	6	\$41,562
P	1250	\$75.25	\$76.38	6	\$45,828
P	1275	\$83.05	\$84.25	6	\$50,550
P	1300	\$91.50	\$92.71	6	\$55,626
<b>P (K0)</b>	1325	\$100.85	\$102.09	3	\$30,627
<b>C (K0)</b>	1325	\$115.00	\$116.35	3	\$34,905
C	1350	\$100.35	\$101.73	5	\$50,865
C	1375	\$86.65	\$87.99	5	\$43,995
C	1400	\$73.90	\$75.17	5	\$37,585
C	1425	\$62.35	\$63.60	5	\$31,800
C	1450	\$51.80	\$53.04	5	\$26,520

C	1475	\$42.45	\$43.52	4	\$17,408
C	1500	\$34.25	\$35.28	6	\$21,168
C	1550	\$21.20	\$22.05	8	\$17,640
C	1600	\$12.30	\$13.02	6	\$7,812
C	1625	\$9.10	\$9.80	4	\$3,920
C	1650	\$6.70	\$7.21	5	\$3,605
C	1700	\$3.45	\$3.92	10	\$3,920
C	1800	\$0.90	\$1.07	12	\$1,284

#### Example 4

Following is a hypothetical historical example of an October 2011 S&P 500 variance trade on August 11, 2011.

After the close on August 10, 2011 CBOE publishes the following parameters for the S&P 500 variance trade effective for the next trade date – August 11, 2011. The information defining the SPX options effective for JUN 2012 basket is highlighted below:

SPX Expiration	Strike Range	K <sub>0</sub>	Min. Strike Interval	Contract Multiplier (\$vega / contract)
<b><i>OCT 2012</i></b>	<b><i>825 - 1325</i></b>	<b><i>1125</i></b>	<b><i>25</i></b>	<b><i>\$10,000</i></b>

#### Order entry and trade match.

- Broker A receives an order to buy 2 SPX OCT 2011 baskets at 14.75.
- Trader B responds with an offer to sell 2 contracts at 15.00.
- Broker A eventually cancels the 14.75 bid and replaces it with a 15.00 bid.
- The S&P 500 variance trade matches at 15.00.
- The System begins to deconstruct the trade into a series of matched trades in all of the SPX option series comprising the S&P 500 variance trade.

#### Deconstruction.

As previously described, the algorithm used to deconstruct variance trades into constituent SPX option trades is a 2-step process; the first step assigns the number of contracts traded for each SPX option series comprising the S&P 500 variance trade and the second step

assigns trade prices to those SPX option series. The following table shows the SPX option mid-quote prices prevailing at the time of the S&P 500 variance trade execution, as well as the trade quantities and trade prices assigned by the deconstruction algorithm. In this example, the S&P 500 variance trade was deconstructed into 22 separate matched trades, totaling 330 SPX option contracts (165 SPX contracts per variance trade basket) and about \$160,000 in option premium (\$80,000 per variance trade basket).

P/C	Strike Price	Mid-quote Option Price	Trade Price (rounded)	Trade Quantity	Trade Value
P	825	\$0.01	\$0.01	26	\$26
P	850	\$0.02	\$0.02	24	\$48
P	875	\$0.05	\$0.05	22	\$110
P	900	\$0.10	\$0.10	22	\$220
P	925	\$0.20	\$0.20	20	\$400
P	950	\$0.39	\$0.39	18	\$702
P	975	\$0.76	\$0.76	18	\$1,368
P	1000	\$1.42	\$1.43	18	\$2,574
P	1025	\$2.58	\$2.59	16	\$4,144
P	1050	\$4.54	\$4.55	16	\$7,280
P	1075	\$7.78	\$7.80	14	\$10,920
P	1100	\$12.73	\$12.75	14	\$17,850
<b>P (K0)</b>	1125	\$20.05	\$20.07	8	\$16,056
<b>C (K0)</b>	1125	\$42.85	42.87	6	\$25,722
C	1150	\$28.12	\$28.14	12	\$33,768
C	1175	\$16.85	\$16.87	12	\$20,244
C	1200	\$8.98	\$8.99	12	\$10,788
C	1225	\$4.13	\$4.14	12	\$4,968
C	1250	\$1.58	\$1.59	10	\$1,590
C	1275	\$0.49	\$0.50	10	\$500
C	1300	\$0.12	\$0.12	10	\$120
C	1325	\$0.02	\$0.02	10	\$20

#### Additional Considerations

Because of the electronic nature of the deconstruction process, option variance baskets will not trade in open outcry on the Exchange trading floor. Only electronically submitted trading interest will be handled by the Exchange. Also, as there are no position limits for SPX options, there will be no limits for executions associated with S&P 500 variance trades. Because

SPX options are what actually change hands at the conclusion of an S&P 500 variance trade, reporting limits applicable to SPX options will continue to apply pursuant to CBOE Rule 24.4, Interpretation and Policy .03. Similarly, the minimum increment for bids and offers in S&P 500 variance trades as well as trading hours will be the same as the minimum increment applicable to SPX.

The Exchange expects S&P 500 variance trades to appeal to institutional users and not to retail customers. Because of the complex nature of S&P 500 variance trades, the Exchange will only allow orders from Trading Permit Holders who have affirmatively communicated to the Exchange a desire to submit orders in S&P 500 variance trades. Thus, orders from retail brokerage firms (or any firms) that have not opted to submit orders in S&P 500 variance trades, will not be allowed to send orders into the Exchanges matching engine. Any such orders would be rejected by the System.

The Exchange represents that appropriate surveillance will be in place in connection with the trading of variance baskets. Indeed, because S&P 500 variance trades result in the execution of standard SPX options, unique surveillance methods are not necessary. Executions that are associated with an S&P 500 variance trade will be surveilled to the same extent as all other SPX executions.

Lastly, CBOE has analyzed its capacity and represents that it believes the Exchange and the Options Price Reporting Authority have the necessary systems capacity to handle the additional traffic associated with S&P 500 option variance basket trades.

## 2. Statutory Basis

The Exchange believes the proposed rule change is consistent with the Securities Exchange Act of 1934 (the "Act")<sup>12</sup> and the rules and regulations thereunder and, in particular, the requirements of Section 6(b) of the Act.<sup>13</sup> Specifically, the Exchange believes the proposed rule change is consistent with the Section 6(b)(5)<sup>14</sup> requirements that the rules of an exchange be designed to remove impediments to and to perfect the mechanism for a free and open market in that the introduction of S&P 500 variance trades will allow market participants to more efficiently trade an entire option portfolio replicating S&P 500 implied variance. In addition, the Exchange understands that market participants may seek to effect comparable investment strategies in the other-the-counter marketplace and believes that the introduction of S&P 500 variance trades will attract order flow to the Exchange, increase the variety of exchange-sponsored investment vehicles available to investors, and provide a valuable trading tool to institutional investors. Thus, the proposed rule change will permit market participants to trade S&P 500 variance trades in an environment subject to exchange-based rules that provides price transparency and eliminates contra-party risk through the role of the OCC as issuer, thereby removing impediments to a free and open market consistent with the Act. Further, S&P 500 variance trades will be subject to CBOE's rules, regulations and oversight, which serve to protect investors and the public interest and provide enhanced investor protection and market surveillance.

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<sup>12</sup> 15 U.S.C. 78s(b)(1) [sic].

<sup>13</sup> 15 U.S.C. 78f(b).

<sup>14</sup> 15 U.S.C. 78f(b)(5).



Allowing constituent trades to be executed and reported without regard for existing bids and offers on the Exchange is consistent with the benchmark order exception in the Linkage Plan<sup>15</sup> as well as with the benchmark exception of the SEC's Order Protection Rule under Regulation NMS (Rule 611(b)(7)).<sup>16</sup> Appending the benchmark designator to these executions would alert users that the executions are not related to the prevailing bids and offers, and will therefore help remove impediments to and to perfect the mechanism for a free and open market.

Requiring permit holders to affirmatively indicate a desire to transmit S&P 500 variance trades to the Exchange before the Exchange would process such orders will help ensure that retail customers and other users that may not intend to transact in variance trades will not do so inadvertently which also helps to protect investors and the public interest.

Lastly, the Exchange believes S&P 500 variance trades will be useful to investors because they will facilitate the use of highly liquid SPX options to hedge and trade the growing number of volatility-related products currently available in both the listed and over-the-counter markets which serves to help remove impediments to and to perfect the mechanism for a free and open market.

B. Self-Regulatory Organization's Statement on Burden on Competition

CBOE does not believe that the proposed rule change will impose any burden on competition not necessary or appropriate in furtherance of the purposes of the Act.

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received from Members, Participants or Others

No written comments were solicited or received with respect to the proposed rule change.

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<sup>15</sup> Section 5(b)(xi) of the Linkage Plan.

<sup>16</sup> 17 CFR 242.611(b)(7).

### III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

Within 45 days of the date of publication of this notice in the Federal Register or within such longer period (i) as the Commission may designate up to 90 days of such date if it finds such longer period to be appropriate and publishes its reasons for so finding or (ii) as to which the self-regulatory organization consents, the Commission will:

- (A) by order approve or disapprove the proposed rule change, or
- (B) institute proceedings to determine whether the proposed rule change should be disapproved.

### IV. Solicitation of Comments

Interested persons are invited to submit written data, views, and arguments concerning the foregoing, including whether the proposed rule change is consistent with the Act. In particular, the Commission seeks comment on the following:

1. The Exchange's proposal would allow the constituent SPX option trades of a variance trade basket to be executed and reported without regard to existing bids and offers on the Exchange in SPX at the time of the transaction. The Commission requests comment on this aspect of the Exchange's proposal, including commenters' opinions on whether this would be consistent with the Exchange Act and what, if any, potential impact this proposal might have on market participants.

2. The Commission notes that the proposal seeks to use the "benchmark" indicator for informational purposes when reporting the constituent legs of a variance trade transaction, though such trades would not be benchmark trades pursuant to Section 5(b)(xi) of the Linkage Plan, which by its terms applies only to inter-market order protection. The Commission requests comment the use of the benchmark trade reporting indicator as proposed.

Comments may be submitted by any of the following methods:

Electronic comments:

- Use the Commission's Internet comment form (<http://www.sec.gov/rules/sro.shtml>); or
- Send an e-mail to [rule-comments@sec.gov](mailto:rule-comments@sec.gov). Please include File No. SR-CBOE-2011-007 on the subject line.

Paper comments:

- Send paper comments in triplicate to Elizabeth M. Murphy, Secretary, Securities and Exchange Commission, Station Place, 100 F Street, NE, Washington, DC 20549-1090.

All submissions should refer to File Number SR-CBOE-2011-007. This file number should be included on the subject line if e-mail is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's Internet website (<http://www.sec.gov/rules/sro.shtml>). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for website viewing and printing in the Commission's Public Reference Room, 100 F Street, NE, Washington, DC 20549, on official business days between the hours of 10:00 a.m. and 3:00 p.m. Copies of such filing also will be available for inspection and copying at the principal office of the Exchange. All comments received will be posted without change; the

Commission does not edit personal identifying information from submissions. You should submit only information that you wish to make available publicly. All submissions should refer to File Number SR-CBOE-2011-007 and should be submitted on or before [insert date 21 days from the date of publication in the Federal Register].

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.<sup>17</sup>

Elizabeth M. Murphy  
Secretary

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<sup>17</sup> 17 CFR 200.30-3(a)(12).