

S&P Strategic Futures Index *Methodology*

December 2018

Table of Contents

Introduction	2
Index Objective and Overview	2
Highlights	2
Index Family	2
Supporting Documents	2
Index Constituents and Weightings	4
General Eligibility Requirements	4
Weighting Scheme	4
Rebalancing	5
Index Construction	6
Overview of the Index Construction	6
Position Determination	6
Commodity Components Roll Strategy	6
Index Maintenance	7
Contract Rolls	7
Currency, Currency Hedged, Inverse, Leveraged, and Risk Control Indices	9
Index Calculation	10
Daily Calculation	10
Index Data	14
Spot, Excess Return and Total Return Indices	14
Index Governance	15
Index Committee	15
Index Policy	16
Holiday Schedule	16
Contact Information	16
Index Dissemination	17
Tickers	17
Index Data	17
Web site	17
Appendix I	18
Component Futures Contracts	18
Exponential Average Multiplier Schedule	18
Appendix II	19
Glossary	19
Disclaimer	20

Introduction

Index Objective and Overview

The S&P Strategic Futures Index (S&P SFI) measures trends based on price movements of certain highly liquid futures contracts, while limiting volatility. The futures contracts are represented individually on either a “long” or “short” basis, depending on market momentum. With both long and short individual components, the index is designed to capture the economic benefit over long time periods, derived from both rising and declining trends within a cross-section of futures markets.

All S&P SFI component positions are determined at the component level. There is no short exemption for any component.

Highlights

The key characteristics of the S&P SFI include:

- The S&P SFI is comprised of 24 component futures contracts encompassing eight financial and six commodity sectors:
 - Financials includes eight global financial futures contracts.
 - Commodities include 16 traditional physical commodity futures contracts.
- Long or short positions are determined by measuring the current component price relative to its exponential moving average.
- The weighting scheme is constructed to ensure that the risk contribution from each component is balanced, subject to the weight of each component being positive and having a cumulative weight totaling 100%. The risk contribution from each component is calculated using its covariance, as defined by its volatility and correlation with other components. Volatility is defined as the standard deviation of the daily returns of the relevant component over a one-year period and correlation is computed using daily returns over the same period.
- Component weights are reset monthly.
- Positions are rolled from the first (1st) through fifth (5th) business day of each month.

Index Family

S&P Dow Jones Indices also calculates two sub-indices representing components of the S&P SFI. Excess and total return versions are also calculated and published for each of these two market sectors.

- **S&P Strategic Futures Commodity Index.** The index reflects the physical commodity futures components of the S&P SFI.
- **S&P Strategic Financial Futures Index.** The index reflects the financial futures components of the S&P SFI.

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' Commodities Indices Policies & Practices Methodology	Commodities 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.

Index Constituents and Weightings

General Eligibility Requirements

The 24 components and general membership of the index are reviewed by the Index Committee periodically based on market conditions and the membership is subject to composition changes if deemed as necessary.

Weighting Scheme

The S&P SFI takes into account the contribution of each component to the overall index risk in order to avoid concentration in any one component and to create diversification in terms of individual component risk contributions.

The aim is to determine an allocation such that the risk contribution from each constituent is balanced, subject to the weight of each constituent being positive and their cumulative weights totalling 100%.

The risk contribution from each constituent is calculated using its covariance, as defined by its volatility and correlation with other commodities. Volatility is defined as the standard deviation of the daily returns of the relevant commodity index over a one-year period and correlation is computed using daily returns over the same period.

The S&P SFI does not make inherent assumptions about the expected return of commodities, and the weighting scheme is based purely on the covariance of the different commodities.

Determination of the Risk Contribution from Each Component. The marginal risk contribution (*MRC*) is defined as the change in volatility of the overall index induced by an infinitesimal increase in the weight of a given component.

Mathematically, it can be summarized as follows:

$$MRC_i = \frac{\partial \sigma_{PORT}}{\partial \varpi_i} = \sum_{j=1}^N \varpi_j \cdot \text{COV}(r_i, r_j) = \text{COV}(r_i, r_{PORT})$$

where:

$$\frac{\partial \sigma_{PORT}}{\partial \varpi_i} = \text{Change in the volatility of the index with respect to a small change in the weight of component } i.$$

$$\text{COV}(r_i, r_j) = \text{Covariance between component } i \text{ and } j.$$

$$\text{COV}(r_i, r_{PORT}) = \text{Covariance between component } i \text{ and the entire index.}$$

The risk contribution (*RC*) from each component is equal to the product of its weight (ϖ) and its respective marginal risk contribution (*MRC*).

$$RC_i = \varpi_i \times MRC_i$$

Determination of Weights of Individual Components. The individual component weights are determined using a numerical optimization technique, with the aim of minimizing, as much as possible, the variance of the risk contributions from all of the components.

Rebalancing

Monthly Rebalancing of Component Weights. Components are rebalanced to their risk weights at the beginning of each month. The rebalancing reference date is the second to last S&P SFI business day of the month. The rebalancing is implemented over a five-day period from the first (1st) through the fifth (5th) S&P SFI business day of the month.

Monthly rebalancing helps to limit volatility. An extended component trend could overweight the S&P SFI and potentially lead to significantly higher volatility of the strategy.

Index Construction

Overview of the Index Construction

The S&P SFI is designed to capture both upward and downward price trends while moderating overall volatility. Components of the strategy are chosen based on fundamental characteristics and the liquidity needed for an investable model.

Position Determination

- **Long positions** are tracked when a component's current price input is greater than or equal to the exponential average of the past seven price inputs.
- **Short positions** are tracked when a component's current price input is less than the exponential average of the past seven price inputs.

The position is determined on the second to last S&P SFI business day of the month (defined as the position determination date, or PDD) when the monthly percentage change of a component's price is compared to past monthly price changes, and the position is exponentially weighted to give greater weight to the most recent return and less weight to the return seven months prior. See *Appendix I* for details regarding the exponential average. The weighted sum of the percentage changes of all the component prices equals the daily movement of the index.

The trade activity period (TAP) is the five S&P SFI business day period when the positions are executed from the first (1st) through the fifth (5th) S&P SFI business days of the month.

The roll rules and procedures followed are those as specified in the *S&P GSCI Methodology*, sections VI.2 (b), VI.2 (c) and VI.2 (d).

Commodity Components Roll Strategy

All long S&P SFI commodity component positions are rolled based on the standard Enhanced roll strategy, and all short S&P SFI commodity component positions are rolled based on the S&P GSCI roll strategy.

Index Maintenance

Contract Rolls

The S&P SFI is a strategy index designed to capture futures contract price trends, since futures contracts expire, the components must roll into the “next” contract to maintain continuity in the calculation of the index.

Currently, each contract has three to four roll periods each year and its own contract calendar based on historical liquidity. Below are the rules for rolling futures contracts in the index.

- The non-currency component contracts are rolled from the current contract to the next contract beginning with the TAP for the month that is two months prior to the current contract maturity.
- The currency contracts are rolled from the current contract to the next maturing futures contract four times per year as of the first TAP for the month prior to the contract’s final maturity month.

Most of the S&P GSCI® futures contracts in the S&P SFI follow the normal schedule with the following exceptions:

- For WTI crude oil during the roll period months of January through June, if the contango between the first and second contract month is more than 0.50%, the contracts will roll to the current year’s December contract. During the roll period months of July through December, if the contango between the first and second contract month is more than 0.50%, the contracts will roll to the next year’s December contract.
- Heating oil is rolled annually to the December contract during the November roll period.
- Natural gas is rolled annually to the January contract during the December roll period.
- Chicago Wheat is rolled annually to the December contract during the November roll period.
- Corn is rolled annually to the July contract during the May roll period.
- Lean Hogs are rolled semi-annually to the April and August contracts during the July and March rolls, respectively.
- Live Cattle is rolled semi-annually to the April and October contracts during the September and March rolls, respectively.

Chart 4 - Active contract schedule used for price inputs of the index

Contract Name	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Soybeans	H	K	K	N	N	X	X	X	X	F	F	H
Coffee	H	K	K	N	N	U	U	Z	Z	Z	H	H
Sugar	H	K	K	N	N	V	V	V	H	H	H	H
Cocoa	H	K	K	N	N	U	U	Z	Z	Z	H	H
Cotton	H	K	K	N	N	Z	Z	Z	Z	Z	H	H
RBOB Gasoline	H	J	K	M	N	Q	U	V	X	Z	F	G
Copper	H	K	K	N	N	U	U	Z	Z	Z	H	H
Gold	J	J	M	M	Q	Q	Z	Z	Z	Z	G	G
Silver	H	K	K	N	N	U	U	Z	Z	Z	H	H
Australian Dollar	H	H	M	M	M	U	U	U	Z	Z	Z	H
British Pound	H	H	M	M	M	U	U	U	Z	Z	Z	H
Canadian Dollar	H	H	M	M	M	U	U	U	Z	Z	Z	H
Euro	H	H	M	M	M	U	U	U	Z	Z	Z	H
Japanese Yen	H	H	M	M	M	U	U	U	Z	Z	Z	H
Swiss Franc	H	H	M	M	M	U	U	U	Z	Z	Z	H
U.S. Treasury Bond	H	M	M	M	U	U	U	Z	Z	Z	H	H
U.S. Treasury Note	H	M	M	M	U	U	U	Z	Z	Z	H	H

Chart 5 – Month Letter Codes

Letter	Contract Expiration	Letter	Contract Expiration	Letter	Contract Expiration
F	January	K	May	U	September
G	February	M	June	V	October
H	March	N	July	X	November
J	April	Q	August	Z	December

The risk of aberrational liquidity or pricing around the maturity date of a commodity futures contract is greater than in the case of cash-settled futures contracts because (among other factors) a number of market participants take delivery of the underlying commodities. Spot markets in commodities occasionally have delivery problems related to, for example, weather conditions disrupting transportation of cattle to a delivery point. Such a delay could cause the spot market to skyrocket, while latter-dated futures contracts are little changed. The strategy avoids delivery issues by owning contracts that are outside of nearby delivery.

Chart 6 – Commodities, Contract Codes, and Exchanges

Reuters Code	Bloomberg Code	Currency & Commodities Contracts	Exchange
AD	AD	Australian Dollar	Chicago Mercantile Exchange
BP	BP	British Pound	Chicago Mercantile Exchange
C	C	Corn	Chicago Board Of Trade
CC	CC	Cocoa	Intercontinental Exchange - US
CD	CD	Canadian Dollar	Chicago Mercantile Exchange
CL	CL	WTI Crude Oil	NYMEX
CT	CT	Cotton #2	Intercontinental Exchange - US
GC	GC	Gold	NYMEX
HG	HG	Copper	NYMEX
HO	HO	Heating Oil	NYMEX
JY	JY	Japanese Yen	Chicago Mercantile Exchange
KC	KC	Coffee 'C'	Intercontinental Exchange - US
LC	LC	Live Cattle	Chicago Mercantile Exchange
LH	LH	Lean Hogs	Chicago Mercantile Exchange
NG	NG	Natural Gas	NYMEX
RB	XB	RBOB Gasoline	NYMEX
S	S	Soybeans	Chicago Board Of Trade
SB	SB	Sugar #11	Intercontinental Exchange - US
SF	SF	Swiss Franc	Chicago Mercantile Exchange
SI	SI	Silver	NYMEX
TY	TY	US 10 Year Note	Chicago Board Of Trade
URO	EU	Euro	Chicago Mercantile Exchange
US	US	US Long Bond	Chicago Board Of Trade
W	W	Chicago Wheat	Chicago Board Of Trade

Currency, Currency Hedged, Inverse, Leveraged, and Risk Control Indices

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

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

Index Calculation

Daily Calculation

Spot Calculation. On a given business day, d , the spot price ($SPOT$) of the index containing i number of Components/Commodities (c) is calculated as follows:

$$SPOT_d = \frac{\left(\sum_{c=1}^i TDW1 + SC1 \right)}{NC_{old}} + \frac{\left(\sum_{c=1}^i TDW2 + SC2 \right)}{NC_{new}}$$

where:

$\sum_{c=i}^i TDW1$ = The sum of the total dollar weight (TDW) of each component's (c 's) current contract.

$\sum_{c=i}^i TDW2$ = The sum of the TDW of each component (c 's) next contract.

$SC1$ = The short component effective during the prior month, expressed in the same terms as contract production weights ($CPWs$).

$SC2$ = The short component effective in the current month, expressed in the same terms as $CPWs$.

NC_{old} = Normalizing constant effective during the prior month.

NC_{new} = Normalizing constant effective during the current month.

The short component (SC) is allocated to the amount of weight remaining in the index after the weight of each component has been defined based on the long and short positions and their respective percentage weights. Adding the weight of the short component to the sum of the component weights results in the weight of the index totaling to 100%.

The short component is calculated as follows:

$$SC = \left(1 - \sum ComponentWeights \right) * 1000$$

Total Dollar Weight Calculation. On any day, d , the total dollar weight (TDW) for commodity c is the product of its contract production weight, contract roll weight and daily contract price for the current and next contracts, respectively.

$$TDWc_d = CPWc_d * CRWc_d * DCRPc_d$$

where:

$TDWC_d$ = Total dollar weight for commodity c on day d .

$CPWC_d$ = Contract production weight for commodity c set on the first business day of the month.

$CRWC_d$ = Contract roll weights for commodity c on day d .

$DCRPC_d$ = Daily contract price for commodity c on day d .

Contract Production Weights (CPWs). These are determined on the last business day of the month. The CPW value is calculated as follows:

$$CPW = \frac{\text{ComponentWeight}}{DCRP_d * 1000}$$

Contract Roll Weights Logic. On a given non-roll day, $CRW1 = 1$ and $CRW2 = 0$

During the roll period the CRW value is computed as follows:

For the S&P SFI, the number of roll days is five (5).

$$CRW = \frac{100\%}{\text{number of roll days}} = 20\%$$

Since the number of roll days is five, 20% of its components roll in and out daily, keeping the aggregate component weights at 100%.

Days	CRW1	CRW2
1	0.8	0.2
2	0.6	0.4
3	0.4	0.6
4	0.2	0.8
5	0	1

The S&P SFI holds the roll for two (2) days after its completion, so the $CRW1$ value during the roll hold days is 0 and the $CRW2$ value is 1.

Normalizing Constant

$$NC_{new} = NC_{old} * \frac{\sum(CPW_{new} * DCRP1_d + CPW_{new} * DCRP2_d) + SC1}{\sum(CPW_{old} * DCRP1_d + CPW_{old} * DCRP2_d) + SC2}$$

where:

CPW_{new} = This month's contract production weight.

CPW_{old} = Last month's contract production weight.

$SC1$ = The short component effective during the last month.

$SC2$ = The short component effective in the current month.

$DCRP1_d$ = Current contract price on day d .

$DCRP2_d$ = Next contract price on day d .

NC_{old} = Normalizing constant effective as of the last month.

Excess Return Calculation. On any business day, the S&P SFI Excess Return (ER) index level is equal to the product of the S&P SFI ER index level on the immediately preceding S&P SFI business day multiplied by one plus the contract daily return as of that day. The index is calculated to a seven (7) digit precision.

$$ER_d = ER_{d-1} * [1 + CDR_d]$$

where:

ER_d = Excess return value for business day d .

ER_{d-1} = Excess return value as of the immediate preceding business day.

CDR_d = Contract daily return of the index.

Contract Daily Return Calculation. The contract daily return (CDR) on any business day, d , is equal to the ratio obtained by dividing the total dollar weight obtained by the total dollar weight invested on the immediately preceding business day, minus one.

$$CDR_d = \frac{TDWO_d}{TDWI_d} - 1$$

where:

$TDWO_d$ = The total dollar weight obtained for business day d .

$TDWI_d$ = The total dollar weight invested as of the immediate preceding business day.

Total Dollar Weight Obtained. On any given day, d , the total dollar weight obtained ($TDWO$) is the amount obtained from an investment on the immediately preceding day. The $TDWO$ for a given day is calculated using the component weights and contract roll weights in effect on the immediately preceding day, $d-1$, and the daily contract reference prices used to calculate the S&P SFI Index on day d .

$$TDWO_d = \frac{NC_{new}}{NC_{old}} * \left[\left(\sum_{c=1}^i (CPW_{new_d} * CRW1_{d-1} * DCRP1_d) + SC1 * CRW1_{d-1} \right) + \left(\sum_{c=1}^i (CPW_{new_d} * CRW2_{d-1} * DCRP2_d) + SC2 * CRW2_{d-1} \right) \right]$$

where:

CPW_{new_d} = Contract production weight of the component on day d .

$CRW1_{d-1}$ = The roll-out percentage of the contract roll weight on day $d-1$.

$CRW2_{d-1}$ = The roll-in percentage of the contract roll weight on day $d-1$.

$DCRP1_d$ = Current contract price on day d .

$DCRP2_d$ = Next contract price on day d .

$SC1$ = Short component effective last month.

$SC2$ = Short component effective in the current month.

NC_{old} = Normalizing constant effective as of the last month.

NC_{new} = Normalizing constant effective during this month.

Total Dollar Weight Invested. On any given day, d , the total dollar weight invested ($TDWI$) is equal to the total dollar weight of the immediate preceding business day, $d-1$, and can be calculated as follows:

$$TDWI_d = \frac{NC_{new}}{NC_{old}} * \left[\left(\sum_{c=1}^i (CPW_{new_d} * CRW1_{d-1} * DCRP1_{d-1}) + SC1 * CRW1_{d-1} \right) + \left(\sum_{c=1}^i (CPW_{new_d} * CRW2_{d-1} * DCRP2_{d-1}) + SC2 * CRW2_{d-1} \right) \right]$$

where:

CPW_{new_d} = Contract production weight of the component on day d .

$CRW1_{d-1}$ = The roll-out percentage of the contract roll weight on day $d-1$.

$CRW2_{d-1}$ = The roll-in percentage of the contract roll weight on day $d-1$.

$DCRP1_d$ = Current contract price on day $d-1$.

$DCRP2_d$ = Next contract price on day $d-1$.

$SC1$ = Short component effective last month.

$SC2$ = Short component effective in the current month.

NC_{old} = Normalizing constant effective as of the last month.

NC_{new} = Normalizing constant effective during this month.

Total Return Calculation. On any given calendar day, d , the Treasury bill return (TBR) is equal to an amount determined in accordance with the following formula:

$$TBR_d = \left[\frac{1}{1 - \frac{91}{360} * TBAR_{d-1}} \right]^{1/91} - 1$$

where:

$TBAR_{d-1}$ = The three-month Treasury bill rate available on the immediately preceding business day, $d-1$.

On any business day, the value of the S&P SFI Total Return (TR) index level is equal to the product of (i) the value of the S&P SFI TR on the immediately preceding business day, (ii) one plus the sum of the contract daily return and the Treasury bill return on the day on which the calculation is made, and (iii) one plus the Treasury bill return for each non-S&P SFI business day since the immediately preceding S&P SFI business day. The result of the foregoing calculation is, then, rounded to seven (7) digits of precision.

$$SPDTITR_d = SPDTITR_{d-1} * (1 + CDR_d + TBR_d) * (1 + TBR_d)^{days}$$

where:

$SPDTSITR_{d-1}$ = The previous day's S&P SFI TR index value.

CDR_d = The contract daily return on day d .

TBR_d = Treasury bill return on day d .

$Days$ = Number of non-business days since the last immediate preceding business day.

Index Data

Spot, Excess Return and Total Return Indices

In order to reflect the performance of a total return investment in commodities, the S&P SFI is available in three return types: Spot, Excess Return (ER) and Total Return (TR).

- The Spot Index (S&P SFI) is based on the price levels of the contracts included in the S&P SFI.
- The Excess Return Index (S&P SFI ER) incorporates the returns of the S&P SFI as well as the discount or premium obtained by “rolling” hypothetical positions in such contracts forward as they approach delivery.
- The Total Return Index (S&P SFI TR) incorporates the returns of the S&P SFI ER and interest earned on hypothetical fully collateralized contract positions on the commodities included in the S&P SFI.

Index Governance

Index Committee

S&P Dow Jones Indices has established an Index Committee to oversee the daily management and operations of the S&P SFI, and is responsible for all analytical methods and calculation of the indices. At each meeting, the Committee reviews any issues that may affect index constituents, statistics comparing the composition of the indices to the market, commodities that are being considered as candidates for addition to an index, and any significant market events. In addition, the Index Committee may revise the methodology covering rules for selecting commodities, 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' Commodities Indices Policies & Practices document.

Index Policy

Holiday Schedule

The S&P SFI is calculated daily based on the CME Group holiday schedule. The index is calculated when the majority of the S&P SFI contracts are open for official trading and official settlement prices are provided, excluding holidays and weekends.

For information on Calculations and Pricing Disruptions, Market Disruption Events and Holidays During Roll Period, Expert Judgment, Data Hierarchy, Unexpected Exchange Closures and Error Corrections, please refer to S&P Dow Jones Indices' Commodities 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, inverse, leveraged, 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 Name	Bloomberg	Reuters
S&P Strategic Futures Index	SPSFI	.SPSFI
S&P Strategic Futures Index ER	SPSFIP	.SPSFIP
S&P Strategic Futures Index TR	SPSFIT	.SPSFIT
S&P Strategic Commodity Futures Index	SPSCFI	.SPSCFI
S&P Strategic Commodity Futures Index ER	SPSCFIP	.SPSCFIP
S&P Strategic Commodity Futures Index TR	SPSCFIT	.SPSCFIT
S&P Strategic Financial Futures Index	SPSFFI	.SPSFFI
S&P Strategic Financial Futures Index ER	SPSFFIP	.SPSFFIP
S&P Strategic Financial Futures Index TR	SPSFFIT	.SPSFFIT

Index Data

Additional daily index data is 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.

Appendix I

Component Futures Contracts

The following are the futures contracts, exchanges and ticker symbols of the markets currently included in the S&P SFI. The Inclusion column indicates the first month for which the returns of the market in question could reasonably be included in the index simulations. Typically a contract is not eligible for inclusion until approximately one year after the contract begins to trade. The delay is due, in part, to the need for the contract to establish sufficient liquidity.

Futures Contract	Exchange	Symbol	Inclusion
Australian Dollar	CME	AD	February 1988
British Pound	CME	BP	January 1985
Canadian Dollar	CME	CD	January 1985
Euro (<i>replaced the German Mark</i>)	CME	EU	January 2000
German Mark	CME	DM	January 1985
Japanese Yen	CME	JY	January 1985
Swiss Franc	CME	SF	January 1985
US 10 Year Treasury Note	CBOT	TY	January 1985
US Treasury Bond	CBOT	US	January 1985

CME: Chicago Mercantile Exchange

CBOT: Chicago Board of Trade

Exponential Average Multiplier Schedule

To create an exponential average for comparison, price inputs (percentage change from current and previous six position determination dates, *PDDs*) are weighted using a multiplier per the schedule below, which is based on 1.6^0 , 1.6^1 , 1.6^2 , etc.

Number of Months	Multiplier	Weight
7	1	2.32%
6	1.6	3.71%
5	2.56	5.94%
4	4.096	9.51%
3	6.5536	15.22%
2	10.48576	24.34%
1	16.777216	38.95%
Total	43.072576	100.00%

The weight given to each month is based on its multiplier versus the accumulation of the multipliers. For example, the price seven months prior is 2.32% ($1/43.072576$), and so on. Therefore, 78.5% of the index's moving average is weighted to the price movements of the last three months, making current price movements more important than those of the more distant past.

Appendix II

Glossary

Term	Description
Active Contract	A liquid, actively traded contract with respect to a designated contract, as defined or identified by the relevant trading facility or, if no such definition or identification is provided by the trading facility, as defined by standard custom and practice in the industry.
CDR	The contract daily return.
Contract Expiration	A date or term specified by the trading facility on or through which a contract is traded as the date or term on, during or after which such contract will expire, or delivery or settlement will occur. The contract expiration may, but is not required to, be a particular contract month.
CPW	The contract production weight.
CRW	The contract roll weight.
DCRP	The daily contract reference price.
ER Index	The excess return index, which is the accretion of the contract daily return indexed to a normalized value.
NC	The normalizing constant.
Roll Period	With respect to any designated contract, the period of five business days beginning on the first (1 st) business day of each calendar month and ending on the fifth (5 th) business day of such month.
Spot Index	An index that reflects the price levels of the designated contracts and the CPW of each such contract.
TBR	The Treasury bill rate.
TDW	The total dollar weight.
TDWI	The total dollar weight invested.
TDWO	The total dollar weight obtained.
TR Index	The total return index, which incorporates the returns of the ER Index and the Treasury bill return.

Disclaimer

Copyright © 2018 S&P Dow Jones Indices LLC. All rights reserved. STANDARD & POOR'S, S&P, S&P 500, S&P 500 LOW VOLATILITY INDEX, S&P 100, S&P COMPOSITE 1500, S&P MIDCAP 400, S&P SMALLCAP 600, S&P GIVI, GLOBAL TITANS, DIVIDEND ARISTOCRATS, S&P TARGET DATE INDICES, GICS, SPIVA, SPDR and INDEXOLOGY are registered trademarks of Standard & Poor's Financial Services LLC ("S&P"). DOW JONES, DJ, DJIA and DOW JONES INDUSTRIAL AVERAGE are registered trademarks of Dow Jones Trademark Holdings LLC ("Dow Jones"). These trademarks together with others have been licensed to S&P Dow Jones Indices LLC. Redistribution or reproduction in whole or in part are prohibited without written permission of S&P Dow Jones Indices LLC. This document does not constitute an offer of services in jurisdictions where S&P Dow Jones Indices LLC, S&P, Dow Jones or their respective affiliates (collectively "S&P Dow Jones Indices") do not have the necessary licenses. Except for certain custom index calculation services, all information provided by S&P Dow Jones Indices is impersonal and not tailored to the needs of any person, entity or group of persons. S&P Dow Jones Indices receives compensation in connection with licensing its indices to third parties and providing custom calculation services. Past performance of an index is not an indication or guarantee of future results.

It is not possible to invest directly in an index. Exposure to an asset class represented by an index may be available through investable instruments based on that index. S&P Dow Jones Indices does not sponsor, endorse, sell, promote or manage any investment fund or other investment vehicle that is offered by third parties and that seeks to provide an investment return based on the performance of any index. S&P Dow Jones Indices makes no assurance that investment products based on the index will accurately track index performance or provide positive investment returns. S&P Dow Jones Indices LLC is not an investment advisor, and S&P Dow Jones Indices makes no representation regarding the advisability of investing in any such investment fund or other investment vehicle. A decision to invest in any such investment fund or other investment vehicle should not be made in reliance on any of the statements set forth in this document. Prospective investors are advised to make an investment in any such fund or other vehicle only after carefully considering the risks associated with investing in such funds, as detailed in an offering memorandum or similar document that is prepared by or on behalf of the issuer of the investment fund or other investment product or vehicle. S&P Dow Jones Indices LLC is not a tax advisor. A tax advisor should be consulted to evaluate the impact of any tax-exempt securities on portfolios and the tax consequences of making any particular investment decision. Inclusion of a security within an index is not a recommendation by S&P Dow Jones Indices to buy, sell, or hold such security, nor is it considered to be investment advice.

These materials have been prepared solely for informational purposes based upon information generally available to the public and from sources believed to be reliable. No content contained in these materials (including index data, ratings, credit-related analyses and data, research, valuations, model, software or other application or output therefrom) or any part thereof ("Content") may be modified, reverse-engineered, reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of S&P Dow Jones Indices. The Content shall not be used for any unlawful or unauthorized purposes. S&P Dow Jones Indices and its third-party data providers and licensors (collectively "S&P Dow Jones Indices Parties") do not guarantee the accuracy, completeness, timeliness or availability of the Content. S&P Dow Jones Indices Parties are not responsible for any errors or omissions, regardless of the cause, for the results obtained from the use of the Content. THE CONTENT IS PROVIDED ON AN "AS IS" BASIS. S&P DOW JONES INDICES PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall S&P Dow Jones Indices Parties be

liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs) in connection with any use of the Content even if advised of the possibility of such damages.

S&P Global keeps certain activities of its various divisions and business units separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain divisions and business units of S&P Global may have information that is not available to other business units. S&P Global has established policies and procedures to maintain the confidentiality of certain non-public information received in connection with each analytical process.

In addition, S&P Dow Jones Indices provides a wide range of services to, or relating to, many organizations, including issuers of securities, investment advisers, broker-dealers, investment banks, other financial institutions and financial intermediaries, and accordingly may receive fees or other economic benefits from those organizations, including organizations whose securities or services they may recommend, rate, include in model portfolios, evaluate or otherwise address.