

**S&P Dynamic Tactical
Allocation Index
*Methodology***

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Introduction

Index Objective

The S&P Dynamic Tactical Allocation Index (DTAQ) measures the weighted return of a multi-asset class strategy. The index employs trend, volatility, and economic signals to determine allocations across sub-indices representing different asset classes.

Supporting Documents

This methodology is meant to be read in conjunction with supporting documents providing greater detail with respect to the policies, procedures and calculations described herein. References throughout the methodology direct the reader to the relevant supporting document for further information on a specific topic. The list of the main supplemental documents for this methodology and the hyperlinks to those documents is as follows:

Supporting Document	URL
S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology	Equity Indices Policies & Practices
S&P Dow Jones Indices' Index Mathematics Methodology	Index Mathematics Methodology

This methodology was created by S&P Dow Jones Indices to achieve the aforementioned objective of measuring the underlying interest of each index governed by this methodology document. Any changes to or deviations from this methodology are made in the sole judgment and discretion of S&P Dow Jones Indices so that the index continues to achieve its objective.

Eligibility Criteria

Index Eligibility

The universe of eligible asset classes and the indices used to represent each are listed in the table below:

Asset Class	Index
U.S. Equities	S&P DTAQ U.S. Equity Sub-Index
Developed Ex-U.S. Equities	S&P Developed Ex-U.S. BMI
Emerging Equities	S&P Emerging BMI
Real Estate	Dow Jones U.S. Real Estate Index
Commodities	Dow Jones Commodity Index
Gold	Dow Jones Commodity Index Gold
U.S. Bonds	S&P DTAQ U.S. Fixed Income Sub-Index

Index Construction

Approach

The allocation strategy first assigns base weights by asset class as shown in the table below:

Asset Class	Index	Base Weight
U.S. Equities	S&P DTAQ U.S. Equity Sub-Index	* 85% times the Country/Region Weight within S&P Global BMI
Developed Ex-U.S. Equities	S&P Developed Ex-U.S. BMI	
Emerging Equities	S&P Emerging BMI	
Real Estate	Dow Jones U.S. Real Estate Index	5%
Commodities	Dow Jones Commodity Index	5%
Gold	Dow Jones Commodity Index Gold	5%
U.S. Fixed Income	S&P DTAQ U.S. Fixed Income Sub-Index	0%

* For the Equities Asset Classes, the base weight allocation is updated at the end of each year in December, effective for the rebalancing after the close of the last business day in December based on the corresponding country/region index weight within the S&P Global BMI, as of the reference date. The base weight remains unchanged throughout the calendar year until the following December allocation update.

The corresponding indices for each of the equity asset classes used to determine the base weight are defined in the table below:

Asset Class	Corresponding Index for Base Weight
U.S. Equities	S&P United States BMI (U.S. Dollar)
Developed Ex-U.S. Equities	S&P Developed Ex-U.S. BMI (U.S. Dollar)
Emerging Equities	S&P Emerging BMI (U.S. Dollar)

For more information on the indices used to assign base weights for the allocation strategy please refer to the respective methodology documents located at www.spdji.com.

Determination of Allocation

Using the base weights as the starting point, the allocation strategy tests each risk asset class, defined as all asset classes except for U.S. Fixed Income, using trend and volatility indicators to determine the final weight for the rebalancing.

The Trend of an asset class can be classified as Positive or Negative, while Volatility can be classified as Normal or High.

The underlying indices are used as the basis for testing each risky asset class with the exception of the U.S. Equities asset class. For the U.S. Equities asset class, the S&P 500 Equal Weighted Index is used as the proxy for testing.

For more information on the S&P 500 Equal Weighted Index please refer to S&P Dow Jones Indices' S&P 500 Equal Weight Index Methodology located at www.spdji.com.

Trend Signal Determination

On the rebalancing reference date, the trend signal for each risk asset class is determined as follows:

$$\text{Trend}_t = \begin{cases} \text{Positive when } P_t \geq \text{SMA}_t \\ \text{Negative when } P_t < \text{SMA}_t \end{cases}$$

where:

- t = Rebalancing reference date
- P_t = Price Return index value (ER for the Commodity and Gold asset classes)
- SMA_t = Prior 125-day simple moving average of P

Volatility Signal Determination

On the rebalancing reference date, the volatility signal for each risk asset class is determined as follows:

$$\text{Volatility}_t = \begin{cases} \text{High when } \text{VOL}_{t,20D} \geq 150\% * \text{VOL}_{t,125D} \\ \text{Normal when } \text{VOL}_{t,20D} < 150\% * \text{VOL}_{t,125D} \end{cases}$$

where:

- t = Rebalancing reference date
- P_t = Price Return index value (ER for the Commodity and Gold asset classes)
- $\text{VOL}_{t,20D}$ = Prior 20-day volatility of P
- $\text{VOL}_{t,125D}$ = Prior 125-day volatility P

and:

$$\text{VOL}_{t,20D} = \sqrt{\frac{252 * \sum_{n=0}^{19} \left(\ln \left(\frac{P_{t-n}}{P_{t-n-1}} \right) \right)^2}{20}}$$

$$\text{VOL}_{t,125D} = \sqrt{\frac{252 * \sum_{n=0}^{124} \left(\ln \left(\frac{P_{t-n}}{P_{t-n-1}} \right) \right)^2}{125}}$$

Allocation Matrix

For the risk asset classes, the final allocation can be 100%, 50%, or 0% of the base weight as defined in the matrix table below:

Allocation Decision Table		
Trend	Volatility	Base Weight Allocation
Positive	Normal	100%
Positive	High	100%
Negative	Normal	50%
Negative	High	0%

Whenever the base weight allocation is less than 100% for any of the risk asset classes, the aggregate excess weight is allocated to the U.S. Fixed Income asset class (FI_t) such that the total index weight equals 100%.

Determination of U.S. Equities Allocation – S&P DTAQ U.S. Equity Allocation Sub-Index

The U.S. Equities allocation is represented by the S&P DTAQ U.S. Equity Allocation Sub-Index, which is an aggregate strategy of three underlying strategies. Each category is assigned a fixed weight.

Strategy/Index	Weight of U.S. Equities Allocation
Sector Contrarian	44.44%
Sector Momentum	22.22%
Equal Weighted	33.33%

Sector Contrarian Strategy

S&P DTAQ US Equity – Contrarian Index allocates to the four worst performing Global Industry Classification (GICS) sectors (as measured by trailing year price return performance) of the S&P 500. The four sectors are equally weighted, thus each is equal to 25% of the total Sector Contrarian Strategy allocation. Since Real Estate is considered to be a separate asset class in the overall index, the Real Estate sector is excluded from the Sector Contrarian Strategy.

Rebalancing. The contrarian strategy is rebalanced once a year after the close of the last business day of December.¹ The rebalancing reference date is two business days prior to the last business day of December. On the reference date, the four worst sectors are selected based on the year's performance to that point.

Re-weighting. The contrarian strategy re-weights the four sectors back to 25% each quarter, after the close of the last business day in March, June, and September.¹

Sector Momentum Strategy

S&P DTAQ US Equity – Momentum Index allocates to the two best performing sectors (as measured by trailing six months price return performance) of the S&P 500. The two sectors are equally weighted, thus each is equal to 50% of the total Sector Momentum strategy allocation. Since Real Estate is considered to be a separate asset class in the overall index, the Real Estate sector is excluded from the Momentum Strategy.

Rebalancing. The sector momentum strategy is rebalanced quarterly after the close of the last business day of March, June, September, and December. The rebalancing reference date is two business days prior to the last business day of March, June, September, and December. On the reference date, the two best performing sectors are selected based on the prior six months' performance to that point.

Re-weighting. The sector momentum strategy re-weights the two sectors back to 50% each quarter, after the close of the last business day of the rebalancing month.

Equal Weighted Strategy

S&P 500 Equal Weighted Index is an equal weighted version of the S&P 500. Index composition is the same as the underlying index. Constituent changes are incorporated in the S&P 500 Equal Weighted Index as and when they are made in the underlying index.

For more information on the S&P 500 Equal Weighted Index please refer to S&P U.S. Indices Methodology document located on our Web site, www.spdji.com.

Re-weighting. The weights of the U.S. Equity strategies are reset on a quarterly basis, after the close of the last business day in March, June, September, and December.

¹ Due to the difference in rebalancing schedules for the Sector Momentum and Sector Contrarian Strategies it is possible for one or more sectors to overlap in these indices.

Determination of U.S. Fixed Income Allocation – S&P DTAQ U.S. Fixed Income Sub-Index

The U.S. Fixed Income allocation is represented by the S&P DTAQ U.S. Fixed Income Sub-Index, which allocates along the yield curve based on the amount of weight allocated to U.S. Fixed Income (see headline index determination of allocation section above) and the economic activity level in the United States. The eligible indices used to represent different maturities along the yield curve are listed below:

Index Name	Designation
S&P 2-Year U.S. Treasury Note Futures Total Return Index	2YR
S&P 5-Year U.S. Treasury Note Futures Total Return Index	5YR
S&P 10-Year U.S. Treasury Note Futures Total Return Index	10YR
S&P U.S. Treasury Bond Futures Index TR	30YR

For more information on the U.S. Treasury Note Futures and U.S. Treasury Bond Futures indices please refer to S&P Dow Jones Indices' S&P Global Bond Futures Index Series Methodology located on our Web site, www.spdji.com.

The economic activity level of the U.S. is one of two inputs on how the U.S. Fixed Income allocation is distributed. There are 3 levels of economic activity which signal from high economic activity to low economic activity:

Economic Activity Level	Economic Activity Z-score Band
1	$EA_t > -1$
2	$-2 < EA_t \leq -1$
3	$EA_t \leq -2$

where:

EA_t = Economic activity Z-score for the end of the previous month as of the rebalance referencing date.

The economic activity level uses the published figures by the Federal Reserve Bank of Chicago at <https://www.chicagofed.org/publications/cfnai/index>. The number used to determine the U.S. Fixed Income allocations will be the number that is available on the website as of the rebalancing reference date for the end of the previous month. For example, for the end-of-month January 2017 rebalancing, the economic activity level would be the number that is published on the website on January 27th, 2017 for December 31st, 2016. If the previous month's level is unavailable at the rebalancing reference date, the index uses the latest available level. Any future revisions to monthly figures will not be considered.

Allocation Within Each Probability Level

Given the economic activity level (EAL_t) and the pre-determined U.S. Fixed Income allocation (FI_t), the allocation along the yield curve is determined as outlined below:

Economic Activity Level 1:

Index Designation	Weight Designation	Fixed Income Allocation (FI_t) Condition	Weight
2YR	W_{2YR}	--	$\text{Min}(FI_t, 25\%)$
5YR	W_{5YR}	$FI_t \leq 25\%$	0%
		$FI_t > 25\%$	$\text{Min}(FI_t - W_{2YR}, 50\%)$
10YR	W_{10YR}	--	$FI_t - W_{2YR} - W_{5YR}$
30YR	W_{30YR}	--	0%

Economic Activity Level 2:

Index Designation	Weight Designation	Fixed Income Allocation (FI_t) Condition	Weight
30YR	W_{30YR}	$FI_t < 15\%$	$(FI_t) / 2$
		$FI_t \geq 15\%$	15%
5YR	W_{5YR}	--	$(FI_t - W_{30YR}) / 4$
2YR	W_{2YR}	$FI_t < 25\%$	0%
		$FI_t \geq 25\%$	$\text{Min}((FI_t - W_{5YR} - W_{30YR}) / 3, 25\%)$
10YR	W_{10YR}	--	$FI_t - W_{2YR} - W_{5YR} - W_{30YR}$

Economic Activity Level 3:

Index Designation	Weight Designation	Fixed Income Allocation (FI_t) Condition	Weight
30YR	W_{30YR}	--	$\text{Min}(FI_t, 30\%)$
5YR	W_{5YR}	--	$(FI_t - W_{30YR}) / 3$
10YR	W_{10YR}	--	$FI_t - W_{5YR} - W_{30YR}$
2YR	W_{2YR}	--	0%

Rebalancing. The S&P DTAQ U.S. Fixed Income Sub-Index is rebalanced monthly after the close of the last business day of each month.

Index Calculation

The S&P Dynamic Tactical Allocation Index and Sub-Index Levels are calculated using the weighted return methodology.

For information on weighted return method calculation, please refer to the S&P Dow Jones Indices' Index Mathematics Methodology available at www.spdji.com.

Index Maintenance

Rebalancing

The index is rebalanced after the close on the last business day of each month. The rebalancing reference date is two business days prior to the rebalance effective date.

Currency of Calculation and Additional Index Return Series

The index is calculated in U.S. dollars.

In addition to the indices detailed in this methodology, additional return series versions of the indices may be available, including, but not limited to: currency, currency hedged, decrement, fair value, inverse, leveraged, and risk control versions. For a list of available indices, please refer to [S&P DJI's All Indices by Methodology Report](#).

For information on various index calculations, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.

For the inputs necessary to calculate certain types of indices, including decrement, dynamic hedged, fair value, and risk control indices, please refer to the Parameters documents available at www.spdji.com.

Base Date and History Availability

Index history availability, base date, and base value are shown in the table below.

Index	Launch Date	First Value Date	Base Date	Base Value
S&P Dynamic Tactical Allocation Index	06/14/2017	06/30/2011	12/31/1999	1000
S&P DTAQ U.S. Equity Sub-Index	06/14/2017	06/30/2011	12/29/1995	1000
S&P DTAQ U.S. Fixed Income Sub-Index	06/14/2017	06/30/2011	12/31/1999	1000

Index Governance

Index Committee

The index is maintained by an Index Committee. All committee members are full-time professional members of S&P Dow Jones Indices' staff. The Committee meets regularly. At each meeting, the Committee reviews pending corporate actions that may affect index constituents, statistics comparing the composition of the index to the market, companies that are being considered as candidates for addition to the index, and any significant market events. In addition, the Committee may revise index policy covering rules for selecting companies, treatment of dividends, share counts or other matters.

S&P Dow Jones Indices considers information about changes to its indices and related matters to be potentially market moving and material. Therefore, all Committee discussions are confidential.

S&P Dow Jones Indices' Index Committees reserve the right to make exceptions when applying the methodology if the need arises. In any scenario where the treatment differs from the general rules stated in this document or supplemental documents, clients will receive sufficient notice, whenever possible.

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

For information on Quality Assurance and Internal Reviews of Methodology, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Index Policy

Holiday Schedule

The index is calculated when the U.S. equity markets are open.

A complete holiday schedule for the year is available at www.spdji.com.

Rebalancing

The Index Committee may change the date of a given rebalancing for reasons including market holidays occurring on the scheduled rebalancing date. Any such change will be announced with proper advance notice where possible.

Unexpected Exchange Closures

For information on Unexpected Exchange Closures, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Recalculation Policy

For information on the recalculation policy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

For information on Calculations and Pricing Disruptions, Expert Judgment and Data Hierarchy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Contact Information

For questions regarding an index, please contact: index_services@spglobal.com.

Index Dissemination

Index levels are available through S&P Dow Jones Indices' Web site at www.spdji.com, major quote vendors (see codes below), numerous investment-oriented Web sites, and various print and electronic media.

Tickers

The table below lists headline indices covered by this document. All versions of the below indices that may exist are also covered by this document. Please refer to [S&P DJI's All Indices by Methodology Report](#) for a complete list of indices covered by this document.

Index	Return Type	Bloomberg	RIC
S&P Dynamic Tactical Allocation Index	Total Return	SPDTAQ	. SPDTAQ
S&P DTAQ US Equity Sub-Index	Total Return	---	. SPDTAQE
S&P DTAQ US Fixed Income Sub-Index	Total Return	---	. SPDTAQF

Index Data

Daily constituent and index level data are available via subscription.

For product information, please contact S&P Dow Jones Indices, www.spdji.com/contact-us.

Web site

For further information, please refer to S&P Dow Jones Indices' Web site at www.spdji.com.

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