



# Construction Rules for Morningstar Dividend Indexes

Morningstar Methodology Paper  
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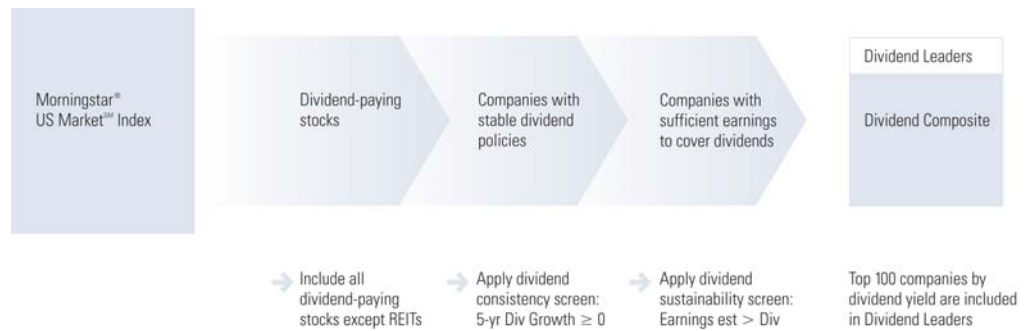
# Introduction

Dividends shield investors from the emotional turmoil of having their investments sink in value. Not too long ago, investors bought stocks based on the dividends that they paid and a large portion of a stock's total return came from dividends. The bull market of the 1990s, which saw a sharp rally in stock prices, diminished the lure of dividends. Yields (annual dividends per share divided by share price) experienced a steady decline as companies saw little incentive in paying large dividends.

However, a change in tax code in May 2003 has helped broaden their appeal to investors by lowering the maximum tax rate on dividends to 15%. A lower tax liability encourages companies to return cash to shareholders, thereby reducing potential misuse of excess cash. Additionally, the penalty of holding high-yielding stocks in taxable accounts relative to capital gains goes away, increasing the attractiveness of dividend-paying stocks. In 2004, 54% of stocks in Morningstar's US Market Index—a proxy for U.S. markets—paid a dividend, which is slightly higher than 52% in 2003.

The objective of the Morningstar Dividend Index Family is to offer investors a benchmark for dividend portfolios—the Morningstar Dividend Composite Index—and a means to invest in a portfolio of stocks that targets the highest yielding stocks within the composite—the Morningstar Dividend Leaders Index.

# Morningstar Dividend Index Construction Process



# Morningstar Dividend Index Characteristics

## **Morningstar Dividend Index Family Structure**

The Morningstar Dividend Index Family consists of 2 indexes that track dividend paying securities. Each index is a subset of the Morningstar US Market Index, a broad market index representing 97% of U.S. equity market capitalization. The Morningstar Dividend Composite Index is a broad benchmark comprised of “qualified income” paying securities screened for dividend consistency and sustainability. The Morningstar Dividend Leaders Index is the top 100 yielding stocks from the Composite Index.

## **Inception Dates and Base Market Values**

The inception dates of the Morningstar Dividend Indexes are June 30, 1997. Daily price and total return series are available from this date forward. The index base market value at inception is 1,000.

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

Index values for the Morningstar Dividend Leaders Index are calculated real-time and disseminated by the American Stock Exchange. The composite index is currently calculated once a day after the market’s close.

## **Index Value Currencies**

The closing values of all Morningstar indexes are calculated in \$US and converted to yen, pounds sterling, and Euro using an average of Reuters bid and ask price.

## **Scheduled Reconstitution Date**

The Morningstar Dividend Indexes are reconstituted—i.e., the index membership is reset—once annually, on the Monday following the third Friday of June. If the Monday is a holiday, reconstitution occurs on the Tuesday immediately following. Reconstitution is carried out after the day’s closing index values have been determined.

## **Scheduled Rebalancing Dates**

The Morningstar Dividend Indexes are rebalanced—i.e. the security weights (the product of the number of free float shares and the indicated dividend per share of each constituent) are adjusted—four times annually. Adjustments are made on the Monday following the third Friday of March, June, September and December. If the Monday is a holiday, reconstitution occurs on the Tuesday immediately following.

# Assigning Stocks to the Dividend Indexes

## Overview

At each reconstitution date, the investable universe and index eligibility are defined based on the criteria described in this section. The investable universe and index eligibility criteria are applied in the sequence in which they appear below. Each criterion is applied only to the “survivors” of the criteria applied previously.

## Investable Universe

To qualify for inclusion in the investable universe, a security must meet the following criteria:

- 1) It must trade on one of the three major exchanges—the NYSE, AMEX, or NASDAQ exchange.
- 2) The issuing company’s country of domicile should be the U.S. or the issuing company’s primary stock market activities are carried out in the U.S.
- 3) Securities that have more than 10 non-trading days in the prior quarter are excluded.
- 4) The following security types do not qualify:
  - ▶ American Depository Receipts and American Depository Shares
  - ▶ Fixed-dividend shares
  - ▶ Convertible notes, warrants, and rights
  - ▶ Tracking stocks
  - ▶ Limited Partnerships and holding companies

# Assigning Stocks to the Dividend Leaders Index (cont.)

## Index Eligibility

To qualify for inclusion in the US Market Index, a security's liquidity score must be among the top 75% of the companies in the investable universe. A security's liquidity score is the average of its ranks on each of the following measures:

- ▶ The average monthly trading volume in \$US during the six calendar months immediately prior to reconstitution or, in the case of corporate entities younger than six months, since the security was first issued (partial month periods are prorated by number of trading days in the month)
- ▶ The lowest 2 months' total trading volume during the six calendar months immediately prior to reconstitution (the months need not be sequential).

## Index Selection

The US Market Index is constructed by selecting the largest stocks that comprise 97% of market capitalization of the investable universe.

To qualify for inclusion in a Morningstar Dividend Index ally, all US Market Index constituents must meet the following criteria:

- ▶ Company's dividend is "qualified income", e.g. REITS are excluded.
- ▶ Company should have a 5-year dividend growth  $\geq 0$ .
- ▶ Company should have a coverage ratio  $> 1.0$

$$\text{Coverage Ratio} = \frac{\text{Earnings Per Share 1Yr Estimate}}{\text{Dividend Per Share}}$$

Dividend Per Share = Annualized dividend rate is based on the most recent declaration

The stocks that meet all of the above criteria comprise the Morningstar Dividend Composite Index. The top 100 stocks by indicated dividend yield are selected from the Composite Index for inclusion in the Morningstar Dividend Leaders Index. The higher coverage ratio breaks all ties.

# Index Calculations

## Overview

The value (price) and total return of an index is calculated using a Laspeyres' formula.

$$Index(t) = \frac{\sum_{i=1}^n (p_{i(t)} * q_{i(t)})}{C(t) \sum_{i=1}^n (p_{i(0)} * q_{i(0)})} * BaseIndexValue = (M(t) / B(t)) * BaseIndexValue$$

The above formulas can be simplified as:  $Index(t) = \frac{M(t)}{D(t)}$

Where:

D(t)	=	divisor at time (t) = B(t)/Base Index Value
n	=	number of stocks in the index
p <sub>i</sub> (0)	=	closing price of stock i at the base date
q <sub>i</sub> (0)	=	constructed shares of company i at the base
p <sub>i</sub> (t)	=	price of stock i at time (t)
q <sub>i</sub> (t)	=	constructed shares of company i at time (t)
C(t)	=	adjustment factor for the base date market capitalization
t	=	time the index is calculated
M(t)	=	market capitalization of the index at time (t)
B(t)	=	adjusted base date market capitalization of the index at time (t)

\*Dividends are reinvested in the index sample of the total return index.

## Index Calculations (cont.)

### Constituent Weighting

The Morningstar Dividend Indexes are weighted according to the dividends paid by each company that are available to investors. Consequently, the available dividend dollar value is the product of the security's shares outstanding, free float factor, and annual indicated dividend per share.

Index Weight is determined by:

$$IW_{i(t)} = \frac{d_{i(t)} * s_{i(t)} * f_{i(t)}}{\sum_{i=1}^n (d_{i(t)} * s_{i(t)} * f_{i(t)})} \quad (1)$$

And the constructed shares ( $q_i(t)$ ) for each constituent in the index calculation formula are:

$$q_{i(t)} = IW_{i(t)} * \frac{\sum_{i=1}^n (p_{i(t)})}{p_{i(t)}} * 1,000,000,000 \quad (2)$$

Where:

n	=	number of stocks in the index
$p_i(t)$	=	price of stock i at time (t)
$d_i(t)$	=	indicated dividend per share of company i at time (t)
$s_i(t)$	=	actual shares of company i at time (t)
$f_i(t)$	=	free float factor of company i at time (t)
(t)	=	time the index weights are calculated

It is important to note that the shares ( $q_i(t)$ ) for the index constituents are artificial constructs used for calculation purposes. Consequently, the constructed shares only have relation to the actual shares of the company in terms of the total dividends paid by the company.

## Index Calculations (cont.)

### Capped Weighting Adjustments

Morningstar makes adjustments to the index weighting ( $IW_i(t)$ ) when a single constituent's weight exceeds the maximum weight allowed. In such instances, the excess weight is distributed among the remaining constituents. The methodology is explained below.

#### The 5-50 Rule

The IRS defines a diversified portfolio as one in which the largest weight does not exceed 25% and in which the sum of the weights that are each greater than 5% does not exceed 50%. We call this latter condition the "5-50 rule."

For a given set of weights,  $w_1, w_2, \dots, w_N$ , with  $w_1 \geq w_2 \geq \dots \geq w_N$ , and  $\sum_{i=1}^N w_i = 1$ , we test to see if the 5-50 rule holds as follows:

Let

$$w_i^* = \begin{cases} w_i, & \text{if } w_i \geq 0.05 \\ 0, & \text{if } w_i < 0.05 \end{cases}$$

If  $\sum_{i=1}^N w_i^* \leq 0.5$ , the 5-50 rule holds.

Let:

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N = number of stocks in the portfolio

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Cap = maximum weight that we allow for any stock, currently 10%

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original weight of the  $i^{\text{th}}$  largest stock in the portfolio,  $x_1 \geq x_2 \geq \dots \geq x_N$

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$$x_i = \sum_{i=1}^n x_i = 1$$

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If  $x_1 \leq \text{cap}$ , we cannot re-weight. If the 5-50 rule holds for  $x_1, x_2, \dots, x_N$ , no re-weighting is needed. If the 5-50 rule does not hold, the cap should be set to a value less than  $x_1$  and the following algorithm should be tried. If we start with  $x_1 > \text{cap}$ , we try the algorithm described below.

## Index Calculations (cont.)

Morningstar re-weights using a two-part linear function as follows:

$$(1) \quad y_i = \begin{cases} y_k + \beta_1(x_i - x_k), & \text{if } i \leq K \\ \beta_2 x_i, & \text{if } i \geq K \end{cases}$$

where  $K$  is the index of the stock at which the function is kinked. Note that this re-weighting preserves the relative weights of all stocks beginning from the  $K^{\text{th}}$  stock.

Given  $K$ , we need to set  $\beta_1$  and  $\beta_2$ . From equation (1), it follows that

$$(2) \quad \beta_1 = \frac{y_1 - y_k}{x_1 - x_k}$$

and

$$(3) \quad \beta_2 = \frac{y_k}{x_k}$$

We set

$$(4) \quad y_1 = \text{cap}$$

We need to set  $y_k$  so that  $\sum_{i=1}^N y_i = 1$ . Some algebra shows that this occurs when

$$(5) \quad y_k = \frac{1 - \gamma y_1}{(K-1) - \gamma + \frac{1-z}{x_k}}$$

## Index Calculations (cont.)

Where (6) 
$$z = \sum_{i=1}^{K-1} x_i$$

And (7) 
$$\gamma = \frac{z - (K-1)x_K}{x_1 - x_K}$$

We chose  $K$  to maximize the number of stocks for which relative weights are preserved. This occurs at the lowest value of  $K$  for which  $\gamma_K \leq \gamma_1$ . Hence, our re-weighting algorithm is as follows:

1. Set  $z=0$ ,  $\gamma_1 = \text{cap}$ , and  $K=1$
2. If  $K < N$ , set  $K=K+1$ ; otherwise go to step 8
3. Set  $z=z+x_{K-1}$
4. Set  $\gamma$  and  $\gamma_K$  using equations (7) and (5) respectively
5. If  $\gamma_K > \gamma_1$ , go back to step 2
6. Set  $\beta_1$  and  $\beta_2$  using equations (2) and (3) respectively
7. For  $i = 1, \dots, N$ , set  $y_i$  using equation (1)
8. If the 5-50 rule holds for  $\gamma_1, \gamma_2, \dots, \gamma_N$ , this is the solution, so stop  
Otherwise go back to step 2
9. There is no solution that meets the 5-50 rule with this cap

## Index Calculations (cont.)

### Divisor Adjustments

To avoid distortions caused by corporate actions that affect the share capital of index constituents, the divisor of the index is adjusted accordingly. The following formulae will be used for divisor adjustments due to corporate action. Note: No divisor adjustment 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.

$$D_{t+1} = D_t * \frac{\sum_{i=1}^n (p_{i(t)} * q_{i(t)}) \pm [\Delta MC(t+1)]}{\sum_{i=1}^n (p_{i(t)} * q_{i(t)})}$$

Where:

D(t)	=	divisor at time (t)
D(t+1)	=	divisor at time (t+1)
P <sub>i</sub> (t)	=	stock price of company i at time (t)
q <sub>i</sub> (t)	=	number of shares of company i at time (t)
DMC(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 companies 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, then the adjusted price is used.

Most but not all of the following actions will require the calculation of an adjustment factor which will be included in the pre-market-open index calculation described above in the section titled "Index Calculation."

## Index Calculations (cont.)

### **Spin-offs**

Issues spun off by index holdings will be held in the index (and in the same sector as that of the company spinning off the issue) until the next rebalancing. The weight of each of the new entities in the index will be determined by using the theoretical prices as of the close of business and the old NumShrs figure for the original as follows:

$$\begin{aligned}\text{NumShrs(OriginalCompany)} &= \text{NumShrs(OldCompany)} \\ \text{NumShrs(NewCompany)} &= \text{Conversion Ratio} * \text{NumShrs(OldCompany)}\end{aligned}$$

### **Stock Dividends / Splits**

Stock splits and dividends will affect the adjustment factor of the index but will have no impact on holdings. The adjustment is as follows:

$$\text{Adjustment} = \frac{\text{Shares After}}{\text{Shares Before}}$$

### **Delisting, Bankruptcy, and Financial Distress:**

If the constituent is delisted by its principal exchange, enters bankruptcy proceedings, or is under extreme financial distress, the security is removed from the US Market Index. Exceptions are made on a case-by-case basis. For example, a security might not be removed immediately when a bankruptcy filing is not a result of operating or financial difficulties.

### **Change of Principal Exchange:**

A security is removed from the US Market Index if its principal exchange ceases to be the NYSE, AMEX, or NASDAQ exchange.

## Index Calculations (cont.)

### **Change of Domicile:**

If a company ceases to meet the company domicile eligibility rule, the company is removed from US Market Index.

### **Third-Party Acquisition or Merger:**

If the issuing company of one or more US Market Index constituents is acquired by or merges with another company, then the original constituent and the acquirer are replaced by one or more securities of the successor entity.

### **Loss of Liquidity:**

If a constituent accumulates 10 consecutive non-trading days between reconstitution dates, it is removed from the indexes. Two business days' prior notice of its removal is provided.

# Data Correction and Precision

## **Intraday Index Data Corrections**

Commercially reasonable efforts are made to ensure the correctness of data used in real-time index calculations. If incorrect price or corporate action data affects index daily high or lows, it is corrected retroactively as soon as feasible.

## **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 retroactively on the day it is discovered to prevent an error from being carried forward. Commercially reasonable efforts are made to correct an older error subject to its significance and feasibility.

## **Computational and Reporting Precision**

All calculated and adjusted data are stored in real numbers. For reporting purposes, index values are rounded to two decimal places and divisors are rounded to appropriate decimal places. The actual number of shares is used to determine the number of shares outstanding for the free float weighting.

## **Undocumented Events**

Any matter arising from undocumented events will be resolved at the discretion of the Morningstar Index Committee.