



# Syntax Stratified Europe & Asia Developed Markets Index (SEADM) Rulebook

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# 1 Methodology Scope

This methodology covers the following Syntax indices:

Index Name	Index Ticker	Total Return Index (TR) or Price Return Index (PR)
Syntax Stratified Europe & Asia Developed Markets	SEADM	PR
Syntax Stratified Europe & Asia Developed Markets (TR)	SEADMTR	TR



## 2 Index Objectives

Syntax® Stratified Indices™ are a family of equity indices that weight constituents based on Syntax's patented methodology to control exposure to related business risks (RBRs). Traditional indices do not control for related business risks and are thus vulnerable to poor performance when economic shocks impact companies that are exposed to the same business risks. Syntax stratification diversifies indices by establishing target weights for RBRs and rebalancing to these targets every quarter. This methodology is designed to mitigate the adverse effects of inadvertent over weightings of related businesses that regularly occur in the market without sacrificing upside potential.

### 2.1 Syntax Stratified Europe & Asia Developed Markets Index

The Syntax Stratified Europe & Asia Developed Markets Index™ is the stratified-weight version of the MSCI EAFE Index. It holds the same constituents as the MSCI EAFE Index but the weight of each company is based on Syntax's patented methodology to control exposure to related business risks (RBRs).



## 3 Universe Selection Process

The Syntax Stratified Europe and Asia Developed Markets Index licenses its constituents from the MSCI EAFE Index. The Syntax Stratified Europe & Asia Developed Markets Index reconstitutes to hold the exact constituents of the MSCI EAFE Index at each rebalance date.



## 4 Index Information

Launch Date:	1 January 2016
First Value Date:	1 January 2003
Base Date:	1 January 2016
Base Value:	1000
Currency:	USD
Exchange Rate:	WM/Reuters 4:00 PM London rate
Rebalancing:	<p>The Syntax Stratified Europe &amp; Asia Developed Markets Index rebalances quarterly, at the close on the third Friday of the quarter-ending month (March, June, September, December). Index share counts are assigned using closing prices from the second Friday of the quarter-ending month (i.e. one week prior to rebalance). Therefore, the actual weight of each constituent at the rebalance differs from the target weight due to market movements.</p>
Additions, Deletions, and Replacements:	<p>The Syntax Stratified Europe &amp; Asia Developed Markets Index follows the addition and deletion schedule of the MSCI EAFE at each rebalance date. Except in the case of spinoffs detailed below, when a constituent enters the MSCI EAFE Index, that same constituent enters the Syntax Stratified Europe &amp; Asia Developed Markets Index at the subsequent rebalance. Except in the case of corporate actions detailed below, when a constituent is deleted from the MSCI EAFE Index, that constituent is deleted from the Syntax Stratified Europe &amp; Asia Developed Markets Index at the subsequent rebalance.</p>



## 5 Corporate Action Methodology

The Syntex Stratified Europe & Asia Developed Markets Index is calculated by S&P Dow Jones Indices Custom Index Group. Calculations are performed in accordance with the following methodology and constituents are weighted using Syntex's proprietary weighting methodology. Please see important disclaimers at the end of this document.

Corporate actions (including stock splits, stock dividends, spin-offs and rights offerings) that impact the Syntex Index constituents are applied after the close of trading on the day prior to the ex-date. Share changes resulting from exchange offers are made on the ex-date.

**Spin-offs:** The spun-off company is added to the index at a zero price at the market close of the day before the ex-date with no divisor adjustment. The spun-off company will be held by the Index until the subsequent rebalance, at which point it will be removed from the index if it fails to meet the index universe inclusion rules.

**Dividends:** Dividends are reinvested in the index after the close on the ex-date.

**Special Dividends:** The price of the stock making the special dividend payment is reduced by the per share special dividend amount after the close of trading on the day before the dividend ex-date.

**Rights Offering:** Rights issues are only enacted if they are in-the-money. In the event of an enacted rights issue, the price is adjusted for the value of the right before the open on the ex-date, and the shares are increased to maintain the constituent's existing weighting within the index.

**Share Changes:** Changes in the number of shares outstanding, typically due to share repurchases, tenders, or offerings, will not be reflected in the index.

**Bankruptcy:** Syntex removes bankrupt securities from its indices at the same time the security is delisted. There will be a minimum of one day notice of a removal of a bankrupt security. Same day removals for bankruptcy do not occur.



If the security is trading on its usual or primary exchange at the close of the day it is removed, that price is used. If the security is halted on or delisted from its usual exchange, the stock may be deleted from the index with a presumed market value of zero.

When a security is in FDIC Receivership, they are dropped from all Syntax indices at the earliest reasonable date.

Bonus Issues, Stock Splits, and Reverse Stock Splits:	For bonus issues, stock splits, and reverse stock splits, the number of shares included in the index will be adjusted in accordance with the ratio given in the corporate action. Since such events will not change the value of the company included in the index, the divisor will not be adjusted when such corporate actions occur.
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Mergers and Acquisitions:	Acquired constituents are deleted from the index intra-quarter. In the event of a stock acquisition or a cash and stock acquisition where the acquirer is in the index, the stock terms of the event will be reinvested back into the acquirer.
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## 6 Weight Generation and Rebalance

All Syntax Indices diversify constituents across groups of related business risks as defined by the patented FIS classification system. Syntax Indices use stratification, a common technique used in statistics, to control exposure to related business risks.

Each Syntax Index has a Syntax Stratification Architecture that outlines a hierarchy of related business risk groups that form the basis for each constituent's weight. Related business risk groups at each level of the Stratification Architecture are defined by a sequence of FIS tags, and every constituent is allocated to exactly one related business risk group at each level of the Syntax Stratification Architecture. This allocation takes place by matching the FIS tags applied to the company against the sequence of FIS tags that define the related business risk group.

At least two weeks prior to each quarterly rebalance, Syntax conducts a quality control review of each index's Stratification Architecture to verify that it continues to be representative of the relevant related business risks present in the set of constituents. Syntax also implements a quarterly review on constituents in the index that underwent a merger, acquisition, or spin-off to determine if these corporate actions necessitate a change to the function of the business and in turn, changed the constituent's FIS tags. Annually, Syntax conducts a review of the FIS tags.



## 7 Index Calculations

The Syntax Stratified Europe & Asia Developed Markets Index is calculated by S&P Dow Jones Indices Custom Index Group. Below is a summary of the basic math used to calculate Syntax Indices.

$P_i$  = price of shares of stock  $i$  in the index

$Q_i$  = quantity of shares of stock  $i$  in the index

$E_i$  = foreign exchange rate between USD and the currency of stock  $i$

$Shares_i$  = number of shares of stock  $i$  in the index

The index value is the index market value divided by the index divisor:

$$Index\ Value = \frac{Index\ Market\ Value}{Divisor}$$

$$Index\ Market\ Value = \sum_i P_i * Shares_i * E_i$$

The index level can be written as:

$$Index\ Level = \frac{\sum_i P_i * Q_i}{Divisor}$$

To maintain the continuity of the index, it is also necessary to adjust the divisor at each rebalance:

$$Index\ Level\ (before\ rebalance) = Index\ Level\ (after\ rebalance)$$

Which means that:

$$Divisor\ (after\ rebalance) = \frac{Index\ Market\ Value\ (after\ rebalance)}{Index\ Value\ (before\ rebalance)}$$

### Calculating the Divisor Adjustment:

As described Section 5, some corporate actions will trigger a divisor adjustment in the index.

A divisor is a factor by which the total market value of an index is divided to give a scaled, and more easily handled, number.



The divisor allows continuous measurement of market valuation because it ensures that the value of the index does not fluctuate across events that do not stem from the performance of the index.

The following formula expands the original formula for calculating the Index Level to show the stock,  $r$ , which is being removed separately.

$$Index\ Level_{t-1} = \frac{(\sum_i P_i * Q_i) + P_r Q_r}{Divisor_{t-1}}$$

Similarly, rewriting the Index Level after the addition of stock  $s$  to show that stock separately:

$$Index\ Level_t = \frac{(\sum_i P_i * Q_i) + P_s Q_s}{Divisor_t}$$

Where  $t-1$  is the moment immediately preceding the deletion of stock  $r$  and  $t$  is the moment immediately after the addition of stock  $s$ . By design,  $IndexLevel_{t-1}$  exactly equals  $IndexLevel_t$ . This allows us to rewrite the above as:

$$\frac{(\sum_i P_i * Q_i) + P_r Q_r}{Divisor_{t-1}} = Index\ Level = \frac{(\sum_i P_i * Q_i) + P_s Q_s}{Divisor_t}$$

Let the left-most and right-most numerators be the Market Value,  $MV$ , of the index at times  $t-1$  and  $t$ .

$MV_t$ ,  $MV_{t-1}$  and  $Divisor_{t-1}$  are all known values. Therefore, we can rearrange the formula to calculate the value of the new divisor:

$$Divisor_t = (Divisor_{t-1}) * \frac{MV_t}{MV_{t-1}}$$

Equivalently, we can write the new divisor as the old divisor plus the percentage change in index value from the event. Rearranging the formula for the Index Value:

$$Divisor = \frac{MV}{Index\ Level}$$

Let  $CMV$  be the change in market value from the addition and deletion. Because the Index Level will not change, the new divisor must be:

$$Divisor_{New} = \frac{MV + CMV}{Index\ Level}$$

Because  $MV/IndexLevel$  is the divisor, we can rewrite this as:

$$Divisor_{New} = Divisor_{old} + \frac{CMV}{Index\ Level}$$





## 8 Index Dissemination

Syntax Stratified Europe & Asia Developed Markets Index is calculated by S&P Dow Jones Indices. Daily levels can be found on [us.spindices.com/custom-indices](https://us.spindices.com/custom-indices), as well as the websites of other major data providers. Prior to 16 March 2018, the Syntax Stratified Europe & Asia Developed Markets Index was calculated by NYSE.



## 9 Disclaimers

The Syntax Stratified Europe & Asia Developed Markets Index (“the Index”) is the property of Syntax, LLC, which has contracted with S&P Opco, LLC (a subsidiary of S&P Dow Jones Indices LLC) to calculate and maintain the Index. The Index is not sponsored by S&P Dow Jones Indices LLC or its affiliates or its third party licensors, including Standard & Poor's Financial Services LLC and Dow Jones Trademark Holdings LLC (collectively, “S&P Dow Jones Indices”). S&P Dow Jones Indices will not be liable for any errors or omissions in calculating the Index. “Calculated by S&P Dow Jones Indices” and the related stylized mark(s) are service marks of S&P Dow Jones Indices and have been licensed for use by Syntax, LLC. S&P® is a registered trademark of Standard & Poor's Financial Services LLC, and Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC.

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