Global Structured Products

BMO Global Smart Volatility Index (6%)

Strategy Brochure

November 15, 2017

BMO Capital Markets®

THE INDEX

DESCRIPTION

The BMO Global Smart Volatility Index (6%) (the "Index") is a proprietary index that is based on the Modern Portfolio Theory approach to asset allocation. This theory suggests how investors can select a portfolio from available assets to maximize expected return for a given amount of risk.

METHODOLOGY CONSTRUCTION

Step 1: Monthly, the Index rebalances to select a new Monthly Unique Portfolio which is the best-performing portfolio over the past six months with volatility equal to or less than 6%.

Step 2: Daily, the Index Calculation Agent monitors the volatility of the Monthly Unique Portfolio over the previous one-month period and adjusts the exposure of the Index to the Monthly Unique Portfolio to target a 6% annualized volatility.

QUICK FACTS

Weighting Method	Volatility Targeted
Rebalancing Frequency	Monthly and Daily
Structure	Total Return
Asset Universe	4 Indices, 6 ETFs, and Cash
Currency	CAD
Annual Index Fee	2.50%
Inception Date	June 29, 2016

INDEX COMPONENTS

The Index Components represent a diverse range of sectors, asset classes and geographic regions. Each Index Component is listed below together with its cap (maximum Weight in the Monthly Unique Portfolio), sector, sector cap, asset class and Bloomberg ticker symbol:

SECTOR CAP	ASSET CLASS	INDEX COMPONENT	DESCRIPTION	BLOOMBERG SYMBOL	ASSET CAP
Equities 50%	Canadian large cap equities	S&P / TSX 60 Index	A capitalization-weighted index consists of 60 of the largest and most liquid (heavily traded) stocks listed on the Toronto Stock Exchange (TSX).	SPTSX60 INDEX	20%
	US large cap equities	S&P 500 Index	A capitalization-weighted designed to measure performance of the broad domestic economy through changes in the aggregate market value of 500 stocks representing all major industries.	SPX INDEX	20%
	European large cap equities	Euro STOXX 50 Index	Europe's leading blue-chip index of the supersector leaders in the Eurozone. The index covers 50 stocks from 12 Eurozone countries.	SX5E INDEX	20%
	Canadian small cap equities	S&P/TSX Small Cap Index	An investable index for the Canadian small cap market.	SPTSXS INDEX	20%
	International high dividend paying equities	iShares International Select Dividend ETF	The iShares International Select Dividend ETF seeks to track the investment results of an index composed of relatively high dividend paying equities in non-U.S. developed markets.	IDV UF EQUITY	20%
Fixed Income 50%	Canadian broad corporate bonds	BMO Aggregate Bond Index ETF	Provides exposure to the performance of the FTSE TMX Canada UniverseXM Bond Index, net of expenses. The Fund invests in a variety of debt securities primarily with a term to maturity greater than one year.	ZAG CT EQUITY	20%
	Canadian short term corporate bonds	BMO Short Corporate Bond Index ETF	Provides exposure to the performance of the FTSE TMX Canada Short Term Corporate Bond Index, net of expenses. The Fund invests in a variety of debt securities primarily with a term to maturity between one and five years.	ZCS CT EQUITY	20%
	Canadian long term provincial bonds	BMO Long Provincial Bond Index ETF	Provides exposure to the performance of FTSE TMX Canada Long Term Provincial Bond Index, net of expenses. The ETF invests in a variety of debt securities primarily with a term to maturity greater than ten years.	ZPL CT EQUITY	20%
	Canadian broad corporate bonds	iShares Canadian Universe Bond Index	Provides exposure to the performance of the FTSE TMX Canada Universe Bond Index. The Fund invests in investment-grade Government of Canada, provincial, corporate and municipal bonds issued domestically in Canada and denominated in Canadian dollars.	XBB CT EQUITY	20%
Alternative 50%	Canadian real estate investment trusts	iShares S&P / TSX Capped REIT Index ETF	Provides income and long-term growth through the investment in the Index Shares underlying the S&P/TSX Canadian REIT Index in the same proportion as they are reflected in that Index.	XRE CT EQUITY	50%
Cash 25%	Cash	Canadian Overnight Repo Rate	Canadian Overnight Repo Rate released by the Bank of Canada.	CANREPO INDEX	25%

INDEX RULES

Determining Eligible Portfolios

The Monthly Unique Portfolio is a hypothetical weighted portfolio of Index Components chosen from among all Eligible Portfolios. The weights applied to each Index Component to determine each Eligible Portfolio (including the Monthly Unique Portfolio) are subject to the following limits:

- Each weight must be 0% or a positive integral multiple of 5%
- The sum of the weights applied to all Index Components must be 100%
- The weight applied to the iShares S&P/TSX Capped REIT Index ETF cannot exceed 50%
- The weight applied to each Securities Component (except the iShares S&P/TSX Capped REIT Index ETF) cannot exceed 20%
- The sum of the weights applied to all Securities Components in a sector (except Cash) cannot exceed 50% and
- The weight applied to the Cash Component cannot exceed 25% (which means that the sum of the Weights applied to all Securities Components must be at least 75%)

Monthly Selection and Reweighting of the Monthly Unique Portfolio

On the first Index Business Day of each month (the "Reweighting Date"), the Index Calculation Agent determines all Eligible Portfolios and calculates their performance for the previous 126 Index Business Days (a period of approximately six calendar months called the "Reweighting Observation Period"). The annualized volatility of each Eligible Portfolio is calculated over the same Reweighting Observation Period. The Monthly Unique Portfolio is the Eligible Portfolio that would have produced the highest overall return on the Index over the Reweighting Observation Period subject to volatility not exceeding an annualized level of 6%. If no eligible portfolio meets these criteria, the limit on volatility is increased by 1% (first to 7%, then to 8% and so on) until a Monthly Unique Portfolio meeting the criteria is found. The "Weights" are the individual weights applied to each Index Component in the Monthly Unique Portfolio.

For a period of up to five Index Business Days following the determination of a Monthly Unique Portfolio on a Reweighting Date (the "Determination Period"), the Index Calculation Agent may, in its sole discretion, continue to use the Monthly Unique Portfolio from the preceding Reweighting Date for purposes of daily rebalancing of volatility and determining the Index Level; provided, however, that the Index Calculation Agent must adopt the most recently determined Monthly Unique Portfolio for such purposes on or before the end of the Determination Period.

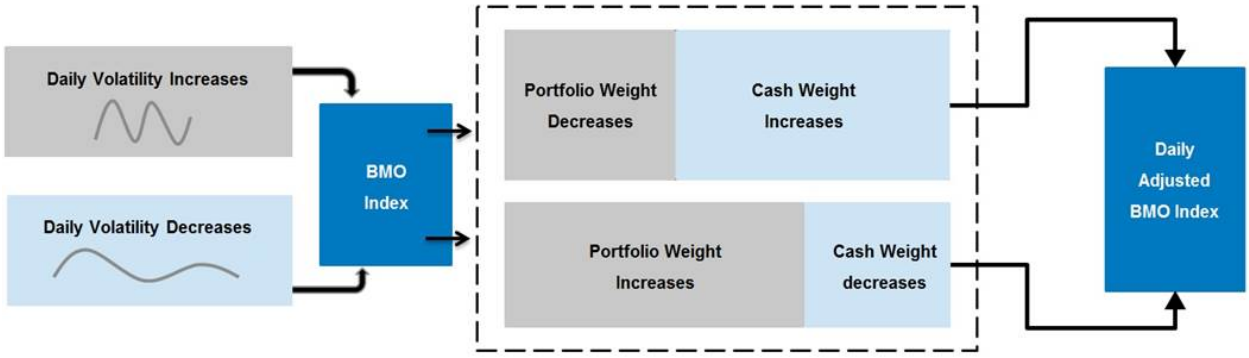
The Index uses volatility to measure a hypothetical portfolio's level of risk, with greater volatility representing higher risk. The Index's volatility is based on fluctuations in the Closing Levels of the weighted Securities Components during the Reweighting Observation Period, with recent fluctuations being weighted more heavily than less recent fluctuations. The calculation of volatility is described in more detail in Appendix A.

Daily Rebalancing

On each Index Business Day between Reweighting Dates, the Index follows a strategy that targets 5% volatility by varying the exposure of the Index to the Monthly Unique Portfolio based on its 1-month historical volatility. The aggregate weight of the Securities Components in the Monthly Unique Portfolio adjusted for the variable exposure will range from 0% to 100%, increasing when the volatility of the Monthly Unique Portfolio decreases and decreasing when the volatility increases. The exposure of the Index to the Monthly Unique Portfolio will not be greater than 100%.

Rebalancing may result in the overall exposure of the Index to certain Index Components exceeding the limits set out above under “Determining Eligible Portfolios”. However, after daily rebalancing, (i) the overall weight of each Index Component (including Cash in the Monthly Unique Portfolio combined with Cash used for rebalancing) will always be at least 0% (i.e., no Index Component will have a negative weighting), and (ii) the sum of the overall weights of all Index Components will always be 100%. In certain circumstances these constraints could result in an Index volatility below 6%. Rebalancing changes the extent to which the Monthly Unique Portfolio is represented in the Index, but it does not change the Weights of the Index Components in the Monthly Unique Portfolio.

The following diagram illustrates the effect of daily rebalancing:



Determining the Index Level

The Index Level on an Index Business Day is the Index Level on the previous Index Business Day plus the return on the Index since the previous Index Business Day minus the portion of the annual fee of 2.50% (the "Fee") that has accrued since the previous Index Business Day. The return on the Index since the previous Index Business day is the sum of the weighted returns on the Index Components since the previous Index Business Day (using the Weights determined on the previous Reweighting Date) after the weighted returns on the Securities Components have been multiplied by the Daily Exposure Factor and the weighted return on the Cash Component (including Cash in the Monthly Unique Portfolio combined with Cash used for daily rebalancing) has been multiplied by one minus the Daily Exposure Factor. The Index Level on each Index Business Day will be reported by BMO Capital Markets at www.bmosp.com.

The Closing Level of each Securities Component, which is used to calculate that Securities Component's return, reflects the 'total return' of that Securities Component, being changes in the price or level of that Securities Component and the reinvestment of any dividends or distributions declared and paid on the Securities Component or on the securities represented in a Securities Component that is an index, net of any withholding taxes, stamp taxes and/or other similar amounts that would be payable by Bank of Montreal had it received such dividends or distributions (as determined by the Index Calculation Agent). In the case of dividends paid by U.S. companies, such taxes are expected to be approximately 15% of gross cash ordinary dividends based on Bank of Montreal's status as a Canadian taxpayer and current withholding rates under the Canada-United States Tax Convention for dividend payments by U.S. companies to Canadian residents. Many of Canada's tax treaties with other countries provide for the same rate of withholding tax on dividend payments made by companies in those countries.

The Index Calculation Agent is bound by the Index Rules in determining the Index Level and, except on the occurrence of certain events, as described in Appendix C, has no discretion in applying the Index Rules to determine the Weights to be applied to the Index Components on each Reweighting Date or, subject to limited discretion to base the Index Level on the previous month's Monthly Unique Portfolio for up to five Index Business Days after a Reweighting Date, as set out above under "Monthly Selection and Reweighting of the Monthly Unique Portfolio", to change the exposure of the Index to the Monthly Unique Portfolio on each Index Business Day between Reweighting Dates.

ANNEX A

Calculation of Realized Volatility

Realized Volatility is calculated for every Securities Component for monthly reweighting; and for the portfolio of Securities Components for daily rebalancing. Both calculations are based on the exponential weighted moving average ("EWMA") approach with an EWMA smoothing factor *l* = 0.94. Calculation of the Realized Volatility for every Securities Component proceeds as follows.

Calculation of Realized Volatility of Eligible Portfolios for Monthly Reweighting (Determination of the Monthly Unique Portfolio)

First, the EWMA of 126 daily returns (from 127 consecutive business days) is calculated as:

$$\mu^{(i)} = \frac{1-l}{1-l^{126}} \sum_{1}^{126} l^{126-t} \left(\frac{S_t^{(i)}}{S_{t-1}^{(i)}} - 1 \right)$$

Then the Realized Volatility is calculated as:

$$\sigma^{(i)} = \frac{1-l}{1-l^{126}} \sum_{1}^{126} l^{126-t} \left(\frac{S_t^{(i)}}{S_{t-1}^{(i)}} - 1 - \mu^{(i)} \right)^2$$

Here:

$\mu^{(i)}$ is the EWMA estimate of the Realized Average of the i[th] Securities Component returns

$\sigma^{(i)}$ is the EWMA estimate of the Realized Volatility of the i[th] Securities Component returns

l is the EWMA smoothing parameter (0.94)

t and *t* – 1 are the Index Business Day and the Index Business Day immediately preceding day *t*

$S_t^{(i)}$ is the Closing Level of the i[th] Securities Component on day *t*

$S_{t-1}^{(i)}$ is the Closing Level of the i[th] Securities Component on day *t* – 1

Calculation of Realized Volatility of the Monthly Unique Portfolio for Daily Rebalancing

The calculation of the Realized Volatility of the Monthly Unique Portfolio for purposes of daily rebalancing is similar to the calculation of the Realized Volatility of Eligible Portfolios for Monthly Reweighting, but the return on the Monthly Unique Portfolio is used instead of Securities Component returns. First, for each of 22 Index Business Days portfolio value is constructed as:

$$P_t = \sum_{1}^{10} w^{(i)} S_t^{(i)}$$

Then EWMA estimates of the portfolio return realized average and realized volatility are calculated as:

$$\mu = \frac{1-l}{1-l^{21}} \sum_{1}^{21} l^{21-t} \left(\frac{P_t}{P_{t-1}} - 1 \right)$$

$$\sigma = \frac{1-l}{1-l^{21}} \sum_{1}^{21} l^{21-t} \left(\frac{P_t}{P_{t-1}} - 1 - \mu \right)^2$$

Where:

t and $t-1$ are the Index Business Day and the Index Business Day immediately preceding day t

P_t is the portfolio value on Index Business Day t

μ is the EWMA of the Realized Average of the daily portfolio returns

σ is the EWMA estimate of the Realized Volatility of the daily portfolio returns

l is the EWMA smoothing parameter (0.94)

$w^{(i)}$ is the Weight of the ith Securities Component after the latest Reweighting Date

Calculation of the Index Level

On each Index Business Day from but excluding the immediately preceding Reweighting Date to and including the next following Reweighting Date, the "**Index Level**" for the Index will be determined as follows:

$$I_t = I_{t-1}\left(1 - Fee\frac{d_t - d_{t-1}}{365}\right)\left(\frac{\sum_1^{10}\frac{w^{(i)}S_t^{(i)}}{S_0^{(i)}}}{\sum_1^{10}\frac{w^{(i)}S_{t-1}^{(i)}}{S_0^{(i)}}}A_{t-1} + \left(1 + r_{t-1}^{ON}\frac{d_t - d_{t-1}}{365}\right)(1 - A_{t-1})\right)$$

$$= I_{t-1}\left(1 - Fee\frac{d_t - d_{t-1}}{365}\right)\left(\frac{\sum_1^{10} w^{(i)}\left(1 + ret_t^{(i)}\right)}{\sum_1^{10} w^{(i)}\left(1 + ret_{t-1}^{(i)}\right)}A_{t-1} + \left(1 + r_{t-1}^{ON}\frac{d_t - d_{t-1}}{365}\right)(1 - A_{t-1})\right)$$

Where:

t is the Index Business Day on which the Index Level is being determined

t-1 is the Index Business Day immediately preceding Index Business Day t

I_t is the Index Level on Index Business Day t

I_{t-1} is the Index Level on the Index Business Day immediately preceding Index Business Day t

Fee is the annual fee (2.5%)

$d_t - d_{t-1}$ is the number of days between Index Business Day t and the previous Index Business Day $t-1$

$w^{(i)}$ is the Weight of the ith Securities Component after the latest Reweighting Date

$S_t^{(i)}$ is the closing level of the ith Securities Component on day t

$S_0^{(i)}$ is the closing level of the ith Securities Component on the latest Reweighting Date

A_{t-1} is the Daily Exposure Factor on the previous Index Business Day $t-1$

r_{t-1}^{ON} is the Canadian overnight repo rate average for Index Business Day $t-1$

$ret_t^{(i)} = (S_t^{(i)} - S_0^{(i)}) / S_0^{(i)}$ is the ith Securities Component return from the latest Reweighting Date to Index Business Day t

The Index Level on any Index Business Day given by this formula reflects the following calculation steps:

1. The **Index Fee** on such Index Business Day will be 2.50% multiplied by the number of calendar days from but excluding the immediately preceding Index Business Day to and including such Index Business Day and divided by 365 with the result being multiplied by the Index Level on the previous Index Business Day;
2. The **Index Level Net of the Fee** on the previous Index Business Day will be the Index Level on the previous Index Business Day less the Index Fee on such Index Business Day;
3. The **Securities Component Return** for each Securities Component on each Index Business Day will be the Closing Level of the Securities Component on such Index Business Day less the Closing Level of the Securities Component on the immediately preceding Reweighting Date, divided by the Closing Level of the Securities Component on the immediately preceding Reweighting Date;
4. The **Relative Weighted Securities Component** for each Securities Component on such Index Business Day will be such Securities Component's Securities Component Return on such Index Business Day plus one with such sum being multiplied by the Weight assigned to such Securities Component on the immediately preceding Reweighting Date;
5. The **Gross Relative Securities Component** on such Index Business Day will be the sum of the Relative Weighted Securities Components for all Securities Components on such Index Business Day;
6. The **Gross Securities Component Quotient** on such Index Business Day will be the ratio of the Gross Relative Securities Component on such Index Business Day to the Gross Relative Securities Component on the previous Index Business Day multiplied by the Daily Exposure Factor determined as of the previous Index Business Day;
7. The **Gross Cash Component Return** on such Index Business Day will be the published Canadian Overnight Repo Rate on the previous Index Business Day multiplied by the number of calendar days from but excluding the immediately preceding Business Date to and including such Index Business Day with the result being divided by 365;
8. The **Gross Cash Component Quotient** on such Index Business Day will be (one plus the Gross Cash Component Return) multiplied by (one minus the Daily Exposure Factor); and
9. The **Index Level** on such Index Business Day will be the Index Level Net of the Fee on such Index Business Day multiplied by the sum of (a) the Gross Securities Component Quotient and (b) the Gross Cash Component Quotient on such Index Business Day, rounded to two decimal places.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