CBOE®

EXECUTE SUCCESS®

Index Methodology

As of July/2015

CBOE Strategy Benchmark Indexes

The CBOE S&P 500 30-Delta BuyWrite Index (BXMD)

THE CBOE S&P 500 30-Delta BuyWrite Index (BXMD)

Introduction:

The CBOE S&P 500 30-Delta BuyWrite Index (BXMD) is a benchmark index designed to track the performance of a hypothetical covered call strategy that establishes a long position indexed to the S&P 500 Index (SPX Index) and writes a monthly Out-of-the-Money (OTM) SPX Call option. The distinctive feature of this index is, when writing the OTM SPX Call option, the option with a delta closest to 0.30 is selected.

Index Design:

On June 20, 1986, the initial roll date of the BXMD Index, a unit of an OTM monthly SPX Call option is written and a unit of the SPX Index is purchased to cover the liability. The Call option selected is the one with a delta closest to 0.30. All inputs used in the delta calculation using the Black formula should be the last available values before 11:00 am ET. The premium collected from writing the SPX Call option is the volume weighted average trade price between 11:30 am and 12:00 pm ET (VWAP). CBOE calculates the VWAP in two steps: first, CBOE excludes trades in the new SPX Call option between 11:30 am and 12:00 pm ET that are identified as having been executed as part of a “spread”; and second, CBOE calculates the weighted average of all remaining transaction prices of the new SPX Call option between 11:30 am and 12:00 pm ET, with weights equal to the fraction of total non-spread volume transacted at each price during this period. If there is no trade in the SPX Call option during the VWAP period, the last bid quote for the SPX Call option before 12:00 pm ET is used. As the long SPX Index position is assumed to be entered into simultaneously with the short SPX Call option position, the weighted average price of the SPX Index is calculated using disseminated values of the SPX Index based on the same time and weights used to calculate the SPX Call option VWAP. Similarly, if there is no trade of the SPX Call option during the VWAP period, the last disseminated value of the SPX Index before 12:00 pm ET is used.

Typically, on the third Friday (Roll Day) of every month since the initial roll date, the SPX Call option settles at 9:30 am ET against the Special Opening Quotation of the SPX Index (SOQ). The option settlement value is determined as $Call\_old_{settle} = Max(0, SOQ_t - K_{old})$. A new OTM monthly SPX Call option will be subsequently written. Following the same rule as the initial roll date, the SPX Call option selected is the one with a delta closest to 0.30 at 11:00 am ET.[1] The premium collected from the SPX Call option would be the VWAP between 11:30 am and 12:00 pm ET, or the last bid quote for the SPX Call option before 12:00 pm ET, if there is no trade in the SPX Call option during the VWAP period. The long SPX Index position remains unchanged.

Index Calculation:

The BXMD Index value is calculated by CBOE in real-time, every 15 seconds.

<u>On each trading day excluding roll dates, the daily return of the index is calculated as:</u>

$$R_t = (SPX_t + DIV_t - Call_t) / (SPX_{t-1} - Call_{t-1})$$

Where SPX_t is the SPX Index close price on day t, DIV_t is the SPX dividend, $Call_t$ is the average of the last bid-ask quote of the 30-delta OTM monthly SPX Call option before 4:00 pm ET. The terms with subscript $t-1$ stand for the values on the previous day.

<u>On Roll Days, the return is calculated in three steps:</u>

First, calculate the return from the previous day market close to morning settlement of the expiring option (9:30 am ET):

$$R_1 = (SOQ_t + DIV_t - Call\_old_{settle}) / (SPX_{t-1} - Call\_old_{t-1})$$

Where SOQ_t is the Special Opening Quotation of the SPX Index on the Roll Day, DIV_t is the SPX dividend, and $Call\_old_{settle} = Max(0, SOQ_t - K_{old})$ is the settlement value of the old SPX Call option. $Call\_old_{t-1}$ is the average of the last bid-ask quote of the SPX Call option before 4:00 pm ET on the previous day.

Second, calculate the return from morning settlement (9:30 am ET) to the moment when the new SPX Call option positions are deemed sold:

$$R_2 = SOQ_t / SPX_{vwap}$$

Where SOQ_t is the Special Opening Quotation of the SPX Index on the Roll Day, and SPX_{vwap} is the volume weighted average price of the SPX Index, calculated using disseminated values of the SPX Index based on the same time and weights used to calculate the SPX Call option VWAP. Note that if there are no trades in the SPX Call option during the VWAP period, the last disseminated value of the SPX Index before 12:00 pm ET is used.

Lastly, calculate the return from the time the new SPX Call option position is deemed sold to the market close:

$$R_3 = (SPX_t – Call\_30d\_new_t) / (SPX_{vwap} – Call\_30d\_new_{vwap})$$

Where SPX_t is the last disseminated value of the SPX Index on the Roll Day *t*, and SPX_{vwap} is the volume weighted average price of the SPX Index, calculated based on the same time and weights used to calculate the new SPX Call option VWAP. $Call\_30d\_new_{vwap}$ is the volume weighted average trade price between 11:30 am and 12:00 pm ET of the new SPX Call option, and $Call\_30d\_new_t$ is the average of the last bid-ask quotes for the SPX Call option before 4:00 pm ET on the Roll Day.

The product of the three parts is the total return of the Roll Day:

$$R_t = R_1 * R_2 * R_3$$

<u>Once the daily return is calculated for every trading day, the daily index value is calculated as:</u>

$$INDEX_t = INDEX_{t-1} * R_t$$

Options involve risk and are not suitable for all investors. Prior to buying or selling an option, a person must receive a copy of Characteristics and Risks of Standardized Options. Copies are available from your broker, by calling 1-888-OPTIONS, or from The Options Clearing Corporation, One North Wacker Drive, Suite 500, Chicago, Illinois 60606 or www.theocc.com. The CBOE S&P 500 30-Delta BuyWrite Index (BXMD) is designed to represent a proposed hypothetical yield enhancement strategy. Like many passive indexes, the BXMD Index does not take into account significant factors such as transaction costs and taxes and, because of factors such as these, many or most investors should be expected to underperform passive indexes. In the construction of the hypothetical BXMD index, the BXMD options are assumed to be sold at a certain price on the third Friday of the month. However, there is no guarantee that all investors will be able to sell at this price, and investors attempting to replicate the BXMD Index should discuss with their brokers possible timing and liquidity issues. Transaction costs and taxes for a strategy such as the BXMD could be significantly higher than transaction costs for a passive strategy of buying-and-holding stocks. Investors should consult their tax advisor as to how taxes affect the outcome of contemplated options transactions. Past performance does not guarantee future results. This paper contains index performance data based on back-testing, i.e., calculations of how the index might have performed prior to launch. Back-tested performance information is purely hypothetical and is provided in this document solely for information purposes. Back-tested performance does not represent actual performance and should not be interpreted as an indication of actual performance. It is not possible to invest directly in an index. Chicago Board Options Exchange, Incorporated (CBOE) calculates and disseminates the BXMD index.

The information in this paper is provided for general education and information purposes only. No statement within this paper should be construed as a recommendation to buy or sell a security or to provide investment advice. The BXMD Index and all other information provided by CBOE and its affiliates and their respective directors, officers, employees, agents, representatives and third party providers of information (the “Parties”) in connection with the BXMD Index (collectively “Data”) are presented "as is" and without representations or warranties of any kind. The Parties shall not be liable for loss or damage, direct, indirect or consequential, arising from any use of the Data or action taken in reliance upon the Data.

The BXMD methodology is the property of CBOE. CBOE®, Chicago Board Options Exchange® and Execute Success® are registered trademarks and BuyWrite℠ and BXMD℠ are service marks of CBOE. S&P 500® is a registered trademark of Standard & Poor’s Financial Services, LLC and has been licensed for use by CBOE. Financial products based on S&P indices are not sponsored, endorsed, sold or promoted by Standard & Poor’s, and Standard & Poor’s makes no representation regarding the advisability of investing in such products. Redistribution, reproduction and/or photocopying in whole or in part are prohibited without the written permission of CBOE.

© 2015 Chicago Board Options Exchange, Incorporated. All rights reserved.