

## Description of the CBOE DJIA BuyWrite Index (BXD<sup>SM</sup>)

The CBOE DJIA BuyWrite Index (the “BXD<sup>SM</sup>” or the “BXD Index”) measures the total rate of return of a hypothetical “covered call” strategy applied to the Dow Jones Industrial Average<sup>®</sup> (the “DJIA”). This strategy, consists of a hypothetical portfolio consisting of a “long” position indexed to the Dow Jones Industrial Average on which are deemed sold a succession of one-month, at-the-money call options on the Dow Jones Industrial Average listed on the Chicago Board Options Exchange (CBOE) under the ticker symbol “DJX”<sup>1</sup>. We refer to this hypothetical portfolio as the “covered DJIA portfolio.” The BXD Index provides a benchmark measure of the total return performance of this hypothetical portfolio. Dividends paid on the component stocks underlying the Dow Jones Industrial Average and the dollar value of option premium deemed received from the sold call options are functionally “re-invested” in the covered DJIA portfolio. The BXD Index is based on the cumulative gross rate of return of the covered DJIA portfolio since the inception of the BXD Index on October 16, 1997, when it was set to an initial value of 100.00.

The BXD covered call strategy requires that each DJX call option in the hypothetical portfolio be held to maturity, generally the third Friday of each month. The call option is settled against the Special Opening Quotation (or SOQ, ticker “DJS”) of the DJX used as the final settlement price of DJX call options<sup>2</sup>. The SOQ is a special calculation of the DJIA that is compiled from the opening prices of component stocks underlying the Dow Jones Industrial Average. The SOQ calculation is performed when all 30 stocks underlying the DJIA have opened for trading, and is usually determined before 11:00 a.m. ET<sup>3</sup>. The final settlement price of the call option at maturity is the greater of 0 and the difference between the SOQ minus the strike price of the expiring call option.

Subsequent to the settlement of the expiring call option, a new at-the-money call option expiring in the next month is then deemed written, or sold, a transaction commonly referred to as a “roll.” The strike price of the new call option is the DJX call option listed on the CBOE with the closest strike price above the last value of the DJX reported before 11:00 a.m. ET<sup>4</sup>. For example, if the last DJX value reported before 11:00 a.m. ET is 104.53 and the closest listed DJX call option strike price above 104.53 is 105, then the 105 strike DJX call option is selected as the new call option to be incorporated into the BXD Index. The long Dow Jones Industrial Average component and the short call option

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<sup>1</sup> DJX options are based on 1/100<sup>th</sup> of the Dow Jones Industrial Average.

<sup>2</sup> If the third Friday is an exchange holiday, the call option will be settled against the SOQ on the previous business day and the new call option will be selected on that day as well.

<sup>3</sup> If one or more stocks in the Dow Jones Industrial Average do not open on the day the SOQ is calculated, the final settlement price for DJX options is determined in accordance with the Rules and By-Laws of the Options Clearing Corporation.

<sup>4</sup> If the last value of the DJX reported before 11:00 a.m. ET is exactly equal to a listed DJX call option strike price, then the new call option is the DJX call option with that exact at-the-money strike price.

component are held in equal notional amounts, i.e., the short position in the call option is “covered” by the long Dow Jones Industrial Average component.

Once the strike price of the new call option has been identified, the new call option is deemed sold at a price equal to the volume-weighted average of the traded prices (“VWAP”) of the new call option during the half-hour period beginning at 11:30 a.m. ET. The CBOE calculates the VWAP in a two-step process: first, the CBOE excludes trades in the new call option between 11:30 a.m. and 12:00 p.m. ET that are identified as having been executed as part of a “spread”, and then the CBOE calculates the weighted average of all remaining transaction prices of the new call option between 11:30 a.m. and 12:00 p.m. ET, with weights equal to the fraction of total non-spread volume transacted at each price during this period. The source of the transaction prices used in the calculation of the VWAP is CBOE’s Market Data Retrieval (“MDR”) System<sup>5</sup>. If no transactions occur in the new call option between 11:30 a.m. and 12:00 p.m. ET, then the new call option is deemed sold at the last bid price reported before 12:00 p.m. ET. The value of option premium deemed received from the new call option is functionally “re-invested” in the portfolio.

**Index Calculation.** The BXD Index is calculated in real-time by the CBOE every fifteen seconds during each trading day excluding roll dates [for the respective components of the covered DJIA portfolio]. The BXD Index is a chained index, i.e., its value is equal to 100 times the cumulative product of gross daily rates of return of the covered DJIA portfolio since the inception date of the BXD Index. On any given day, the BXD Index is calculated as follows:

$$BXD_t = BXD_{t-1}(1 + R_t)$$

where  $R_t$  is the daily rate of return of the covered DJIA portfolio. This rate includes ordinary cash dividends paid on the stocks underlying the Dow Jones Industrial Average that trade “ex-dividend” on that date.

On each trading day excluding roll dates, the daily gross rate of return of the BXD equals the change in the value of the components of the covered DJIA portfolio, including the value of ordinary cash dividends payable on component stocks underlying the Dow Jones Industrial Average that trade “ex-dividend” on that date, as measured from the close in trading on the preceding trading day. The gross daily rate of return is equal to:

$$1 + R_t = (S_t + Div_t - C_t)/(S_{t-1} - C_{t-1})$$

In this equation,  $S_t$  is the closing value of the DJX at date  $t$ ,  $Div_t$  represents the ordinary cash dividends payable on the component stocks underlying the Dow Jones Industrial

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<sup>5</sup> Time & Sales information from CBOE’s MDR System is disseminated through the Options Price Reporting Authority (OPRA) and is publicly available through most price quote vendors.

Average that trade “ex-dividend” at date  $t$  expressed in DJX index points, and  $C_t$  is the arithmetic average of the last bid and ask prices of the call option reported before 4:00 p.m. ET at date  $t$ .  $S_{t-1}$  is the closing value of the DJX on the preceding trading day and  $C_{t-1}$  is the average of the last bid and ask prices of the call option reported before 4:00 p.m. ET on the preceding trading day.

On roll dates, the gross daily rate of return is compounded from three gross rates of return, the gross rate of return from the previous close to the time the SOQ is determined and the expiring call is settled; the gross rate of return from the SOQ to the initiation of the new call position and the gross rate of return from the time the new call option is deemed sold to the close of trading on the roll date, expressed as follows:

$$1 + R_t = (1 + R_a) \times (1 + R_b) \times (1 + R_c)$$

where:

$$1 + R_a = (S^{SOQ} + Div_t - C_{Settle}) / (S_{t-1} - C_{t-1});$$

$$1 + R_b = (S^{VWAV}) / (S^{SOQ}); \text{ and}$$

$$1 + R_c = (S_t - C_t) / (S^{VWAV} - C_{VWAP})$$

In this equation,  $R_a$  is the rate of return of the covered DJIA portfolio from the previous close of trading through the settlement of the expiring call option.  $S^{SOQ}$  is the Special Opening Quotation used in determining the settlement price of the expiring call option. As previously defined,  $Div_t$  represents dividends on Dow Jones Industrial Average component stocks determined in the same manner as on non-roll dates, and  $C_{Settle}$  is the final settlement price of the expiring call option.  $S_{t-1}$  and  $C_{t-1}$  are determined in the same manner as on non-roll dates.

$R_b$  is the rate of return of the un-covered DJIA portfolio from the settlement of the expiring option to the time the new call option is deemed sold.  $S^{VWAV}$  is the volume-weighted average value of the DJX based on the same time and weights used to calculate the VWAP in the new call option

$R_c$  is the rate of return of the covered DJIA portfolio from the time the new call option is deemed sold to the close of trading on the roll date. As defined above,  $S^{VWAV}$  is the volume-weighted average value of the DJX based on the same time and weights used to calculate the VWAP in the new call option.  $C_{VWAP}$  is the volume-weighted average trading price of the new call option between 11:30 a.m. and 12:00 p.m. ET and  $C_t$  refers to the average bid/ask quote of the new call option reported before 4:00 p.m. ET on the roll date.

For more information please visit:

**[www.cboe.com/bxd](http://www.cboe.com/bxd)**

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