

# **S&P Strategic Futures Index** *Methodology*

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# Introduction

## Index Objective and Overview

The S&P Strategic Futures Index (S&P SFI) measures the performance of a strategy based on trends in price movements of specific futures contracts. The futures contracts are represented individually on either a long or short basis, depending on market momentum. 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 (1<sup>st</sup>) through fifth (5<sup>th</sup>) business day of each month, following the S&P GSCI calendar.

## 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 below:

- **S&P Strategic Commodity Futures 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:

<b>Supporting Document</b>	<b>URL</b>
S&P Dow Jones Indices' Commodities Indices Policies & Practices Methodology	<a href="#">Commodities Indices Policies &amp; Practices</a>
S&P Dow Jones Indices' Index Mathematics Methodology	<a href="#">Index Mathematics Methodology</a>

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 commodity and financial futures. Volatility is defined as the standard deviation of the daily returns of the underlying excess return indices over a 365 day 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 ( $\varpi$ ) 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 an objective to minimize realized variance of the risk contributions from all 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 previous month. The rebalancing is implemented over a five-day period from the first (1<sup>st</sup>) through the fifth (5<sup>th</sup>) S&P SFI business day of the current month.

# 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 current 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 trade activity period (TAP) is the five S&P SFI business day period when the positions are executed from the first (1<sup>st</sup>) through the fifth (5<sup>th</sup>) 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 schedule, and all short S&P SFI commodity component positions are rolled based on the S&P GSCI roll schedule.

*For additional information on the contract calendars, please refer to the *S&P GSCI Index Methodology* and the *S&P GSCI Enhanced Commodity Index Methodology*, available at [www.spdji.com](http://www.spdji.com).*

# 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
COMEX 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

**Chart 6 – Commodities, Contract Codes, and Exchanges:**

<b>RIC</b>	<b>Bloomberg Code</b>	<b>Currency &amp; Commodities Contracts</b>	<b>Exchange</b>
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	COMEX
HG	HG	Copper	COMEX
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	COMEX
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 of Calculation and Additional Index Return Series**

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 the [S&P DJI Methodology & Regulatory Status Database](#).

*For information on index calculation, 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](http://www.spdji.com).*

# 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  $d$ .

$DCRP_{c_d}$  = 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:

$$CPW = \frac{\text{Component Weight}}{DCRP_d * 1000}$$

**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 immediately 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 bays since the last immediately 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 Methodology.*



# Index Policy

## **Holiday Schedule**

The S&P SFI is calculated daily based on the CME Group holiday schedule.

*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 Methodology.*

## **Contact Information**

For questions regarding an index, please contact: [index\\_services@spglobal.com](mailto:index_services@spglobal.com).

# Index Dissemination

Index levels are available through S&P Dow Jones Indices' Web site at [www.spdji.com](http://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 the [S&P DJI Methodology & Regulatory Status Database](#) for a complete list of indices covered by this document.

Index Name	Bloomberg	RIC
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](http://www.spdji.com/contact-us).

## Web site

For further information, please refer to S&P Dow Jones Indices' Web site at [www.spdji.com](http://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 <sup>st</sup> ) business day of each calendar month and ending on the fifth (5 <sup>th</sup> ) 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.

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