BlackRock

BlackRock ESG U.S. 5% Index ER Methodology

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PRODUCED AND MAINTAINED BY:
BLACKROCK INDEX SERVICES, LLC

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Introduction

The BlackRock ESG U.S. 5% Index ER (the "Index") measures the extent to which the performance of a diversified multi-asset weighted basket of up to four Exchange-Traded Funds (one Equity ETF and three Fixed Income ETFs) and a Cash Constituent, outperforms the sum of the Return on the notional Interest Rate, which is a rate equal to Fed Funds Effective Rate, plus an Index Fee of 0.50 % per annum, in each case accruing daily on an Act/360 basis, subject to a given Target Volatility level. A Volatility Control overlay is used to adjust into or out of risky assets with the objective of stabilizing the Index's Return.

The Index includes the following features:

- The Equity ETF provides exposure to large- and mid-cap U.S. stocks with favorable environmental, social and governance (ESG) practices. It consists of the iShares ESG Aware MSCI USA ETF (ESGU).
- The three Fixed Income ETFs provide exposure to U.S. Treasury bonds with short-term (1-3 years), medium-term (7-10 years) and long-term (20+ years) tenors. A Rates Momentum Signal is used to reduce exposure to the latter two ETFs when medium-term rates demonstrate unfavorable momentum. The three Fixed Income ETFs are:
    - iShares 1-3 Year Treasury Bond ETF (SHY);
    - iShares 7-10 Year Treasury Bond ETF (IEF); and
    - iShares 20+ Year Treasury Bond ETF (TLT)
- The allocations to the Equity ETF, the Fixed Income ETFs and the Cash Constituent are determined on each Business Day according to the following Volatility Control procedure:
    - First, an optimization process determines the weights of the Equity ETF and Fixed Income ETFs necessary to reach a 5% expected risk, subject to exposure caps placed on the longer tenor Treasury bond ETFs (IEF and TLT).
    - Second, to the extent that the historically realized volatility of a three-asset portfolio consisting of the Equity ETF (ESGU) and the two longer tenor Fixed Income ETFs (IEF and TLT), with relative weights described in the prior step, differs from the Target Volatility (and using a volatility forecast more responsive than that used in the previous step), the Index adjusts the weight of the iShares 1-3 Year Treasury Bond ETF (SHY) to more closely match the 5% Target.
    - Lastly, in the unlikely event the forecast volatility of the four-asset portfolio exceeds the 5% Target Volatility, the Index will match the Target Volatility by allocating a fraction of the ETF constituent weights to a CASH Constituent.

Index Constituents are comprised of iShares® ETFs which may provide liquid, transparent and cost-effective building blocks that can be used in working toward the target objectives.

For additional Governance and Methodology details including usage and licensing opportunities for the BlackRock Indices, please contact BLKIndexServices@blackrock.com.

Definitions

Act/360 – Means the actual number of days in the relevant accrual period divided by 360.

Backfill Convention – With respect to any timeseries whereby a minimum of N periods required is specified, the first N-1 values of such timeseries shall be equal to the N-th value of such timeseries.

Business Day - Refers to a day when the New York Stock Exchange is open for regular trading.

Cash Constituent - Is intended to express the notional Returns accruing to a hypothetical investor from an investment in a notional money market account denominated in U.S. dollars that accrues interest at a rate determined by reference to the Interest Rate, according to the Act/360-day count convention.

Closing Price – With respect to an Index Constituent means the closing price for such Index Constituent as reported on its Exchange, or its successor.

ETF Daily Return – The daily Return R_t of an ETF is defined as:

$$R_t = \frac{L_t - L_{t-1} + D_t}{L_{t-1}}$$

Where:

L_t is the ETF Closing Price with respect to Business Day t

D_t is the ETF Gross cash dividend with respect to Business Day t

ETF Volatility – The ETF Volatility is used in the calculations of the Alphas associated with Stage 1 of the Volatility Control. It is defined as the latest available value from the 20-day Half-Life Exponentially Weighted Moving Volatility timeseries of ETF daily Returns, with at least 10 periods required, according to the Backfill Convention.

Exchange – Means the primary exchange on which shares of an ETF are listed.

Excess Return - Total Return minus the sum of (i) the notional Interest Rate and (ii) the Index Fee, in each case compounded on a daily basis.

Exponentially Weighted Moving Average ("EWMA") – Backward-looking average value for each point of a time series, where a Half-Life is applied to weight the more recent values more heavily and the older values less so. The Exponentially Weighted Moving Average of timeseries X with a Half-Life HL is a timeseries of same dimension, denoted EWMA (X) and is calculated as:

$$EWMA^{HL}(X)_t = \frac{\sum_{i=1}^{t} \beta_{t,i} X_i}{\sum_{i=1}^{t} \beta_{t,i}}$$

$$\beta_{t,i} = \left(\frac{1}{2}\right)^{\frac{t-i}{HL}}$$

Where:

t: is the t-th position within timeseries EWMA(X)

X_i : is the i-th element of timeseries X

HL : is the specified Half-Life used in number of Business Days. The Index uses 22 days per month and 252 days per year when the Half-Life is specified in months or years.

In instances where it is specified that "at least N periods required according to the Backfill Convention", the first N-1 elements of $EWMA^{HL}(X)$ are then set to $EWMA^{HL}(X)_N$.

Exponentially Weighted Moving Covariance Matrix – i-by-j matrix where the element on the i-th row and j-th column is the Exponentially Weighted Moving Covariance of the i-th and j-th arguments with the specified Half-Life.

Exponentially Weighted Moving Covariance ("EWMC") – Backward-looking covariance value for each point of a time series, where a Half-Life is applied to weight the more recent values more heavily and the older values less so. The Exponentially Weighted Moving Covariance of timeseries X and Y with a Half-Life HL is a timeseries of same dimension, denoted $EWMC^{HL}(X,Y)$ and is calculated as:

$$For\ t > 1 \qquad EWMC^{HL}(X,Y)_t = \frac{EWMA^{HL}(XY)_t - EWMA^{HL}(X)_t \times EWMA^{HL}(Y)_t}{D} \times N$$

$$EWMC^{HL}(X,Y)_1 = EWMC^{HL}(X,Y)_2$$

With:

$$D = 1 - \frac{v_2}{v_1^2}$$

$$and \quad \beta_{t,i} = \left(\frac{1}{2}\right)^{\frac{t-i}{HL}} \qquad v_2 = \sum_{i=1}^{t} \beta_{t,i}^2 \qquad v_1 = \sum_{i=1}^{t} \beta_{t,i}$$

Where:

t: is the t-th position within timeseries $EWMC^{HL}(X,Y)$
N: is the number of observations per year associated with X and Y (i.e., 252 for daily Return observations).
HL: is the Half-Life

Exponentially Weighted Moving Volatility ("EWMV") – Backward-looking standard deviation value for each point of a time series, where a Half-Life is applied to weight the more recent values more heavily and the older values less so. The Exponentially Weighted Moving Volatility of timeseries X, $EWMV^{HL}(X)$ with a Half-Life HL is a timeseries of same dimension, denoted $EWMV^{HL}(X)$, calculated as:

$$EWMV^{HL}(X) = \sqrt{EWMC^{HL}(X,X)}$$

Final Index Daily Weights – Include the Index Equity ETF Daily Weight, the Index Fixed Income ETFs Daily Weights and the weight of the Cash Constituent. Together, they sum to 1.

Fixed Income ETF Target Exposure Caps – Calculated daily and based on the state of the Rates Momentum Signal, the Target Exposure Caps feed into the calculation of the maximum weight assignable to each of the Fixed Income ETFs during Stage 1 of the Volatility Control Procedure.

Fixed Income ETF Exposure Caps – Calculated daily, the Fixed Income Target Exposure Caps are converted into the Fixed Income Exposure Caps through application of a smoothing procedure. The smoothing procedure ensures that day-over-day changes are implemented over multiple Business Days as opposed to all at once.

The Fixed Income ETF Exposure Caps represent the maximum weight assignable to each of the Fixed Income ETFs during Stage 1 of the Volatility Control Procedure.

Half-Life – The number of periods required for the weight used in the exponentially weighted moving calculations to decrease by half.

Index Administrator - Means BlackRock Index Services, LLC being the entity responsible for the production and maintenance of this Methodology and the administration and calculation of the Index.

Index Constituents - Means each of the ETFs and the Cash Constituent.

Index Equity ETF Daily Weight – The weight in the Final Index Daily Weights that corresponds to the Equity ETF.

Index Fee - Is equal to 0.50%. This fee is per annum and deducted from the Index value using the Act/360-day count convention.

Index Fixed Income ETFs Daily Weights – The subset of weights in the Final Index Daily Weights that correspond to the Fixed Income ETFs.

Index Subscriber - Is a person or entity that licenses Index determination services from the Index Administrator and hence is the licensee of the Index.

Index Website - Accessed via https://www.blackrock.com/investing/products/blackrock-index-services (and may be updated by the Index Administrator from time to time).

Data Start Date ("IDSD") – 1 June 2018

Interest Rate - Fed Funds Effective Rate or any successor rate should such rate be discontinued, as determined by the Index Administrator. If it is determined that there is an industry accepted successor rate, the Index Administrator will present this to ISGCo for approval and use going forward. Should the successor rate not have equivalent economic value than Fed Funds Effective Rate, the Index Administrator would then make an adjustment for such rate used to have equivalent value to Fed Funds Effective Rate, provided that if the Index Administrator determines that there is an industry accepted adjustment, the Index Administrator will present this to ISGCo for approval and use going

forward. The Interest Rate is per annum and deducted from the Index value using the Act/360-day count convention.

Market Disruption Events - Occurs when data is not sufficiently available or able to accurately and reliably represent the market or economic reality. Additional details are available upon request in the Error and Event Handling Policy document.
Mean-Variance Optimization – An optimization that allocates weights to assets using the trade-off between risk and Return. The Index uses in-house software that may yield different results from other software, commercial or open-source.

Rates Momentum Signal – Seeks to measure momentum in Interest Rates as observed through U.S. Treasury bond Returns. Computed daily, the Rates Momentum Signal feeds into the calculation of the Fixed Income ETF Exposure Caps applied at Stage 1 of the Volatility Control procedure.

Fixed Income ETF Exposure Caps for the medium-term and long-term Treasury bonds ETFs are increased (decreased) when the Rates Signal Reference Asset demonstrates strong (weak) recent performance relative to a one-year average.

Rates Signal Reference Asset – The medium-term US Treasury bond ETF (IEF). The Rates Signal Reference Asset is used in the calculation of the Rates Momentum Signal.

Return – Calculated as the relative change in levels between two time periods, expressed in units of 1 (i.e., 0.01 corresponds to a 1% change).

Signal – A raw insight into the performance of an asset that feeds into the calculation of the index weights.

Target Volatility – is 5% for the Index.

Volatility Control - The daily multi-step volatility control overlay applied to achieve the Target Volatility.

Index Objective

The objective of the BlackRock ESG U.S. 5% Index ER (the "Index") is to offer exposure to the iShares ESG Aware MSCI USA ETF subject to a 5% Target Volatility. The index manages to the Target Volatility by incorporating Fixed Income US Treasury iShares® ETFs and a Cash Constituent.

The Index tracks the Return of the weighted ETFs and any Cash Constituent, above the sum of the Return on the Interest Rate and the Index Fee.

Index ETF Constituents

This Index is composed of U.S. listed iShares Exchange-Traded Funds (each an "ETF" and together, the "ETFs") that are managed, distributed and sponsored by subsidiaries of BlackRock, Inc. The Index Services Governance Committee ("ISGCo") has been established by BlackRock, Inc. to provide independent oversight of the Index Administrator in accordance with the International Organization of Securities Commissions Principles on Financial Indexes ("IOSCO Principles").

The iShares® ETFs comprising the Index are:

Equity ETF

- ESGU - iShares ESG Aware MSCI USA ETF

Fixed Income ETFs (each a "Fixed Income ETF" and together the "Fixed Income ETFs")

- SHY – iShares 1-3 Year Treasury Bond ETF
- IEF – iShares 7-10 Year Treasury Bond ETF
- TLT – iShares 20+ Year Treasury Bond ETF

The index also includes a Cash Constituent, which earns a Return based on a notional Interest Rate. The notional Interest Rate is set equal to Effective Federal Funds Rate.

Index Construction

On a daily basis, to achieve the Target Volatility of 5%, the allocations to the Equity ETF, the Fixed Income ETFs and the Cash Constituent are adjusted through application of a Volatility Control procedure. An input to the Volatility Control procedure is the Fixed Income ETF Exposure Caps. The Exposure Caps are computed daily based on the state of the Rates Momentum Signal.

Rates Momentum Signal

The Rates Momentum Signal measures momentum in Interest Rates as observed through U.S. Treasury bond Returns. The signal feeds into the calculation of the Fixed Income ETF Exposure Caps which are required during Stage 1 of the Volatility Control procedure.

The iShares 7-10 Year Treasury Bond ETF (IEF) is the reference asset for the Rates Momentum Signal (the "Rates Signal Reference Asset").

On each Business Day, the Rates Momentum Signal is computed as follows:

1. An implied Rates Signal Reference Asset level (the "Implied Rates Signal Reference Asset Level") timeseries is computed from the Rates Signal Reference Asset daily Return timeseries, starting on the Initial Data Start Date:

$$L_{IDSD}^{RSRA} = 0$$

$$for\ t > IDSD \qquad L_t^{RSRA} = \prod_{i=2}^{i=t}(1 + R_i^{RSRA}) - 1$$

Where:

L_{IDSD}^{RSRA} is the Implied Rates Signal Reference Asset Level on the t=1 Initial Data Start Date

L_t^{RSRA} is the Implied Rates Signal Reference Asset Level on Business Day t

R_i^{RSRA} is the Rates Signal Reference Asset Return for Business Day i with

$$R_i^{RSRA} = \frac{P_i^{RSRA} - P_{i-1}^{RSRA} + D_i^{RSRA}}{P_{i-1}^{RSRA}}$$

P_i^{RSRA} is the Rates Signal Reference Asset Closing Price for Business Day i

D_i^{RSRA} is the Rates Signal Reference Asset Gross cash dividend with respect to Business Day i

2. From and including the Initial Data Start Date and for each following Business Day t, a rates momentum signal (the "Rates Momentum Signal") on the Implied Rates Signal Reference Asset Level is calculated as follows:

$$RMS_t^{RSRA} = \begin{cases} 1 & if\ IDSD \le t \le IDSD + 9 \\ v\left(10 - \sum_{i=t-9}^{t} u(LA_{i-1}^{RSRA} - L_i^{RSRA})\right) & if\ t > IDSD + 9 \end{cases}$$

$$LA_t^{RSRA} = \frac{\sum_{i=\max(1,t+1-252)}^{i=t} L_i^{RSRA}}{\min(t, 252)}$$

$$u(x) = 0\ if\ x \le 0\ and + 1\ otherwise$$

$$v(x) = +1\ if\ x \ne 0\ and - 1\ otherwise$$

Where:

$IDSD$ refers to the Initial Data Start Date

RMS_t^{RSRA} is the Rates Momentum Signal on Business Day t

L_i^{RSRA} is the Implied Rates Signal Reference Asset Level on Business Day i

Fixed Income ETF Target Exposure Caps

Used as an input to Stage 1 of the Volatility Control procedure, the Fixed Income ETF Target Exposure Caps are designed to reduce the Index's allocation to Fixed Income ETFs when the outlook for Interest Rates, as measured by the Rates Momentum Signal, indicates the environment for bond investing is adverse.

On the Initial Data Start Date, the Fixed Income ETF Exposure Caps are set to 20% for the iShares 20+ Year Treasury Bond ETF (TLT), 30% for the iShares 7-10 Year Treasury Bond ETF (IEF), and 100% for the iShares 1-3 Year Treasury Bond ETF (SHY).

Thereafter, on any Business Day t following the Initial Data Start Date

a. If the Rates Momentum Signal on the Business Day immediately preceding Business Day t is equal to +1, then the Target Exposure Caps are set to 20% for the iShares 20+ Year Treasury Bond ETF (TLT), 30% for the iShares 7-10 Year Treasury Bond ETF (IEF) and 100% for the iShares 1-3 Year Treasury Bond ETF (SHY):

$$ExpCap_t^{SHY,T} = 1$$
$$ExpCap_t^{IEF,T} = 0.3$$
$$ExpCap_t^{TLT,T} = 0.2$$

b. Otherwise, the Target Exposure Caps are set to 0% for the iShares 20+ Year Treasury Bond ETF (TLT), 15% for the iShares 7-10 Year Treasury Bond ETF (IEF) and 100% for the iShares 1-3 Year Treasury Bond ETF (SHY):

$$ExpCap_t^{SHY,T} = 1$$
$$ExpCap_t^{IEF,T} = 0.15$$
$$ExpCap_t^{TLT,T} = 0$$

As a result, if on each of ten consecutive Business Days, the Implied Rates Signal Reference Asset Levels are below the Rates Signal Reference Asset's one-year average (measured, with respect to each of the ten Business Days, based on the arithmetic average of Implied Rates Signal Reference Asset Levels for the 252 Business Days preceding the relevant Business Day), the Target Exposure Caps for IEF and TLT are tightened.

Fixed Income ETF Exposure Caps

For each Fixed Income ETF, the Target Exposure Caps are converted to Exposure Caps through application of a smoothing procedure. The procedure seeks to reduce the potential for large, abrupt changes in weights by distributing the change in exposure cap over multiple Business Days.

With respect to a Business Day t, the Fixed Income ETF Exposure Cap is equal to:

- On the Initial Data Start Date:

$$ExpCap_{IDSD}^{FI} = ExpCap_{IDSD}^{FI,T}$$

- If Business Day t is after the Initial Data Start Date then:

$$ExpCap_t^{FI} = \frac{\sum_{i=\max(1,t+1-5)}^{i=t} ExpCap_i^{FI,T}}{\min(t,5)}$$

Where:

$ExpCap_i^{FI,T}$: is the Target Exposure Cap for the relevant Fixed Income ETF on the Business Day i

Note the Fixed Income Exposure Caps only apply to Stage 1 of the Volatility Control procedure. As a result, the Fixed Income ETF Final Index Daily Weights may exceed these caps from time to time based on adjustments made in Stage 2 of the Volatility Control procedure.

Volatility Control

With respect to Business Day t, the daily Volatility Control procedure occurs in multiple stages.

Stage 1

a. Build the 4-by-4 20-day Half-Life Exponentially Weighted Moving Covariance Matrices $C_{20}(t)$ of the ESGU, SHY, IEF and TLT daily Returns timeseries starting on the Initial Data Start Date and ending on Business Day t.

   $C_{20}(t)$ require a minimum of 10 daily Returns in its calculation and for 1 <= t <=9, $C_{20}(t)$ is set to $C_{20}(10)$.

b. Compute $Alpha(t)^{VC}$ for ESGU, SHY, IEF and TLT using scores of 1, 0, 0.4 and 0.45:

$$Alpha(t)^{VC} = Score^{VC} \times \sigma(t)^{VC} \times IC$$

$IC = 0.10$ is the Information Coefficient

$\sigma(t)^{VC}$ is the ETF Volatility for Business Day t

$$VC = \{\text{ESGU}, \text{SHY}, \text{IEF}, \text{TLT}\}$$

   The ETF scores shown above express a risk-adjusted return preference for ESGU, followed by TLT, IEF and then SHY.

c. Using the Covariance Matrix from step a, the Alphas from step b, and the Fixed Income Exposure Caps calculated previously, compute an initial set of target weights for each of the 4 assets by solving the following optimization:

$$Maximize\ (h'\alpha)$$

$$Subject\ to:$$

$$The\ sum\ of\ the\ h\ weights\ equals\ 1$$
$$The\ upper\ and\ lower\ bounds\ on\ h\ weights$$
$$0 \le h^{ESGU} \le 1$$
$$0 \le h^{SHY} \le ExpCap(t)^{SHY}$$
$$0 \le h^{IEF} \le ExpCap(t)^{IEF}$$
$$0 \le h^{TLT} \le ExpCap(t)^{TLT}$$
$$The\ annualized\ risk\ forecast\ h'C_{20}(t)h\ equals\ 5\%^2$$

   Where:

   h is the 4-by-1 matrix of the ESGU, SHY, IEF and TLT weights

   h' is the transpose of h, a 1-by-4 matrix

   α is the 4-by-1 matrix of Alphas calculated in Step b

   $C_{20}(t)$ is the 4-by-4 Daily Covariance Matrix calculated in Step a

   $ExpCap(t)^{FI}$ is the Exposure Cap for each Fixed Income ETF

   If a feasible solution to this optimization cannot be found, the target volatility at this stage is iteratively increased in increments of 0.1% until an optimal solution is found.

Stage 2

a. From the weights obtained in Stage 1, create a new basket that includes ESGU, IEF and TLT but excludes SHY. This basket is hereafter referred to as the Risky Asset ("RAS"). The weights of each asset within RAS are:

$$w_{t+1}^{i} = \frac{h_{t+1}^{i}}{h_{t+1}^{ESGU} + h_{t+1}^{IEF} + h_{t+1}^{TLT}}$$

where h_{t+1}^{i} are the weights obtained in Stage 1c.

b. Using the weights obtained in Step 2a, calculate the timeseries of RAS Returns from the Initial Data Start Date to Business Day t

c. Compute the 10-day Half-Life Exponentially Weighted Moving Variances σ_{RAS}^2 and σ_{SHY}^2 and Covariance $\sigma_{RAS,SHY}$ of the RAS and SHY daily Returns timeseries starting on the Initial Data Start Date and ending on Business Day t using the following recursive equations:

$$\sigma_{RAS}^2(0) = 0.0075$$

$$\sigma_{SHY}^2(0) = 0.00025$$

$$\sigma_{RAS,SHY}(0) = 0$$

$$\sigma_{RAS}^2(\theta) = \lambda\sigma_{RAS}^2(\theta - 1) + (1 - \lambda){R_{\theta}^{RAS}}^2$$

$$\sigma_{SHY}^2(\theta) = \lambda\sigma_{SHY}^2(\theta - 1) + (1 - \lambda){R_{\theta}^{SHY}}^2$$

$$\sigma_{RAS,SHY}(\theta) = \lambda\sigma_{RAS,SHY}(\theta - 1) + (1 - \lambda)R_{\theta}^{RAS}R_{\theta}^{SHY}$$

Where:

$$0 < \theta \leq t$$

$$\lambda = e^{\frac{-\log(2)}{10}}$$

$\sigma_{RAS}^2(\theta)$ is the 10-day Half-Life Exponentially Weighted Moving Variance of the daily Returns of RAS on Business Day θ

$\sigma_{SHY}^2(\theta)$ is the 10-day Half-Life Exponentially Weighted Moving Variance of the daily Returns of SHY on Business Day θ

$\sigma_{RAS,SHY}(\theta)$ is the 10-day Half-Life Exponentially Weighted Moving Covariance of the daily Returns of RAS and SHY on Business Day θ

d. Construct the RAS and SHY two-asset basket with Target Volatility of 5% by solving the following system of equations:

$$w_{RAS}^2\sigma_{RAS}^2(t) + w_{SHY}^2\sigma_{SHY}^2(t) + 2w_{RAS}w_{SHY}\sigma_{RAS,SHY}(t) = \sigma_{Target}^2$$

$$w_{RAS} + w_{SHY} = 1$$

$$0 \leq w_{RAS}, w_{SHY} \leq 1$$

Where:

w_{RAS} is the RAS weight in effect between close of Business Day t+1 and close of Business Day t+2

w_{SHY} is the SHY weight in effect between close of Business Day t+1 and close of Business Day t+2

σ^2_{Target} is the target variance, equal to (5%/yr)^2

This system of equations has two sets of solutions:

$$w^{\pm}_{RAS} = \frac{-b \pm \sqrt{d}}{2a}$$

$$w_{SHY} = 1 - w_{RAS}$$

With

$$a = \sigma^2_{RAS} + \sigma^2_{SHY} + -2\sigma_{RAS,SHY}$$

$$b = 2\sigma_{RAS,SHY} - 2\sigma^2_{SHY}$$

$$c = \sigma^2_{SHY} - \sigma^2_{Target}$$

$$d = b^2 - 4ac \quad if \quad b^2 > 4ac \quad and \quad d = 0 \quad if \quad b^2 \leq 4ac$$

If $0 < w^+_{RAS} = \frac{-b+\sqrt{d}}{2a} \leq 1$ then the RAS basket weight w_{RAS} = w^+_{RAS} and w_{SHY} = $1 - w_{RAS}$

If $w^+_{RAS} = \frac{-b+\sqrt{d}}{2a} > 1$ then the RAS basket weight w_{RAS} = 1 and w_{SHY} = 0

If $w^+_{RAS} = \frac{-b+\sqrt{d}}{2a} < 0$ then the RAS basket weight w_{RAS} = 0 and w_{SHY} = 1

e. Using the weights obtained in 2d, compute the risk of the intermediate portfolio I:

$$\sigma_I(t) = \sqrt{w^2_{RAS}\sigma^2_{RAS}(t) + w^2_{SHY}\sigma^2_{SHY}(t) + 2w_{RAS}w_{SHY}\sigma_{RAS,SHY}(t)}$$

The final allocations for the Cash Constituent, SHY and RAS basket are:

$$h^{CASH}_{t+1} = (1 - A(t))$$
$$h^{SHY}_{t+1} = A(t) * w_{SHY}$$
$$h^{RAS}_{t+1} = A(t) * w_{RAS}$$

With:

$$A(t) = min\left(1, \frac{\sigma_{Target}}{\sigma_I(t)}\right)$$

And where:

σ_{Target} is the Target Volatility set at 5%

It should be noted that under normal market conditions, the SHY and RAS basket weights determined in step 2d will result in a forecast volatility that matches the 5% Target Volatility, and thus the CASH constituent allocation h^{CASH}_{t+1} will normally be zero.

Stage 3

The Final Index Daily Weights for ESGU, IEF, TLT and the Cash Constituent effective at the close of Business Day t+1 are obtained by multiplying the Step 2a weights w_{t+1}^{i} by the h_{t+1}^{RAS} calculated in step 2e:

$$h_{t+1}^{ESGU} = w_{t+1}^{ESGU} * h_{t+1}^{RAS}$$

$$h_{t+1}^{IEF} = w_{t+1}^{IEF} * h_{t+1}^{RAS}$$

$$h_{t+1}^{TLT} = w_{t+1}^{TLT} * h_{t+1}^{RAS}$$

The Final Index Daily Weights for SHY and the Cash Constituent effective at the close of Business Day t+1 are the SHY and Cash allocations computed in step 2e:

$$h_{t+1}^{SHY} = h_{t+1}^{SHY}$$

$$h_{t+1}^{CASH} = h_{t+1}^{CASH}$$

Lastly, the Final Index Daily Weights are rounded to the nearest 6th decimal place. If their sum altogether doesn't add up to 100%, then the difference is added to or subtracted from the constituent with the largest weight.

Data Sources

Data Provider	Data Point
Refinitiv	• ETF prices, Returns and cash dividends • Interest Rate

Index Maintenance & Publication

The inception date of the Index is January 25, 2021, when the base Index level was set to 1000. Index values are calculated once every Business Day at the close of the applicable Business Day. The Index value is calculated in U.S. dollars and published to the second decimal place.

Dividend Reinvestment

- ETF Dividends – The Index assumes ETF dividends are reinvested back into the index after the close of trading on the ex-dividend date.
- ETF Share Split – Index shares are multiplied by the split factor. Price is divided by the split factor.

Index Rebalance Timeline

The Volatility Control is computed daily to yield Index Daily Weights. These weights are implemented in the final Index holdings on a one Business Day lag.

Index Calculations

The Index is calculated based on the Excess Return of the constituents versus the sum of the Cash Constituent and the Index Fee. The Excess Return Index calculation is:

$$R^{e}(t) = \left(\sum_{i=1}^{n}\left[\left(\frac{P_i(t) + D_i(t)}{P_i(t-1)} - 1\right) \times h_i(t-1)\right] + R_c(t) \times h_C(t-1)\right) - R_c(t) - I(t)$$

where:

$R^{e}(t)$ = Excess Return from close of day t − 1 to close of day t.

n = Number of ETFs in the index

$P_i(t)$ = Closing Price of the i^{th} ETF at close of day t, as provided by the Data Source

$D_i(t)$ = Gross cash dividends on the i^{th} ETF in day t, as provided by the Data Source

$P_i(t-1)$ = Closing Price of the i^{th} ETF at close of day t − 1, as provided by the Data Source

$h_i(t-1)$ = Final Index Daily Weight on the i^{th} ETF effective at close on day t − 1

$R_c(t)$ = Return on the Cash Constituent from day t − 1 to day t

$h_C(t-1)$ = Cash Constituent Daily Weight effective at close on day t − 1

$I(t)$ = Index Fee accrued from day t − 1 to day t

t = Business Day on which the Index is calculated

The Interest Rate uses the Act/360-day count convention.

The Return on Cash from day t-1 to day t is:

$$R_c(t) = \frac{EFFR(t-1) \times ACT(t-1,t)}{100 \times 360}$$

Where:

$EFFR(t-1)$ = Effective Federal Funds Rate on day t − 1 and published on day t at approximately 9: 00 a. m

$ACT(t-1,t)$ = Number of calendar days between the close of Business Day t − 1 and the close of Business Day t

The Index Fee from day t-1 to day t is:

$$I(t) = \frac{I_F \times ACT(t-1,t)}{100 \times 360}$$

Where:

I_F = 0.5 is the 50bp Annual Index Fee

$ACT(t-1,t)$ = Number of calendar days between the close of Business Day t − 1 and the close of Business Day t

The Index level will be calculated using the Closing Price for each Index Constituent on its Exchange, or its successor. The Index level for a given Business Day will be computed and published after market close using the following formula:

$$Index\ (t) = \left(1 + \ R^e(t)\right) * Index\ (t-1)$$

In the event of half trading days, the Index level will be calculated in the same way as a full trading day where the Closing Price is used.

Governance

For additional Governance and Methodology details including usage and licensing opportunities for the BlackRock Indices, please contact BLKIndexServices@blackrock.com.

Appendix

1. **New York Stock Exchange –** The Indices will follow the schedule which can be obtained on https://www.nyse.com/markets/hours-calendars.
2. **Index Methodology Changes**

   The indices follow a rules-based methodology and more details pertaining to the Methodology Change Policy can be made available upon request.
3. **Error Correction Process**

The Error and Event Handling Policy can be made available upon request.

4. Index Complaints

Complaints can be submitted, which seek clarity or proposed action relating to

- Index determination process
- Application of the methodology
- Market conditions or other changes impacting the index strategy

Complaints regarding the index must be submitted via email to BLKIndexServices@BlackRock.com

The complaint must include the:

1. The name of the Index;
2. The date of the issue;
3. A detailed description of how the issue impacts the Index;
4. Suggested turnaround time to resolve the issue to denote the priority of the matter.

5. Index Cessation

Index Cessation Policy can be made available upon request

Disclaimer

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