

**S&P Economic Cycle Factor
Rotator Indices**
Methodology

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Introduction

Index Objective and Highlights

The S&P Economic Cycle Factor Rotator Index (“Rotator Index”)¹ and S&P Economic Cycle Factor Rotator (Cash Bond) Index (USD) seek to model a rotational investment strategy across four distinct factor-based indices based on the most recent economic data from the Chicago Fed National Activity Index (“CFNAI”). Each of the four distinct strategies is represented by a sub-index consisting of one component equity index and one component fixed income index: the S&P 5-Year U.S. Treasury Note Futures Excess Return Index or the S&P U.S. Treasury Bond 5-7 Year Excess Return Index. The four component equity indices are:

Strategy	Target Portfolio/Sub-index	Component Equity Index
Momentum	S&P Momentum Daily Risk Control 6% Excess Return Index	S&P Momentum United States LargeMidCap (USD) Excess Return
Value	S&P Value Daily Risk Control 6% Excess Return Index	S&P 500 Pure Value Excess Return
Buyback	S&P Buyback Daily Risk Control 6% Excess Return Index	S&P 500 Buyback FCF Index Excess Return
Low Volatility High Dividend	S&P Low Volatility High Dividend Daily Risk Control 6% Excess Return Index	S&P 500 Low Volatility High Dividend Excess Return

The four target portfolios are calculated on a daily risk control basis with a target volatility of 6%. Using the CFNAI data as an input, the Rotator Index then chooses the appropriate target portfolio based on the Target Style Allocation Scheme.

The CFNAI is a weighted average of 85 indicators of national economic activity drawn from four broad data categories:

- Production and income
- Personal consumption and housing
- Employment, unemployment, and hours
- Sales, orders, and inventories

A zero value for the index indicates that the national economy is expanding at its historical trend rate of growth; negative values indicate below-average growth; and positive values indicate above-average growth.

The CFNAI data, representing the previous month’s activity, is typically released around the 21st of each month. Current CFNAI data are available at the Federal Reserve Bank of Chicago’s Web site at www.chicagofed.org/research/data/cfnai/current-data. The new monthly signal is announced three business days prior to the month end and is implemented on the first business day of the following month.

Please refer to Index Construction for details on each sub-index’s allocation to equity and fixed income, and the rule according to which the Rotator Index allocates among the four sub-indices based on current and historical CFNAI data.

¹ Two versions of the index are calculated using component equity indices based on two types of returns: price return and total return. For further details, please refer to Eligibility Criteria and Index Construction on the following pages.

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
S&P Dow Jones Indices' Fixed Income Policies & Practices Methodology	Fixed Income Policies & Practices
S&P Dow Jones Indices' Fixed Income 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 eligible asset classes and the component indices used to represent the sub-indices are detailed in the tables below.

Sub-index	Asset Class	Sub-Components		Ticker
S&P Momentum Daily Risk Control 6% Excess Return Index	Equity	S&P Momentum United States LargeMidCap (USD) Excess Return ²		SPUSMUE
	Fixed Income ³	Bond Future	S&P 5-Year U.S. Treasury Note Futures Excess Return Index	SPUST5P
		Cash Bond	S&P U.S. Treasury Bond 5-7 Year Excess Return Index	
	Cash ⁴	2 Month US Dollar LIBOR interest rate		US0002M
3 Month US Dollar LIBOR interest rate		US0003M		

Sub-index	Asset Class	Sub-Components		Ticker
S&P Value Daily Risk Control 6% Excess Return Index	Equity	S&P 500 Pure Value Excess Return ²		500PVER
	Fixed Income ³	Bond Future	S&P 5-Year U.S. Treasury Note Futures Excess Return Index	SPUST5P
		Cash Bond	S&P U.S. Treasury Bond 5-7 Year Excess Return Index	
	Cash ⁴	2 Month US Dollar LIBOR interest rate		US0002M
3 Month US Dollar LIBOR interest rate		US0003M		

Sub-index	Asset Class	Sub-Components		Ticker
S&P Buyback Daily Risk Control 6% Excess Return Index	Equity	S&P 500 Buyback FCF Index Excess Return ²		SPBUYFUER
	Fixed Income ³	Bond Future	S&P 5-Year U.S. Treasury Note Futures Excess Return Index	SPUST5P
		Cash Bond	S&P U.S. Treasury Bond 5-7 Year Excess Return Index	
	Cash ⁴	2 Month US Dollar LIBOR interest rate		US0002M
3 Month US Dollar LIBOR interest rate		US0003M		

Sub-index	Asset Class	Sub-Components		Ticker
S&P Low Volatility High Dividend Daily Risk Control 6% Excess Return Index	Equity	S&P 500 Low Volatility High Dividend Excess Return ²		SP5LVHDE
	Fixed Income ³	Bond Future	S&P 5-Year U.S. Treasury Note Futures Excess Return Index	SPUST5P
		Cash Bond	S&P U.S. Treasury Bond 5-7 Year Excess Return Index	
	Cash ⁴	2 Month US Dollar LIBOR interest rate		US0002M
3 Month US Dollar LIBOR interest rate		US0003M		

For information on the component equity indices, please refer to the S&P Momentum Indices Methodology, S&P U.S. Style Indices Methodology, S&P Buyback FCF and PE Indices Methodology, and S&P Low Volatility High Dividend Indices Methodology, respectively. In conjunction with these methodologies, please refer to S&P Dow Jones Indices' Index Mathematics Methodology for details on excess return index calculations. These documents are available at www.spdji.com.

For information on the component fixed income index, please refer to the S&P Global Bond Futures Index Series Methodology available at www.spdji.com.

² Two versions of the excess return component equity index are calculated: one based on the underlying price return index and one based on the underlying total return index.

³ The Rotator Index and Cash Bond index use the Bond Futures Index and the Cash Bond Index as their respective fixed income components.

⁴ Cash items are used in calculating the excess return; the indices do not hold cash.

Index Construction

Approach

Four target portfolios (Momentum, Value, Buyback, and Low Volatility High Dividend) are created as the basis for each S&P Economic Cycle Factor Rotator Index (“Rotator Index”). On a monthly basis, the Rotator Index allocates to one of these four target portfolios depending on the CFNAI inputs, based on the Target Style Allocation Scheme.

Component Equity Indices

The first step in the formation of the Rotator Index is to calculate the underlying component equity indices. Two versions of each excess return component equity index are calculated: one based on the underlying index’s price return and one based on the underlying index’s total return. Please refer to Appendix I for more details on the Excess Return calculations.

Sub-Indices

The next step in the formation of the Rotator Index is to determine the Sub-Indices. Please refer to Appendix II for more details on the calculation of the Sub-Index calculation.

Calculation of the Sub-index Level

The next step in the formation of the Rotator Index is to calculate each Sub-Index level. The Risk Controlled Sub-index level for each of the four target portfolios are calculated as follows:

$$Subindex_t = Subindex_{t-1} \times \left(1 + W_{E,t-2} \times \left(\frac{ER_t^E}{ER_{t-1}^E} - 1 \right) + W_{B,t-2} \times \left(\frac{ER_t^B}{ER_{t-1}^B} - 1 \right) \right)$$

where:

$W_{E,t}$ = The weight of the equity at time t

$W_{B,t}$ = The weight of the bond at time t

ER_t^E = The closing excess return level of equity constituent at time t

ER_t^B = The closing excess return level of bond constituent at time t

Target Style Allocation Scheme

The next step in the formation of the Rotator Index is to determine to which Sub-Index to allocate. This is based on the three-month average and change of CFNAI. For each month, k , the three-month average and change of CFNAI are defined as follows:

$$3M\ Average(k) = \frac{1}{3} * \{CFNAI(k) + CFNAI(k - 1) + CFNAI(k - 2)\}$$

$$3M\ Change(k) = CFNAI(k) - CFNAI(k - 3)$$

where:

$CFNAI(k)$ = The most recent value of the CFNAI as of publishing date (un-restated)

$CFNAI(k-1)$ = The most recent value of the CFNAI prior to $CFNAI(k)$

$CFNAI(k-2)$ = The most recent value of the CFNAI prior to $CFNAI(k-1)$

$CFNAI(k-3)$ = The most recent value of the CFNAI prior to $CFNAI(k-2)$

If restated values are available for previous months, they will be used in the calculation of the current three-month average and three-month change. However, the index will not revise previously calculated averages and change rates from previous index rebalancings.

On the first trading day of each calendar month, the target style Equity Allocated Index (k) is determined as follows:

1. If $3M\ Average(k) \geq 0$ and $3M\ Change(k) \geq 0$, then Equity Allocated Index (k) is SPUSMUE (Momentum)
2. If $3M\ Average(k) < 0$ and $3M\ Change(k) \geq 0$, then Equity Allocated Index (k) is 500PVER (Value)
3. If $3M\ Average(k) \geq 0$ and $3M\ Change(k) < 0$, then Equity Allocated Index (k) is SPBUYFUER (Buyback)
4. If $3M\ Average(k) < 0$ and $3M\ Change(k) < 0$ and $3M\ Average(k - 1) < 0$ and $3M\ Change(k - 1) \geq 0$, then Equity Allocated Index (k) is 500PVER (Value)

Otherwise, Equity Allocated Index (k) is SP5LVHDE (Low Volatility High Dividend).

At each monthly rebalancing, an indicator vector, \vec{v}_t , is used to identify the target portfolio deployed at time t and is defined as follows:

For month k ,

If Equity allocated index (k) is Momentum, then $\vec{v}_t = \{1,0,0,0\}$

If Equity allocated index (k) is Value, then $\vec{v}_t = \{0,1,0,0\}$

If Equity allocated index (k) is Buyback, then $\vec{v}_t = \{0,0,1,0\}$

If Equity allocated index (k) is Low Volatility High Dividend, then $\vec{v}_t = \{0,0,0,1\}$

Furthermore, \vec{v}_t^i returns the i^{th} value of the vector at time t . For example, if the style at time t is 3, then $\vec{v}_t^3 = 1$, and $\vec{v}_t^1 = \vec{v}_t^2 = \vec{v}_t^4 = 0$.

Index Returns and Level Calculations

The next step in the formation of the Rotator Index is to calculate the daily index returns and levels for each Sub-Index. The daily index levels of the Rotator Index in any given month are calculated using the daily returns of the target portfolio selected for the given month. Let each Risk Controlled sub-index for each target portfolio style be defined as:

Momentum = $Subindex_t^1$

Value = $Subindex_t^2$

Buyback = $Subindex_t^3$

Low Volatility High Dividend = $Subindex_t^4$

The final step in the formation of the Rotator Index is to calculate the overall Rotator Index return and level. Using the indicator vector as defined above, \vec{v}_t , the daily returns are computed by summing the four style risk controlled sub-indices. The indicator serves to select the appropriate target portfolio for time t .

$$IndexDailyReturn_t = \sum_{i=1}^4 \vec{v}_t^i \left(\frac{Subindex_t^i}{Subindex_{rebalancing}^i} - 1 \right)$$

$$IndexValue_t = IndexValue_{t-1} * (1 + IndexDailyReturns_t)$$

Equity-Only Rotator Indices

In addition to the above indices, there are other versions of the Rotator Indices, the Equity-Only Rotator Indices, that allocate among the same set of Target Strategies, but whose underlying component equity indices are different. Each Target Strategy is represented as shown below:

Target Strategy	Equity Index
Momentum	S&P Momentum United States LargeMidCap Index (US Dollar)
Value	S&P 500 Pure Value
Buyback	S&P 500 Buyback FCF Index
Low Volatility High Dividend	S&P 500 Low Volatility High Dividend Index

There are three versions of the Equity-Only Rotator Indices, in which the equity index that represents each target strategy will all be based on the Price Return, Total Return, or Net Total Return index values.

There is no excess return calculation or risk control calculation involved in these indices.

The target strategy allocation determination is based on the CFNAI, and is conducted the same way as detailed above in the “Target Style Allocation Scheme” section.

The Equity-Only Rotator Index level is calculated in the same was as detailed above in the “Index Returns and Level calculations” section.

Index Maintenance

Rebalancing

Each S&P Economic Cycle Factor Rotator Index is rebalanced monthly after the market close on the first business day of each month. Index allocation changes are typically announced three business days prior to the rebalancing date.

The target portfolios (sub-indices) are rebalanced in accordance with S&P Dow Jones Indices' Risk Control 2.0 Indices Methodology. The target portfolios for the equity-only versions are rebalanced in accordance with each respective underlying index methodology.

For information on the component equity indices, please refer to the S&P Momentum Indices Methodology, S&P U.S. Style Indices Methodology, S&P Buyback FCF and PE Indices Methodology, and S&P Low Volatility High Dividend Indices Methodology, respectively.

For further information on the Risk Control 2.0 Methodology, please refer to S&P Dow Jones Indices' Index Mathematics Methodology. All methodologies are available at www.spdji.com.

Additions and Deletions. Component indices are not expected to change between rebalancing periods. If a constituent is discontinued, the Index Committee may elect to discontinue representation of the affected asset class within the index or designate a successor component index.

Currency, Currency Hedged, and Risk Control Indices

The indices are calculated in U.S. dollars.

Currency, currency hedged, and risk control versions of the indices may be available. For a list of available currency, currency hedged, and risk control indices, please contact Client Services at index_services@spglobal.com.

For more information on currency, currency hedged, and risk control indices, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.

Base Date and History Availability

Index history availability, base dates, and base values are shown in the table below.

Index ⁵	Launch Date	First Value Date	Base Date	Base Value
S&P Economic Cycle Factor Rotator Index	08/16/2016	08/01/1995	08/01/1995	100
S&P Economic Cycle Factor Rotator (Cash Bond) Index (USD)	02/16/2018	08/01/1995	08/01/1995	100
S&P Economic Rotator Index NTR – Equity Only	06/08/2017	01/02/2001	01/02/2001	100
S&P Economic Rotator Index PR – Equity Only	06/08/2017	07/03/1995	07/03/1995	100
S&P Economic Rotator Index TR – Equity Only	06/08/2017	07/03/1995	07/03/1995	100
S&P Momentum Daily Risk Control 6% Excess Return Index	08/16/2016	08/01/1995	08/01/1995	100
S&P Value Daily Risk Control 6% Excess Return Index	08/16/2016	08/01/1995	08/01/1995	100
S&P Buyback Daily Risk Control 6% Excess Return Index	08/16/2016	08/01/1995	08/01/1995	100
S&P Low Volatility High Dividend Daily Risk Control 6% Excess Return Index	08/16/2016	08/01/1995	08/01/1995	100

⁵ Dates and base values are the same for both index versions (i.e. those based on the component equity price return index and those based on the component equity total return index).

Index Governance

Index Committee

The Global Benchmarks Index Committee maintains the indices. All committee members are full-time professional members of S&P Dow Jones Indices' staff. The Committee meets monthly. At each meeting, the Committee may revise index policy covering rules for including other assets or asset classes, changes to target weight allocations, currencies, the timing of rebalancing, 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 Index 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 document.

Index Policy

Holiday Schedule

The indices are calculated on all U.S. equity market business days.

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 or around the scheduled rebalancing date. Any such change will be announced with proper advance notice where possible.

Unscheduled Exchange Closures

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

Recalculation Policy

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

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

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 currency, currency hedged, risk control, and return type versions of the below indices that may exist are also covered by this document. Please contact index_services@spglobal.com for a complete list of indices covered by this document.

Index	Bloomberg
<i>Indices based on component equity total return indices:</i>	
S&P Economic Cycle Factor Rotator Index (TR)	SPECFR6T
S&P Economic Rotator Index TR – Equity Only	SPECFRT
S&P Momentum Daily Risk Control 6% Excess Return Index (TR)	SPECFM6T
S&P Value Daily Risk Control 6% Excess Return Index (TR)	SPECFV6T
S&P Buyback Daily Risk Control 6% Excess Return Index (TR)	SPECFB6T
S&P Low Volatility High Dividend Daily Risk Control 6% Excess Return Index (TR)	SPECFL6T
<i>Indices based on component equity price return indices:</i>	
S&P Economic Cycle Factor Rotator Index	SPECFR6P
S&P Economic Cycle Factor Rotator (Cash Bond) Index (USD)	SPECFR6B
S&P Economic Rotator Index PR – Equity Only	SPECFRP
S&P Momentum Daily Risk Control 6% Excess Return Index (PR)	SPECFM6P
S&P Value Daily Risk Control 6% Excess Return Index (PR)	SPECFV6P
S&P Buyback Daily Risk Control 6% Excess Return Index (PR)	SPECFB6P
S&P Low Volatility High Dividend Daily Risk Control 6% Excess Return Index (PR)	SPECFL6P
<i>Indices based on component equity net total return indices:</i>	
S&P Economic Rotator Index NTR – Equity Only	SPECFRN

FTP

Daily index level data is available via FTP 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.

Appendix I

For the S&P Momentum United States LargeMidCap (USD) Excess Return, S&P 500 Pure Value Excess Return, S&P 500 Buyback FCF Index Excess Return, and S&P 500 Low Volatility High Dividend Excess Return, the interest rate formula is designed to replicate a rolling investment in a three-month interest rate as follows:

$$InterestRate_{i-1} = (D_{i-1,t} * IR3M_{i-1} - (IR3M_{i-1} - IR3M_{i-2} - D_{i-1,t} * (IR3M_{i-1} - IR2M_{i-1}) * (1/30)) * 90) / 360$$

where:

$D_{i-1,t}$ = The number of calendar days between day $i-1$ and day t

$IR3M_{i-1}$ = Three-month interest rate on day $i-1$

$IR2M_{i-1}$ = Two-month interest rate on day $i-1$

These two versions are then ultimately used in calculating two versions of the S&P Economic Cycle Factor Rotator Index, one based on the underlying component equity price return index and one based on the underlying component equity total return index.

Appendix II

The four target portfolios are calculated on a daily risk control basis with a target volatility of 6%, short-term decay factor of 94%, long-term decay factor of 97%, and on an excess return basis, in accordance with S&P Dow Jones Indices' Risk Control 2.0 Indices Methodology. There are four target strategy portfolios, each consisting of one style equity index excess return, and one fixed income index (the S&P 5-Year U.S. Treasury Note Futures Excess Return Index or the S&P U.S. Treasury Bond 5-7 Year Excess Return Index), as shown below:

Target Strategy	Equity Index	Fixed Income Index
Momentum	S&P Momentum United States LargeMidCap (USD) Excess Return	S&P 5-Year U.S. Treasury Note Futures Excess Return Index
Value	S&P 500 Pure Value Excess Return	
Buyback	S&P 500 Buyback FCF Index Excess Return	Or
Low Volatility High Dividend	S&P 500 Low Volatility High Dividend Excess Return	S&P U.S. Treasury Bond 5-7 Year Excess Return Index

The weightings of the equity and fixed income exposures within the four target portfolios are based on their individual portfolio volatilities, except for the following difference: when there is no solution to the quadratic, the weights are reduced until the target volatility is achieved, with the weights restricted to a maximum of 100% and a minimum of 0%.

For more information on the Risk Control 2.0 Indices Methodology and excess return index calculations, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.

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