

December 2021

The S-Network BlackSwan Tech & Treasury Index (QSWNXT)

**Index Rules and Methodology**

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## **The S-Network BlackSwan Tech & Treasury Index (QSWNXT)**

### **Official Rule Book**

#### **I. General Description**

The S-Network BlackSwan Tech & Treasury Index (Ticker: QSWNXT) holds treasuries and long-dated call options (LEAPs) on the Invesco QQQ ETF Trust (QQQ). The index seeks to realize capital appreciation in line with the performance of QQQ while avoiding substantial capital drawdowns.

On each rebalancing date, the index places 90% of its index market capitalization in treasuries and 10% in QQQ LEAP call options. Treasury weighting is determined by the option reconstitution schedule.

The treasury portion of the portfolio replicates and maintains the initial duration of the 10-Year US Treasury. The option portion holds 5% of index market capitalization in June 70-delta QQQ call options and 5% in December 70-delta QQQ call options. Initially and at rebalance date, calls that are purchased should all have at least one year plus one day until expiration when available. Otherwise, the contract with the furthest expiration is purchased for the given month. The 70-delta rule only applies to initial purchases on the rebalance date. Should there not be a 70-delta option, the closest option above 70 will be utilized. On any given rebalance date, the non-traded tranche of options will not be trimmed/added to or rebalanced back to 70-delta calls.

#### **II. The Index Committee**

The QSWNXT Index Committee (“The Committee”) will be composed of no less than three members. The Committee Chairman will have extensive experience with and expertise in US equity markets. The other members will have experience in indexes and/or financial products.

The Committee will be responsible for overseeing the activities of the calculation agent and approving all changes to the index related to its semi-annual reconstitutions and quarterly rebalances.

The Committee meets quarterly, either in person or via teleconference, to discuss index issues and organize the semi-annual reconstitutions and quarterly rebalances.

The composition of the Committee may, from time to time, be changed to reflect changes in market conditions.

All members of the index committee and their advisors shall comply with S-Network Global Indexes’ code of conduct and ethics with respect to the disclosure and use of material non-public information.

### III. Index Value at Inception

The S-Network BlackSwan Tech & Treasury Index (Ticker: QSWNXT) had a value of 1000 on its inception date of June 7, 2021. QSWNXT is calculated on a Total Return basis.

### IV. Eligibility Criteria, Stock Selection, and Weighting

The QSWNXT Index holds a portfolio of US Treasury notes and bonds that targets the modified duration of the 10-year Treasury bond. In addition, the QSWNXT Index holds June and December QQQ LEAP options in a notional amount equal to the capitalization of the QSWNXT Index.

The Treasury portion of the QSWNXT Index uses a barbell approach to fix its duration. The Treasury portion of the QSWNXT Index is made up of two parts:

- a. The Core Portfolio (95% of the Treasury portion's weight), which is rebalanced semi-annually in conjunction with the reconstitution of the LEAP option positions. The Core Portfolio's duration is set to match that of the 10-year Treasury on the date of the semi-annual reconstitution. The Core Portfolio is made up of 3-, 5-, 7-, 10- and 30-year Treasuries, with the 3-, 5-, 7- and 10-year notes held at equal weights and the weight of the 30-year bond adjusted up or down to either lengthen or shorten the Core Portfolio's overall duration as indicated.
- b. The Trading Portfolio (5% of the Treasury portion's weight), which is rebalanced whenever the duration of the Treasury portion of the portfolio misaligns with the duration of the 10-year maturity Treasury note by +/- 0.5 years or more. The rebalancing of the trading portfolio occurs on the second day following the duration misalignment. The Trading Portfolio is made up of the 2-year note and the 30-year bond. Their relative weights are adjusted to lengthen or shorten the duration of the Trading Portfolio, which when combined with the Core Portfolio result in the duration for the bond portion of the portfolio matching the duration of the 10-year note.

To determine the duration of the Treasury portion of the portfolio at the end of each trade date, the following steps are taken:

The formula used to calculate Modified duration is:

$$\text{Modified Duration} = \frac{\text{Macaulay's Duration}}{(1 + ytm/k)}$$

Where:

- *ytm* = yield to maturity
- *k* = compounding period (2 for treasury bonds)

The formula used to calculate Macaulay's duration is:

$$\text{Macaulay's Duration} = \sum_{i=1}^n \frac{cF}{(1 + y/k)^{kn}} + \frac{F}{(1 + y/k)^{kn}}$$

Where:

- $n$  = number of periods (maturity  $\times$  2 for treasury bonds)
- $c$  = coupon
- $F$  = face value (value at maturity)
- $y$  = yield
- $k$  = compounding period (2 for treasury bonds)

The initial weights for the core bond portfolio are calculated with the following formulas:

$$\begin{aligned} \text{average duration of core bonds} &= (MD_3 + MD_5 + MD_7 + MD_{10})/4 \\ \text{target duration} &= MD_{10} + 0.25 \\ \text{weight of 30 yr bond} &= 1 - (\text{target duration} - MD_{30})/(\text{average duration of core bonds} - MD_{30}) \\ \text{weight of each core bond} &= (1 - \text{weight of 30 yr bond})/4 \end{aligned}$$

The initial weights for the trading portfolio are calculated with the following formulas:

$$\begin{aligned} w_{30} &= (MD_2 + \text{target duration})/(MD_2 + MD_{30}) \\ w_2 &= 1 - w_{30} \end{aligned}$$

Where:

- $w_{30}$  = weight of the 30 year treasury
- $w_2$  = weight of the 2 year treasury

The modified duration of the total portfolio is calculated with the following formula:

$$\text{modified duration of bond portfolio} = \sum_{i=1}^6 w_i * MD_i$$

Where:

- $w_i$  = weight of the  $i$ th bond
- $MD_i$  = modified duration of the  $i$ th bond

LEAP call option positions are reconstituted twice per year on or around the fourth trading days of June and December. At each June reconstitution, the index liquidates its existing June LEAP call options and purchases June LEAP call options that expire the following June. The December LEAP call option position will remain unchanged at each June reconstitution.

At each December reconstitution, the index liquidates its existing December LEAP call options and purchases December LEAP call options that expire the following December. The June LEAP call option position will remain unchanged at each December reconstitution.

Net gains or losses derived from the reconstitutions of the LEAP call option position will be added to or subtracted from the treasury portfolio at each reconstitution.

Share weights will be based on "mid" prices as of the close of trading on the date two trade days prior to the effective date of the reconstitution ("The Record Date").

Prior to July 1, 2020, "ask" prices for the Treasuries were used.

## V. Rules for Reconstitutions, Rebalances, and Index Changes

The QSWNXT Index is calculated by S-Network Global Indexes, Inc. ("The Calculation Agent"). The Calculation Agent is also responsible for index maintenance and price dissemination.

**Index Changes.** The QSWNXT Index is reconstituted semi-annually on or around the fourth business day of the last month of each calendar half for half of the options. If options are at a gain, the index will rebalance at one year plus one trading day to make its gains long-term. If the one-year-plus-one-day mark occurs Wednesday or later during the expiration week, the index instead rebalances on the fourth day of the rebalance month regardless of gain/loss on the option.

**Index Reconstitutions (Option Portfolio).** The QSWNXT Index (Option Portfolio) is reconstituted semi-annually on or around the fourth business day of the last month of each calendar half. Option gains or losses on the reconstitution date are added to or taken from treasuries as needed in order for allocations to meet index requirements.

**Index Rebalances (Treasury Bond Portfolio).** The QSWNXT Index (Treasury Bond Portfolio) is rebalanced semi-annually on or around the fourth business day of the last month of each calendar half. December and June rebalances will replicate the schedule of the options reconstitution to avoid redundant trading.

**Additions and Deletions.** Additions and Deletions to the Indexes are made 1) at the close of trading on the semi-annual reconstitution date (on or around the fourth business day of the last month of each calendar half) and 2) in the event the trading portfolio is rebalanced when needed to maintain the key rate duration.

## VI. Roles of Parties in the Semi-Annual Reconstitutions

- i) The Calculation Agent will determine if the option position is at a gain or loss as of the first business day of the last month of each calendar half (the "snapshot date").
- ii) On the first business day of the last month of each calendar half, the Calculation Agent shall provide the Committee, or its designee, the performance of the option position set for reconstitution.
- iii) The Committee shall approve or reject the changes and notify the calculation agent of its decisions upon receipt of the performance on the first business day of the last month of each calendar half.

- iv) If options are at a net loss on the first trading day of the reconstitution month, the index is reconstituted on the fourth business day of trading of that reconstitution month (June or December).
- v) If options are at a gain, the index will reconstitute at one year plus one trading day to make it long-term. If the one-year-plus-one-day mark occurs on the Wednesday or after of the expiration week, the index will reconstitute on the fourth business day of the reconstitution month regardless of gain/loss on the option.
- vi) The Calculation Agent will replicate the duration of the 10-year maturity in accordance with the reconstitution schedule of the option position.
- vii) Share weights for LEAP call options are calculated using “mid” prices as of the close on the reconstitution date.
- viii) QSWNXT will post all reconstitution data on its website prior to market open on the next business day following the reconstitution date.

## **VII. Calculation and Dissemination of Index Values**

If the current day’s US Treasury yield curve rates are not available for index calculation by 5:30 PM ET, the Calculation Agent will use the latest available data.

The Calculation Agent will calculate closing values for the Total Return Index based on closing prices as reported by the relevant exchanges.

The Calculation Agent will post the following files to its FTP server prior to 7:00PM ET each trading day:

Closing Index File (CLS.SNCH) – Index constituents, closing prices, weights, share weights, and related data as of the day’s close.

Adjusted Closing Index File (ADJ.SNCH) – Index constituents, closing prices, weights, share weights, and related data as of the next trading day’s open.

Corporate Action File (SNAH) – Data related to upcoming corporate actions and allocation changes for the index constituents.

Index Values File (SNL) – Closing values for the index, including divisors.

Closing values for the Index will be transmitted to Cboe Global Indices prior to 7:00PM ET for redistribution to various vendors and providers of financial data via the Cboe Streaming Market Indices (CSMI) feed.

The Index will be calculated and disseminated in USD.

The Calculation Agent will calculate closing values for the Total Return Index based on closing prices as reported by the relevant exchanges.

### VIII. Dissemination

Index values are disseminated in US dollars via the CSMI feed using the following ticker:

<u>Index Name</u>	<u>Index Ticker</u>
S-Network BlackSwan Tech & Treasury Total Return Index	QSWNXT

Values for the Total Return Index (QSWNXT) are distributed in “real-time” – that is, in 15-second snapshots, between approximately 9:30AM (EST) and 4:30PM (EST) Monday through Friday, excluding exchange holidays.

### IX. Ongoing Maintenance

Off-The-Run Treasury Corporate Actions  
LEAP Option Corporate Actions

### X. Calculation and Adjustments

- i) Input Data Sources
- ii) Index Formula. The index is calculated using a Laspeyres formula. This formula is used for the calculation of the return index and the price index. The only difference is that the divisor  $D_t$  is different for the two indexes (return index and price index).

The index is computed as follows:

$$= \frac{\sum_{i=1}^n (p_{it} * q_{it})}{(C_t \sum_{i=1}^n (p_{i0} * q_{i0}))} * Base Index Value = \frac{M_t}{B_t} * Base Index Value$$

The above mentioned formula can be simplified as:  $Index_t = \frac{M_t}{D_t}$

Where:

- $D_t = \frac{B_t}{base\ index\ value} = \text{divisor at time (t)}$
- $n =$  the number of stocks in the index
- $p_{i0} =$  the closing price of stock  $i$  at the base date
- $q_{i0} =$  the number of shares of stock  $i$  at the base date
- $p_{it} =$  the price of stock  $i$  at time  $(t)$
- $q_{it} =$  the number of shares of stock  $i$  at time  $(t)$
- $C_t =$  the adjustment factor for the base date market capitalization
- $t =$  the time the index is computed
- $M_t =$  market capitalization of the index at time  $(t)$



$B_t$  = adjusted base date market capitalization of the index at time

Dividend payments are not taken into account in the price indexes, whereas dividend payments are reinvested in the index constituents of the Total Return Index on a proportional basis. The adjustment protects the indexes from the effects of changes in index composition and the impact of corporate actions.

- iii) Divisor Adjustments. Corporate actions affect the share capital of component stocks and, therefore, trigger increases or decreases in the index. To avoid distortion, the divisor of the index is adjusted accordingly.
- iv) Changes in the index's market capitalization due to changes in the composition (additions, deletions, or replacements), weighting (following quarterly reviews), or corporate actions (mergers, or special cash or stock distributions of other stocks) result in a divisor change to maintain the index's continuity. By adjusting the divisor, the index value retains its continuity before and after the event. For rights offerings, the Calculation Agent will price the rights during the subscription period, not before or after. Alternatively, the Calculation Agent may start pricing the rights after the ex-date and before the subscription period under the condition that the rights are priced daily.

\* Formulae for Divisor Adjustment. The following formulae will be used for divisor adjustments. (Note: No divisor adjustments are necessary for stock splits, since market capitalization does not change, and the share number and share price are adjusted prior to the opening of trading on the split's ex-date.)

$$D_{t+1} = D_t * \left( \frac{\sum(p_{it} * q_{it}) \mp \Delta MC_{t+1}}{\sum(p_{it} * q_{it})} \right)$$

Where:

$D_t$  = divisor at time (t)

$D_{t+1}$  = divisor at time (t+1)

$p_{it}$  = stock price of stock i at time (t)

$q_{it}$  = number of shares of stock i at time (t)

$\Delta MC_{t+1}$  = add new components' market capitalization and adjusted market capitalization (calculated with adjusted closing prices and shares effective at time t+1 and/or minus market capitalization of stocks to be deleted (calculated with closing prices and shares at time t))

Note: If the current trading price of an issue is unavailable, the previous trading session's closing price is used. However, if the issue is affected by any corporate action that requires an adjustment, the adjusted price is used.

- v) Computational Precision. Index values are rounded to two decimal places and divisors are rounded to integers. Any values derived by the index calculation engine from a corporate action used for the divisor adjustments, and index computations are rounded to seven decimal places.

## **XI. Data Correction Policy**

To maintain a high standard of data integrity, a series of procedures have been implemented to ensure accuracy, timeliness, and consistency. Input prices are monitored using a variety of computerized range-check warning systems for both ticker-plant and real-time index systems. Fault tolerant methods are employed in the collection of market and corporate action data. Various verification and audit tasks are performed to ensure the quality of the real-time data feeds and related market data. While every effort is taken to ensure the accuracy of the information used for the index calculation, an index error may occur due to incorrect or missing data, including trading prices, exchange rates, shares outstanding, and corporate actions (operational errors or other reasons).

- i) Index-Related Data and Divisor Corrections. Incorrect pricing and corporate action data for individual issues in the database will be corrected upon detection. In addition, an incorrect divisor of an index, if discovered within five days of its occurrence, will always be fixed on the day it is discovered to prevent an error from being carried forward.
- ii) If a divisor error is discovered more than five days after occurrence, the adjustment will depend upon how significant the error is, how far back the error occurred, and the feasibility of performing the adjustment.

## **XII. Appendix: Review Schedule**

Rebalancing and Constituent Changes

Frequency: Semi-Annually

Effective date: On or around the fourth business day of the last month of each calendar half

Advance notice: Approximately 2 weeks whenever possible

News Notification\*

Frequency: As needed

Effective date: As announced

Advance notice: At least two business days whenever possible

\* Includes events such as delistings, mergers, bankruptcies, and other extraordinary events; Based on available news.