Nasdaq Index Weight Calculations

19 Sep 2024

Table of Contents

Definitions of Common Index Weighting Schemes

1.1 Market capitalization-weighted index

Index Security weights are based on securities' market capitalizations, generally derived by multiplying each security's Last Sale Price (LSP) times its total shares outstanding (TSO). Index Security weights are determined by dividing each Index Security's market capitalization by the aggregate market capitalization of all Index Securities.

1.2 Free float market capitalization-weighted index

Index Security weights are based on securities' free float market capitalizations, generally derived by taking the products of each security's Last Sale Price (LSP), total shares outstanding (TSO), and a float factor equal to the proportion of total shares outstanding available for trading. Index Security weights are determined by dividing each Index Security's free float market capitalization by the aggregate free float market capitalization of all Index Securities.

1.3 Equal-weighting

Index weights may be adjusted to achieve equal dollar values across units; this is referred to as an equal-weighting scheme and is used by equal-weighted indexes. Some indexes employ equal-weighting schemes to produce their final index weights; others employ equal-weighting schemes during one or more weight adjustment stages as inputs for further adjustment.

1.4 Modified weighting schemes

Modified weight indexes are those (1) whose security weights are dependent on weighting by another data set (such as proprietary scoring) or (2) that include adjustments to Index Security weights based on upper or lower bounds of eligible index weights. Many such modified weighting schemes exist.

Nasdaq Standard Index Weight Adjustment Guidelines

Every modified weight index undergoes a weight adjustment procedure during rebalance. Adjustments are generally made according to the following rules and principles.

2.1 Definitions

Unit: A security, company, industry, or any other component of an index or distinct group of index components that is subject to a weight constraint.

Initial weight (w_n): A unit's index weight prior to adjustments. Each methodology specifies how to calculate initial security index weights. Adjustments are applied to initial weights to derive final weights.

Final weight (w_n^*): A unit's index weight following adjustments. Index weight constraints typically apply to final weights. Adjustments may not result in any final weights of 0%.

Weight constraint (C_{nj}): A threshold that an index weight may not exceed (weight cap) or fall below (weight floor). Weight constraints may exist both uniformly across all units ($C_{1j} = C_{2j} = \cdots = C_{Nj}$) as well as non-uniformly ($C_{nj} \neq C_{mj}$). Non-uniform constraints are commonly based on categorical (e.g. country, sector) and quantitative (e.g. market value rank, cumulative weight) security attributes. Multiple weight constraints ($j = 1,2, \ldots$) may apply to each unit throughout weight adjustment.

Capped unit: Any unit for which the product of the relevant adjustment factor and the unit's initial weight breaches a weight constraint. In such cases the unit's weight is generally set equal to the constraint and the unit is considered "capped" (or "capped at" the constraint). An uncapped unit is any unit whose weight is not set to a weight cap.

Capping level: Any unit (e.g. security, issuer, country, sector, index) to which a weight constraint applies. All security weights are constrained at the index level (i.e. they must sum to 100%). Many indexes contain security-level weight constraints (e.g. no security weight may exceed a certain percentage); some constrain the collective weights of securities belonging to specified groups (e.g. sectors, countries).

Adjustment factor (AF_n): The ratio of a unit's final weight to its initial weight. In general, the set of all final weights is selected such that $\sum_{n=1}^{N} |AF_n - 1|$ and $var(AF_1, \ldots, AF_N)$ are minimized given the weight constraints of the particular index and readjustment type, according to the following equations:

$$w_n^* = \min\left(C_{n1}, \ldots, C_{nJ}, AF_n w_n\right)$$

$$\sum_{n=1}^{N} w_n^* = \sum_{n=1}^{N} \min\left(C_{n1}, \ldots, C_{nJ}, AF_n w_n\right) = \sum_{n=1}^{N} w_n$$

N: $number\ of\ securities\ in\ adjustment\ stage$
$w_1, \ldots, w_N$: $set\ of\ initial\ security\ weights\ for\ securities\ 1, \ldots, N$
$w_1^*, \ldots, w_N^*$: $set\ of\ final\ security\ weights\ for\ securities\ 1, \ldots, N$
$C_{1j}, \ldots, C_{Nj}$: $set\ j\ of\ weight\ constraints\ for\ securities\ 1, \ldots, N$
$AF_1, \ldots, AF_N$: $set\ of\ adjustment\ factors\ for\ securities\ 1, \ldots, N$

Note: indexes with weight floors as constraints use the maximum of the constraint and the adjusted weight, rather than the minimum.

Capping stage: Some weight adjustment schemes contain multiple stages of capping, generally used to adjust weights of subsets of securities at different times or to adjust weights of one unit level before

those of another unit level. In such schemes, one stage's adjusted weights are typically used as the next stage's initial weights.

2.2 Principles

The initial index weights of the Index Securities are generally determined by dividing each Index Security's (sometimes weighted or otherwise adjusted) market capitalization by the aggregate (sometimes weighted or otherwise adjusted) market capitalization of all Index Securities. Initial index weights are then adjusted using the definitions and rules above along with the principles below to meet the constraints specified by each index methodology.

In general, within each capping level the ranked order of final Index Security weights is consistent with the ranked order of the initial weights, although capping in one level may change the order of components with respect to components in other levels.

Weight constraints are applied simultaneously to all specified capping levels. For instance, if a security's weight breaches a security weight constraint and the collective weights of all securities within its sector breach the sector weight constraint, both security and sector are "capped at" their respective weight constraints. Weight adjustments are not made in a back-and-forth iterative fashion between levels. (Within multi-stage procedures, this principle applies to each individual stage.)

References to the weight of a unit other than an Index Security refer to the aggregated weights of all Index Securities belonging to the group of Index Securities. Issuer weights are the aggregated weights of the issuers' Index Securities; industry weights are the aggregated weights of the Index Securities within an industry; etc.

Within a capping level (e.g. each group of Index Securities subject to a group weight constraint), all uncapped Index Securities share an adjustment factor, as this minimizes var(AF_1,…,AF_n). All uncapped Index Securities whose weights are not constrained at a higher level (e.g. belonging to uncapped groups) share an index-wide adjustment factor.

2.3 Index Share Calculation

Index Shares are generally determined so that the product of an Index Security's Index Shares and Last Sale Price on the rebalance reference date equals its index weight produced by the weight adjustment procedure.

Disclaimer

Nasdaq may, from time to time, exercise reasonable discretion as it deems appropriate in order to ensure Index integrity, including but not limited to, quantitative inclusion criteria. Nasdaq may also, due to special circumstances, if deemed essential, apply discretionary adjustments to ensure and maintain the high quality of the index construction and calculation. Nasdaq does not guarantee that any Index accurately reflects future market performance.

Neither Nasdaq, Inc., its third-party providers, nor any of their respective affiliates (collectively "Corporations") make any recommendation to buy or sell any security or any representation about the financial condition of any company. Investors should undertake their own due diligence and carefully evaluate companies before investing. The information contained herein is provided for informational and educational purposes only, and nothing contained herein should be construed as investment advice, either on behalf of a particular security or an overall investment strategy. **ADVICE FROM A SECURITIES PROFESSIONAL IS STRONGLY ADVISED.**