

S&P GSCI Dynamic Roll *Methodology*

April 2018

Table of Contents

Introduction	2
Index Objective	2
Highlights	2
The S&P GSCI Dynamic Roll Methodology	2
Supporting Documents	2
Definitions	4
Glossary	4
Dynamic Roll Selection Process	5
Process	5
Dynamic Roll Selection for a Given Commodity, C	5
Monthly Dynamic Roll Schedule	7
Index Maintenance	17
Monthly Roll Determination	17
Annual Contract Eligibility Review	17
Currency, Currency Hedged, and Risk Control Indices	18
Index Governance	19
Index Committee	19
Index Policy	20
Announcements	20
Contact Information	20
Index Dissemination	21
Tickers	21
FTP	22
Web site	22
Appendix I	23
Calculation of the S&P GSCI Dynamic Roll Select	23
Appendix II	24
Calculation of the S&P GSCI Dynamic Roll Alpha Light Energy	24
Appendix III	26
Methodology Changes	26
Disclaimer	27

Introduction

Index Objective

The S&P GSCI[®] Dynamic Roll (S&P GSCI DR) is a commodity index that utilizes a more flexible monthly futures contract rolling strategy, to determine the new futures contract months for the underlying commodities, than the liquidity focused S&P GSCI.

For a list of defined terms used throughout this document, please refer to Definitions.

At each Roll Determination Date, the Dynamic Roll Algorithm (DRA) measures the current shape of the forward curves of the S&P GSCI DR designated eligible futures contract prices, for each commodity listed in the respective Dynamic Roll Matrices. The contract rolling strategy is optimized based on the implied roll yields and the Dynamic Roll Parity Principle, with specific Rank Orders assigned to each of the S&P GSCI Commodities.

Highlights

The S&P GSCI roll schedule is limited to the most liquid nearby contract months, whereas the S&P GSCI Dynamic Roll Matrix use a systematic methodology to search for the optimal contract months along the curve to roll into, subject to using only the most liquid of all available contracts of a given commodity.

When the futures curve for a given commodity is in a general state of contango, the S&P GSCI Dynamic Roll methodology will generally use futures contracts months that are further out on the futures curve, with the intention of minimizing the effects of negative roll yields. When the futures curve for a given commodity is in a general state of backwardation, the nature of the S&P GSCI Dynamic Roll methodology, the Index is to generally use nearby futures contracts.

The S&P GSCI Dynamic Roll Methodology

This methodology uses various terms and definitions from the *S&P GSCI Methodology*, henceforth referred to as the *S&P GSCI Methodology*. Where not specifically noted otherwise in this document, the rules of the S&P GSCI Methodology will prevail. Where the terms in this document are also defined in the S&P GSCI Methodology, the definitions in this document prevail.

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' GSCI Reference Guide	GSCI Reference Guide
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.

Definitions

Glossary

DRA(k) Algorithm. The DRA(k) Algorithm is the k^{th} Dynamic Roll Algorithm, with k indicating the number of top-ranked futures contract months included in the Optimum Set of Contract Months for that algorithm. The values of k are from 1 through 4.

Dynamic Roll Matrix. The Dynamic Roll Matrix of a given commodity lists all the eligible futures contract months for that commodity, for each calendar month of the year. The eligible contract months are determined based on the liquidity profile measured by open interest and volume, which are verified annually.

Dynamic Roll Parity Principle. For a given commodity, if the Rolled-out Contract is included in the Optimum Set of Contract Months, continue to use the same contract month as the Rolled-in Contract for the current month; otherwise, choose the first ranked contract month in the Optimum Set of Contract Months to be the new Rolled-in Contract for the current month.

Monthly Dynamic Roll Schedule. Refer to the next chapter, *Dynamic Roll Selection Process*.

Optimum Set of Contract Months. For a given commodity, the Optimum Set of Contract Months is the set of top-ranked contract months determined by that commodity's Dynamic Roll Algorithm. The number of contract months included in the Optimum Set of Contract Months is governed by the Rank Order of the given commodity.

Rank Order. The Rank Order of a given commodity, denoted by k , refers to the choice of the DRA(k) algorithm for that commodity during the monthly Dynamic Roll Selection Process, detailed in the next chapter. The values of Rank Order are from 1 through 4.

Rolled-in Contract Month. For a given commodity's Roll Determination Date, the Rolled-in Contract Month is the contract month selected via the Dynamic Roll Selection Process for that commodity. At the end of the S&P GSCI Roll Period it, then, becomes the Rolled-out Contract Month for the upcoming Roll Determination Date.

Rolled-out Contract Month. For a given commodity, the Rolled-out Contract Month is the current active futures contract month in use for that commodity.

Roll Determination Date. The Roll Determination Date is the third S&P GSCI Business Day of each month, two days prior to the start of the S&P GSCI Roll Period.

Dynamic Roll Selection Process

Process

Based on the closing values on the Roll Determination Date, the DRA(k) algorithms are run for each of the commodities included in the S&P GSCI, based on the respective Rank Orders of the commodities. The Dynamic Roll selections of all the S&P GSCI commodities are assembled into the Monthly Dynamic Roll Schedule (see below). The Monthly Dynamic Roll Schedule is applied to the S&P GSCI Dynamic Roll calculations at the beginning of the S&P GSCI Roll Period.

For a given S&P GSCI Commodity, the roll schedule follows the S&P GSCI roll schedule; i.e., there is no need to perform the monthly Dynamic Roll Selection Process for those commodities on the months in which the S&P GSCI roll schedule uses the same contracts as in the prior month.

Dynamic Roll Selection for a Given Commodity, C

Create a selected forward curve based on the Dynamic Roll Matrix. For any given commodity, C , each component of its Dynamic Roll Matrix is:

$$C(i,j) = \text{The } j^{\text{th}} \text{ futures contract month for month } i$$

Define:

$$M[C(i,j-1)] = \text{The calendar month of the } (j-1)^{\text{th}} \text{ contract for month } i,$$

$$M[C(i,j)] = \text{The calendar month of the } j^{\text{th}} \text{ contract for month } i, \text{ and}$$

$$\text{Interval } d = M[C(i,j)] - M[C(i,j-1)]$$

Thus, the selected forward curve, for month i , can be viewed as a series of eligible futures contract prices:

$$C(i,1), C(i,2), C(i,3), \dots \text{ up to } C(i,j), \text{ where } j \text{ is the number of eligible contracts in month } i.$$

Calculate the implied roll yield of each consecutive pair of contracts on the selected forward curve. The implied roll yield of the consecutive contracts $C(i,j-1)$ and $C(i,j)$ is computed as follows:

$$\text{Implied roll yield}_{C(i,j)} = \left[\frac{C(i, j-1) - C(i, j)}{C(i, j) * d} \right]$$

Rank the Contract Months from best to worst, based on their implied roll yields. The Contract Months are ranked based on their implied roll yields, with the best candidate for the new Rolled-in Contract Month being that having the highest implied roll yield, and the next best candidate being that having the second highest implied roll yield, and so on:

$$Best(1) = C(i,f),$$

where:

$Implied\ roll\ yield_C(i,f) = Highest\{Implied\ roll\ yield_C(i,j), j=1, \dots, \text{number of eligible contracts in month } i\}$,

$$Best(2) = C(i,g),$$

where:

$Implied\ roll\ yield_C(i,g) = Second\ highest\ (Implied\ roll\ yield_C(i,j), j=1, \dots, \text{number of eligible contracts in month } i)$

and so on.

Create the Optimum Set of Contract Months based on the Rank Order of the Commodity. Select the first k Contract Months based on their rankings, where k is the Rank Order of the given commodity, and create the Optimum Set of Contracts for that commodity.

$$\{Best(1), Best(2), \dots, Best(k)\}$$

Apply the Dynamic Roll Parity Principle. For a given commodity, if the Rolled-out Contract is included in the Optimum Set of Contract Months, continue to use the same contract month as the Rolled-in Contract for the current month; otherwise, choose the first ranked contract month in the Optimum Set of Contract Months to be the new Rolled-in Contract for the current month.

Monthly Dynamic Roll Schedule

Assemble the New Rolled-in Contract Months. S&P Dow Jones Indices creates a Monthly Dynamic Roll Schedule of the S&P GSCI DR by assembling all the new Rolled-in Contract Months for all the S&P GSCI Commodities. This set of Contract Months is effective for the upcoming monthly Roll Period, from the fifth (5th) business day to the ninth (9th) business day.

The Rank Orders of the S&P GSCI Commodities. As applied in the calculation of the S&P GSCI Dynamic Roll, the Rank Orders of the S&P GSCI Commodities are given as follows:

Commodity	Code	Rank Order
Corn	C	1
Cocoa	CC	1
Crude Oil	CL	3
Brent Crude Oil	LCO	1
Cotton	CT	1
Feeder Cattle	FC	1
Gold	GC	1
Heating Oil	HO	1
Coffee	KC	1
Kansas Wheat	KW	2
Aluminum	MAL	2
Live Cattle	LC	1
Lean Hogs	LH	1
Lead	MPB	1
Nickel	MNI	3
Copper	MCU	3
Zinc	MZN	3
Natural Gas	NG	1
Gasoil	LGO	4
Soybeans	S	1
Sugar	SB	1
Silver	SI	2
Wheat	W	2
Unleaded Gas	RB	2

Rank order descriptions are as follows:

- Rank Order of 1 – Use the DRA(1) Algorithm, with the Optimum Set of Contracts consisting of only the top one contract
- Rank Order of 2 – Use the DRA(2) Algorithm, with the Optimum Set of Contracts consisting of the top two ranked contracts
- Rank Order of 3 – Use the DRA(3) Algorithm, with the Optimum Set of Contracts consisting of the top three ranked contracts
- Rank Order of 4 – Use the DRA(4) Algorithm, with the Optimum Set of Contracts consisting of the top four ranked contracts

For example, Corn has a Rank Order of 1. If the Rolled-out Contract for corn is not the same as the top ranked contract, use the top-ranked contract in the Optimum Set of Contracts as the new Rolled-In Contract Month. Otherwise, if the Rolled-Out Contract Month is the same as the top ranked contract, then the same Rolled-out Contract Month will continue to be used as the new Rolled-in Contract Month.

In the case of Crude Oil, which has a Rank Order of 3, this means if the Rolled-out Contract is not one of the top three Contract Months in the Optimum Set of Contracts for Crude Oil, the top ranked Contract

Month is selected as the new Rolled-in Contract Month. Otherwise, if the Rolled-out Contract is among the top three Contract Months in the Optimum Set of Contracts, then the same Rolled-Out Contract Month will continue to be used as the new Rolled-In Contract Month.

The Dynamic Roll Matrices of the S&P GSCI Commodities. The Dynamic Roll Matrix of a given commodity is a listing of all eligible contract months for that commodity, on a month by month basis. The eligible contract months are determined based on the liquidity profile measured by open interest and volume, which are verified annually.

The following tables represent the Dynamic Roll Matrices for 2018, with column headers as follows: The column "0" is the "front futures" contract. The eligible contracts for each month are listed from column "1" onward. Contract months listed under "1" are the same as the S&P GSCI Roll Schedule for that commodity. Rows excluding contract months indicate non-roll months.

CL	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	H1	M1	Z1	Z2	
Feb	2	H0	J0	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	Z2	
Mar	3	J0	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	Z2		
Apr	4	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	U1	Z1	Z2		
May	5	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	U1	Z1	Z2	Z3		
Jun	6	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	N1	U1	Z1	Z2	Z3		
Jul	7	Q0	U0	V0	X0	Z0	F1	G1	H1	J1	K1	M1	N1	U1	Z1	Z2	Z3	
Aug	8	U0	V0	X0	Z0	F1	G1	H1	J1	K1	M1	N1	U1	Z1	M2	Z2	Z3	
Sep	9	V0	X0	Z0	F1	G1	H1	J1	K1	M1	N1	U1	Z1	M2	Z2	Z3		
Oct	10	X0	Z0	F1	G1	H1	J1	K1	M1	N1	Q1	U1	Z1	M2	Z2	Z3		
Nov	11	Z0	F1	G1	H1	J1	K1	M1	N1	Q1	U1	V1	X1	Z1	F2	M2	Z2	Z3
Dec	12	F1	G1	H1	J1	K1	M1	N1	Q1	U1	V1	X1	Z1	F2	H2	M2	Z2	Z3

LCO	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	H0	J0	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	Z2	
Feb	2	J0	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	Z2		
Mar	3	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	M2	Z2	Z3	
Apr	4	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	M2	Z2	Z3		
May	5	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	U1	Z1	M2	Z2	Z3		
Jun	6	Q0	U0	V0	X0	Z0	F1	G1	H1	J1	K1	M1	U1	Z1	M2	Z2	Z3	
Jul	7	U0	V0	X0	Z0	F1	G1	H1	J1	K1	M1	N1	U1	Z1	M2	Z2	Z3	
Aug	8	V0	X0	Z0	F1	G1	H1	J1	K1	M1	N1	U1	Z1	M2	Z2	Z3		
Sep	9	X0	Z0	F1	G1	H1	J1	K1	M1	N1	Q1	U1	Z1	M2	Z2	Z3		
Oct	10	Z0	F1	G1	H1	J1	K1	M1	N1	Q1	U1	V1	X1	Z1	M2	Z2	Z3	
Nov	11	F1	G1	H1	J1	K1	M1	N1	Q1	U1	V1	X1	Z1	F2	M2	Z2	Z3	
Dec	12	G1	H1	J1	K1	M1	N1	Q1	U1	V1	X1	Z1	F2	G2	H2	M2	Z2	Z3

NG	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	H1	J1			
Feb	2	H0	J0	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	H1	J1				
Mar	3	J0	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	H1	J1					
Apr	4	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	J1					
May	5	M0	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	J1						
Jun	6	N0	Q0	U0	V0	X0	Z0	F1	G1	H1	J1							
Jul	7	Q0	U0	V0	X0	Z0	F1	G1	H1	J1	K1	V1						
Aug	8	U0	V0	X0	Z0	F1	G1	H1	J1	K1	V1	Z1						
Sep	9	V0	X0	Z0	F1	G1	H1	J1	K1	M1	V1	Z1						
Oct	10	X0	Z0	F1	G1	H1	J1	K1	M1	N1	V1	Z1						
Nov	11	Z0	F1	G1	H1	J1	K1	M1	N1	V1	Z1							
Dec	12	F1	G1	H1	J1	K1	M1	N1	V1	Z1	F2							

LGO	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0	N0	U0	V0	Z0	M1	Z1						
Feb	2	H0	J0	K0	M0	N0	Q0	U0	V0	Z0	M1	Z1						
Mar	3	J0	K0	M0	N0	Q0	U0	V0	Z0	M1	Z1							
Apr	4	K0	M0	N0	Q0	U0	V0	X0	Z0	M1	Z1							
May	5	M0	N0	Q0	U0	V0	X0	Z0	F1	M1	Z1							
Jun	6	N0	Q0	U0	V0	X0	Z0	F1	H1	M1	Z1							
Jul	7	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	Z2						
Aug	8	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	Z2							
Sep	9	V0	X0	Z0	F1	G1	H1	J1	M1	Z1	Z2							
Oct	10	X0	Z0	F1	G1	H1	J1	K1	M1	Z1	Z2							
Nov	11	Z0	F1	G1	H1	J1	K1	M1	U1	Z1	Z2							
Dec	12	F1	G1	H1	J1	K1	M1	N1	U1	Z1	Z2							

HO	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0	N0	U0	Z0									
Feb	2	H0	J0	K0	M0	N0	Q0	U0	Z0									
Mar	3	J0	K0	M0	N0	Q0	U0	V0	Z0									
Apr	4	K0	M0	N0	Q0	U0	V0	X0	Z0									
May	5	M0	N0	Q0	U0	V0	X0	Z0	F1									
Jun	6	N0	Q0	U0	V0	X0	Z0	F1										
Jul	7	Q0	U0	V0	X0	Z0	F1	G1	H1	M1	Z1							
Aug	8	U0	V0	X0	Z0	F1	G1	H1	M1	Z1								
Sep	9	V0	X0	Z0	F1	G1	H1	J1	M1	Z1								
Oct	10	X0	Z0	F1	G1	H1	J1	K1	M1	Z1								
Nov	11	Z0	F1	G1	H1	J1	K1	M1	Z1									
Dec	12	F1	G1	H1	J1	K1	M1	U1	Z1									

RB	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0	N0	U0	Z0									
Feb	2	H0	J0	K0	M0	N0	Q0	U0	Z0									
Mar	3	J0	K0	M0	N0	Q0	U0	Z0										
Apr	4	K0	M0	N0	Q0	U0	V0	Z0										
May	5	M0	N0	Q0	U0	V0	X0	Z0										
Jun	6	N0	Q0	U0	V0	X0	Z0											
Jul	7	Q0	U0	V0	X0	Z0												
Aug	8	U0	V0	X0	Z0	F1												
Sep	9	V0	X0	Z0	F1	H1	J1											
Oct	10	X0	Z0	F1	G1	H1	J1	M1										
Nov	11	Z0	F1	G1	H1	J1	K1	M1										
Dec	12	F1	G1	H1	J1	K1	M1	U1	Z1									

GC	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	J0	M0	Q0	Z0												
Feb	2																	
Mar	3	J0	M0	Q0	V0	Z0												
Apr	4																	
May	5	M0	Q0	V0	Z0													
Jun	6																	
Jul	7	V0	Z0	G1	J1	Z1												
Aug	8																	
Sep	9																	
Oct	10																	
Nov	11	Z0	G1	J1	M1	Z1												
Dec	12																	

SI	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0	Z0													
Mar	3																	
Apr	4	K0	N0	U0	Z0													
May	5																	
Jun	6	N0	U0	Z0														
Jul	7																	
Aug	8	U0	Z0	H1														
Sep	9																	
Oct	10																	
Nov	11	F1	H1	K1	Z1													
Dec	12																	

MAL	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0	N0	U0	Z0	Z1								
Feb	2	H0	J0	K0	M0	N0	Q0	U0	Z0	Z1								
Mar	3	J0	K0	M0	N0	Q0	U0	V0	Z0	Z1								
Apr	4	K0	M0	N0	Q0	U0	V0	X0	Z0	F1	Z1							
May	5	M0	N0	Q0	U0	V0	X0	Z0	F1	M1	Z1							
Jun	6	N0	Q0	U0	V0	X0	Z0	F1	H1	M1	Z1							
Jul	7	Q0	U0	V0	X0	Z0	F1	H1	M1	Z1								
Aug	8	U0	V0	X0	Z0	F1	H1	M1	Z1	Z2								
Sep	9	V0	X0	Z0	F1	G1	H1	J1	M1	Z1	Z2							
Oct	10	X0	Z0	F1	G1	H1	J1	M1	Z1	Z2								
Nov	11	Z0	F1	G1	H1	J1	K1	M1	Z1	Z2								
Dec	12	F1	G1	H1	J1	K1	M1	N1	Z1	Z2								

MPB	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0															
Feb	2	H0	J0	K0														
Mar	3	J0	K0	M0														
Apr	4	K0	M0															
May	5	M0	N0															
Jun	6	N0	Q0															
Jul	7	Q0	U0															
Aug	8	U0	V0	Z0														
Sep	9	V0	X0	Z0														
Oct	10	X0	Z0															
Nov	11	Z0	F1															
Dec	12	F1	G1	H1														

MNI	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0												
Feb	2	H0	J0	K0	M0													
Mar	3	J0	K0	M0	N0	U0												
Apr	4	K0	M0	N0	Q0	U0												
May	5	M0	N0	Q0	U0													
Jun	6	N0	Q0	U0	X0	Z0												
Jul	7	Q0	U0	V0	X0	Z0	F1											
Aug	8	U0	V0	X0	Z0	F1												
Sep	9	V0	X0	Z0	F1													
Oct	10	X0	Z0	F1	H1													
Nov	11	Z0	F1	G1	H1													
Dec	12	F1	G1	H1	J1	K1	M1											

MCU	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0	N0	U0	Z0	Z1								
Feb	2	H0	J0	K0	M0	N0	Q0	U0	Z0	Z1								
Mar	3	J0	K0	M0	N0	Q0	U0	V0	Z0	Z1								
Apr	4	K0	M0	N0	Q0	U0	V0	Z0	H1	Z1								
May	5	M0	N0	Q0	U0	V0	Z0	H1	Z1									
Jun	6	N0	Q0	U0	V0	X0	Z0	F1	H1	M1	Z1							
Jul	7	Q0	U0	V0	X0	Z0	F1	H1	M1	Z1								
Aug	8	U0	V0	X0	Z0	F1	G1	H1	M1	Z1	Z2							
Sep	9	V0	X0	Z0	F1	G1	H1	M1	Z1	Z2								
Oct	10	X0	Z0	F1	G1	H1	J1	M1	Z1	Z2								
Nov	11	Z0	F1	G1	H1	J1	K1	M1	U1	Z1	Z2							
Dec	12	F1	G1	H1	J1	K1	M1	N1	U1	Z1	Z2							

MZN	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	H0	J0	K0	M0	Z0											
Feb	2	H0	J0	K0	M0	N0	Z0											
Mar	3	J0	K0	M0	N0	U0	Z0											
Apr	4	K0	M0	N0	Q0	U0	Z0											
May	5	M0	N0	Q0	U0	Z0												
Jun	6	N0	Q0	U0	V0	X0	Z0											
Jul	7	Q0	U0	V0	X0	Z0												
Aug	8	U0	V0	X0	Z0	F1												
Sep	9	V0	X0	Z0	F1	G1	H1											
Oct	10	X0	Z0	F1	G1	H1												
Nov	11	Z0	F1	G1	H1													
Dec	12	F1	G1	H1														

CC	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0														
Mar	3																	
Apr	4	K0	N0	U0														
May	5																	
Jun	6	N0	U0	Z0														
Jul	7																	
Aug	8	U0	Z0	H1														
Sep	9																	
Oct	10																	
Nov	11	Z0	H1	K1														
Dec	12																	

CT	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0	Z0													
Mar	3																	
Apr	4	K0	N0	Z0														
May	5																	
Jun	6	V0	Z0	H1														
Jul	7																	
Aug	8																	
Sep	9																	
Oct	10																	
Nov	11	Z0	H1	K1														
Dec	12																	

KC	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0	U0	Z0												
Mar	3																	
Apr	4	K0	N0	U0	Z0	H1												
May	5																	
Jun	6	N0	U0	Z0	H1													
Jul	7																	
Aug	8	U0	Z0	H1														
Sep	9																	
Oct	10																	
Nov	11	Z0	H1	K1														
Dec	12																	

SB	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0	V0	H1												
Mar	3																	
Apr	4	K0	N0	V0	H1													
May	5																	
Jun	6	N0	V0	H1	K1	N1	V1											
Jul	7																	
Aug	8																	
Sep	9	V0	H1	K1	N1	V1												
Oct	10																	
Nov	11																	
Dec	12																	

W	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0	Z0													
Mar	3																	
Apr	4	K0	N0	U0	Z0													
May	5																	
Jun	6	N0	U0	Z0														
Jul	7																	
Aug	8	U0	Z0	H1	N1													
Sep	9																	
Oct	10																	
Nov	11	Z0	H1	K1	N1													
Dec	12																	

KW	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0	Z0													
Mar	3																	
Apr	4	K0	N0	Z0														
May	5																	
Jun	6	N0	U0	Z0														
Jul	7																	
Aug	8	U0	Z0	H1	N1													
Sep	9																	
Oct	10																	
Nov	11	Z0	H1	N1														
Dec	12																	

C	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0	U0	Z0												
Mar	3																	
Apr	4	K0	N0	U0	Z0	H1												
May	5																	
Jun	6	N0	U0	Z0	H1	N1	Z1											
Jul	7																	
Aug	8	U0	Z0	H1	N1	Z1												
Sep	9																	
Oct	10																	
Nov	11	Z0	H1	K1	N1	U1	Z1											
Dec	12																	

S	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	K0	N0	X0													
Mar	3																	
Apr	4	K0	N0	Q0	X0													
May	5																	
Jun	6	U0	X0	F1	H1	K1	N1											
Jul	7																	
Aug	8																	
Sep	9																	
Oct	10	X0	F1	H1	K1	N1	X1											
Nov	11																	
Dec	12	F1	H1	K1	N1	X1												

LC	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	J0	M0	Q0													
Feb	2																	
Mar	3	J0	M0	Q0	V0													
Apr	4																	
May	5	M0	Q0	V0	Z0													
Jun	6																	
Jul	7	Q0	V0	Z0	G1													
Aug	8																	
Sep	9	V0	Z0	G1	J1													
Oct	10																	
Nov	11	Z0	G1	J1	M1													
Dec	12																	

FC	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1																	
Feb	2	H0	J0	K0	Q0													
Mar	3	J0	K0	Q0														
Apr	4	K0	Q0															
May	5																	
Jun	6																	
Jul	7	Q0	U0	V0														
Aug	8	U0	V0	X0														
Sep	9	V0	X0															
Oct	10	X0	F1															
Nov	11																	
Dec	12	F1	H1															

LH	Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan	1	G0	J0	M0														
Feb	2																	
Mar	3	K0	M0	N0	Q0													
Apr	4																	
May	5	M0	N0	Q0	V0													
Jun	6	N0	Q0	V0	Z0													
Jul	7	Q0	V0	Z0														
Aug	8																	
Sep	9	V0	Z0	G1														
Oct	10																	
Nov	11	Z0	G1	J1	M1													
Dec	12																	

Index Maintenance

Monthly Roll Determination

The S&P GSCI Dynamic Roll performs the Dynamic Roll Selection Process on a monthly basis.

Annual Contract Eligibility Review

The eligible contract months are reviewed annually based on liquidity rules following the S&P GSCI. For the S&P GSCI Dynamic Roll, a contract must have a Monthly Dollar Value Traded (MDVT) of at least U.S. \$1.2 billion (U.S. \$15 billion over 12 months) to be included as an eligible contract for the calendar month, and a Monthly Dollar Value Traded (MDVT) of at least U.S. \$0.4 billion (U.S. \$5 billion over 12 months) to remain eligible for the calendar month.

For more information on liquidity rules for the S&P GSCI, please refer to the index methodology, located on our Web site, www.spdji.com.

In addition to the MDVT requirement, a contract must meet the same requirement on Monthly Dollar Open Interest (MDOI). The Annual Calculation Period is defined as the 12-month period ending on August 31st of the calendar year immediately prior to the year for which the eligible contracts are being determined. If a contract is eligible for inclusion in a particular calendar month, it stays eligible for the subsequent calendar months until its expiry. There is no restriction on the number of eligible contracts included in each calendar month.

Calculation of Monthly Dollar Value Traded and Monthly Dollar Open Interest:

$$MDVT_i = \sum_{t=1}^n (V_t * DCRP_t) * CS$$

where:

- $MDVT_i$ = Monthly Dollar Value Traded of contract i
- V_t = Volume on day t
- $DCRP_t$ = Daily Contract Reference Price on day t
- n = Number of business days in the calendar month
- CS = Contract Size

$$MDOI_i = \frac{1}{n} \sum_{t=1}^n (OI_t * DCRP_t) * CS$$

where:

- $MDOI_i$ = Monthly Dollar Open Interest of contract i
- OI_t = Open Interest on day t
- $DCRP_t$ = Daily Contract Reference Price on day t
- n = Number of business days in the calendar month

CS = Contract Size

For inclusion as an eligible contract:

MDVT and MDOI \geq U.S. \$1.2 Billion

To remain as an eligible contract:

MDVT and MDOI \geq U.S. \$0.4 Billion

Currency, Currency Hedged, and Risk Control Indices

Additional 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.

Index Governance

Index Committee

The S&P GSCI Committee maintains the S&P GSCI Dynamic Roll. The Index Committee meets regularly. At each meeting, the Index Committee reviews any significant market events. In addition, the Index Committee may revise index policy for timing of rebalancings 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

Announcements

Announcements of the daily index values are made after the futures market close each day.

Announcements of the new futures contract months to be rolled into are made following the close of business on the third business day of each month.

For information on Calculations and Pricing Disruptions, Expert Judgment, Data Hierarchy and Unexpected Exchange Closures, 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, 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.

Bloomberg:

Index	Spot	ER	TR
S&P GSCI Dynamic Roll	SPDYCI	SPDYCIP	SPDYCITR
S&P GSCI Wheat Dynamic Roll	SPDYWH	SPDYWHP	SPDYWHTR
S&P GSCI Kansas Wheat Dynamic Roll	SPDYKW	SPDYKWP	SPDYKWTR
S&P GSCI Corn Dynamic Roll	SPDYCN	SPDYCNP	SPDYCNTR
S&P GSCI Soybeans Dynamic Roll	SPDYSO	SPDYSOP	SPDYSOTR
S&P GSCI Coffee Dynamic Roll	SPDYKC	SPDYKCP	SPDYKCTR
S&P GSCI Sugar Dynamic Roll	SPDYSB	SPDYSBP	SPDYSBTR
S&P GSCI Cocoa Dynamic Roll	SPDYCC	SPDYCCP	SPDYCCTR
S&P GSCI Cotton Dynamic Roll	SPDYCT	SPDYCTP	SPDYCTTR
S&P GSCI Lean Hogs Dynamic Roll	SPDYLH	SPDYLHP	SPDYLHTR
S&P GSCI Live Cattle Dynamic Roll	SPDYLC	SPDYLCP	SPDYLCTR
S&P GSCI Feeder Cattle Dynamic Roll	SPDYFC	SPDYFCP	SPDYFCTR
S&P GSCI Heating Oil Dynamic Roll	SPDYHO	SPDYHOP	SPDYHOTR
S&P GSCI Gas Oil Dynamic Roll	SPDYGO	SPDYGOP	SPDYGOTR
S&P GSCI Crude Oil Dynamic Roll	SPDYCL	SPDYCLP	SPDYCLTR
S&P GSCI Brent Crude Oil Dynamic Roll	SPDYBR	SPDYBRP	SPDYBRTR
S&P GSCI Natural Gas Dynamic Roll	SPDYNG	SPDYNGP	SPDYNGTR
S&P GSCI Aluminum Dynamic Roll	SPDYIA	SPDYIAP	SPDYIATR
S&P GSCI Copper Dynamic Roll	SPDYIC	SPDYICP	SPDYICTR
S&P GSCI Lead Dynamic Roll	SPDYIL	SPDYILP	SPDYILTR
S&P GSCI Nickel Dynamic Roll	SPDYIK	SPDYIKP	SPDYIKTR
S&P GSCI Zinc Dynamic Roll	SPDYIZ	SPDYIZP	SPDYIZTR
S&P GSCI Gold Dynamic Roll	SPDYGC	SPDYGCP	SPDYGCTR
S&P GSCI Silver Dynamic Roll	SPDYSI	SPDYSIP	SPDYSITR
S&P GSCI Unleaded Gas Dynamic Roll	SPDYHU	SPDYHUP	SPDYHUTR
S&P GSCI Agriculture Dynamic Roll	SPDYAG	SPDYAGP	SPDYAGT
S&P GSCI Energy Dynamic Roll	SPDYEN	SPDYENP	SPDYENT
S&P GSCI Industrial Metals Dynamic Roll	SPDYIN	SPDYINP	SPDYINT
S&P GSCI Livestock Dynamic Roll	SPDYLV	SPDYLVP	SPDYLVT
S&P GSCI Precious Metals Dynamic Roll	SPDYPM	SPDYPM P	SPDYPM T
S&P GSCI Light Energy Dynamic Roll	SPDYLE	SPDYLEP	SPDYLET
S&P GSCI Dynamic Roll Capped Commodity	SPDYP	SPDYPP	SPDYPT
S&P GSCI Energy Dynamic Roll Capped Commodity	SPDYPE	SPDYPEP	SPDYPET
S&P GSCI Industrial Metals Dynamic Roll Capped Commodity	SPDYPI	SPDYPIP	SPDYFIT
S&P GSCI Agriculture Dynamic Roll Capped Component	SPDYPA	SPDYPA P	SPDYPA T
S&P GSCI Dynamic Roll Equal Weight Select	SPDYEW	SPDYEW P	SPDYEW T
S&P GSCI Dynamic Roll Select	SPDYSE	SPDYSEP	SPDYSET

Reuters:

Index	Spot	ER	TR
S&P GSCI Dynamic Roll	.SPDYCI	.SPDYCIP	.SPDYCITR
S&P GSCI Wheat Dynamic Roll	.SPDYWH	.SPDYWHP	.SPDYWHTR
S&P GSCI Kansas Wheat Dynamic Roll	--	--	--
S&P GSCI Corn Dynamic Roll	.SPDYCN	.SPDYCNP	.SPDYCNTR
S&P GSCI Soybeans Dynamic Roll	.SPDYSO	.SPDYSOP	.SPDYSOTR
S&P GSCI Coffee Dynamic Roll	--	--	--
S&P GSCI Sugar Dynamic Roll	.SPDYSB	.SPDYSBP	.SPDYSBTR
S&P GSCI Cocoa Dynamic Roll	--	--	--
S&P GSCI Cotton Dynamic Roll	.SPDYCT	.SPDYCTP	.SPDYCTTR
S&P GSCI Lean Hogs Dynamic Roll	--	--	--
S&P GSCI Live Cattle Dynamic Roll	.SPDYLC	.SPDYLCP	.SPDYLCTR
S&P GSCI Feeder Cattle Dynamic Roll	--	--	--
S&P GSCI Heating Oil Dynamic Roll	.SPDYHO	.SPDYHOP	.SPDYHOTR
S&P GSCI Gas Oil Dynamic Roll	.SPDYGO	.SPDYGOP	.SPDYGOTR
S&P GSCI Crude Oil Dynamic Roll	.SPDYCL	.SPDYCLP	.SPDYCLTR
S&P GSCI Brent Crude Oil Dynamic Roll	.SPDYBR	.SPDYBRP	.SPDYBRTR
S&P GSCI Natural Gas Dynamic Roll	.SPDYNG	.SPDYNGP	.SPDYNGTR
S&P GSCI Aluminum Dynamic Roll	.SPDYIA	.SPDYIAP	.SPDYIATR
S&P GSCI Copper Dynamic Roll	.SPDYIC	.SPDYICP	.SPDYICTR
S&P GSCI Lead Dynamic Roll	.SPDYIL	.SPDYILP	.SPDYILTR
S&P GSCI Nickel Dynamic Roll	.SPDYIK	.SPDYIKP	.SPDYIKTR
S&P GSCI Zinc Dynamic Roll	.SPDYIZ	.SPDYIZP	.SPDYIZTR
S&P GSCI Gold Dynamic Roll	.SPDYGC	.SPDYGCP	.SPDYGCTR
S&P GSCI Silver Dynamic Roll	.SPDYSI	.SPDYSIP	.SPDYSITR
S&P GSCI Unleaded Gas Dynamic Roll	.SPDYHU	.SPDYHUP	.SPDYHUTR
S&P GSCI Agriculture Dynamic Roll	--	--	--
S&P GSCI Energy Dynamic Roll	--	--	--
S&P GSCI Industrial Metals Dynamic Roll	--	--	--
S&P GSCI Livestock Dynamic Roll	--	--	--
S&P GSCI Precious Metals Dynamic Roll	--	--	--
S&P GSCI Light Energy Dynamic Roll	--	--	--
S&P GSCI Dynamic Roll Capped Commodity	--	--	.SPDYPT
S&P GSCI Energy Dynamic Roll Capped Commodity	--	--	.SPDYPET
S&P GSCI Industrial Metals Dynamic Roll Capped Commodity	--	--	.SPDYPIT
S&P GSCI Agriculture Dynamic Roll Capped Component	--	--	.SPDYPAT
S&P GSCI Dynamic Roll Equal Weight Select	--	--	--
S&P GSCI Dynamic Roll Select	--	--	--

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

Calculation of the S&P GSCI Dynamic Roll Select

The S&P GSCI Dynamic Roll Select (the Index) reflects the total return available through an unleveraged investment in the S&P GSCI Dynamic Roll; however, rather than using the 24 commodities from the S&P GSCI, only the select 14 commodities of the S&P GSCI Equal Weight Select are included in the Index.

Methodology Overview. During the January roll period at the beginning of each calendar year, the S&P GSCI Dynamic Roll Select includes only the same select commodities as the S&P GSCI Equal Weight Select. The select commodities are weighted based on the same Contract Production Weights (CPWs) as the commodities in S&P GSCI Dynamic Roll. The CPWs are updated annually and instituted during the January roll period. The periodic rolling process of the individual commodities follows the methodology specified by the S&P GSCI Dynamic Roll. Announcements of the new futures contract months to be rolled into are made following the close of business on the second business day of each month.

The S&P GSCI Equal Weight Select. The S&P GSCI Equal Weight Select sorts the S&P GSCI commodity space into six commodity groups and selectively includes only the largest and most liquid commodities in each commodity group.

The S&P GSCI Equal Weight Select is comprised of 14 commodities, categorized into six commodity groups, where:

- No single group accounts for more than 30 % of the total.
- Rules-based annual reconstitution.
- Turnover minimized through an annual rebalancing.
- Fewer commodities than the S&P GSCI which results in fewer monthly rolls.

For more information on the S&P GSCI Equal Weight Select please refer to the S&P GSCI Equal Weight Select Methodology available on our Web site, www.spdji.com.

Appendix II

Calculation of the S&P GSCI Dynamic Roll Alpha Light Energy

The S&P GSCI Dynamic Roll Alpha Light Energy index measures a long position in the S&P GSCI Dynamic Roll Light Energy ER index and a short position in the S&P GSCI Light Energy ER index (the benchmark index), on a market neutral basis.

The Index aims to measure the effects of the different roll strategies between the S&P GSCI Dynamic Roll Light Energy index and the S&P GSCI Light Energy index while neutralizing the market directional bias.

Long-Short Index

The index value is determined by measuring the difference between a long position in the S&P GSCI Dynamic Roll Light Energy ER index and a short position in the S&P GSCI Light Energy ER index.

Calculation

On each Index Level Determination Date, t , a reference index level is determined by the following formula:

$$Ref_t = Ref_{t_r} * \left[1 + \frac{Enhanced_t}{Enhanced_{t_r}} - \frac{Bench_t}{Bench_{t_r}} \right]$$

where:

- Ref_t = the Long-Short reference index level on date t
- $Enhanced_t$ = the S&P GSCI Dynamic Roll Light Energy ER index on date t
- $Bench_t$ = the S&P GSCI Light Energy ER index on date t
- t_r = the last Rebalancing Day preceding the date t (The rebalancing dates are the 9th S&P GSCI day of each month)

Market Neutral Exposure

The final index value is determined by measuring the daily return of the Long-Short Index adjusted by the return of a target exposure weighted benchmark index.

Market Neutral Exposure Calculation

On each Index Level Determination Date t , the index exposure to the benchmark index is determined by the following formulae:

$$Exposure_t = TargetExposure_{t-2}$$

$$TargetExposure_t = - \frac{RefVolatility_t}{BenchVolatility_t} * Correl_t$$

where:

- $TargetExposure_t$ = the exposure multiplier for the benchmark index
- $RefVolatility_t$ = the 120-day volatility of the reference index (of the daily natural log (ln) return)
- $BenchVolatility_t$ = the 120-day volatility of the benchmark index (of the daily ln-return)
- $Correl_t$ = the 120-day correlation of the reference and benchmark indices (of the daily ln-return)

Index Calculation

On each Index Level Determination Date t , the index level is determined by the following formula:

$$Index_t = Index_{t-1} * \left[\frac{Ref_t}{Ref_{t-1}} + Exposure_{t-1} * \left(\frac{Bench_t}{Bench_{t-1}} - 1 \right) \right]$$

where:

$Index_t$ = the index level on Index Level Determination Date t

The index start date is July 14, 1995, with a base level of 100.

Appendix III

Methodology Changes

Methodology changes as of January 31, 2015 are as follows:

Change	Effective Date (After Close)	Previous	Methodology Updated
Annual Contract Eligibility Review	01/6/2017	Existing eligibility months are verified annually.	Liquidity rules added to make the eligibility rules-based. Reviewed in November for the annual January rebalance.

Disclaimer

Copyright © 2018 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved. STANDARD & POOR'S, S&P, SPDR, S&P 500, S&P EUROPE 350, S&P 100, S&P 1000, S&P COMPOSITE 1500, S&P MIDCAP 400, S&P SMALLCAP 600, GIVI, GLOBAL TITANS, S&P RISK CONTROL INDICES, S&P GLOBAL THEMATIC INDICES, S&P TARGET DATE INDICES, S&P TARGET RISK INDICES, DIVIDEND ARISTOCRATS, STARS, GICS, HOUSINGVIEWS, INDEX ALERT, INDEXOLOGY, MARKET ATTRIBUTES, PRACTICE ESSENTIALS, S&P HEALTHCARE MONITOR, SPICE, and SPIVA are registered trademarks of Standard & Poor's Financial Services LLC, a division of S&P Global ("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, reproduction and/or photocopying in whole or in part are prohibited without written permission. This document does not constitute an offer of services in jurisdictions where S&P Dow Jones Indices LLC, Dow Jones, S&P or their respective affiliates (collectively "S&P Dow Jones Indices") do not have the necessary licenses. 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. Past performance of an index is not a guarantee of future results.

It is not possible to invest directly in an index. Exposure to an asset class represented by an index is 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.

Closing prices for S&P Dow Jones Indices' US benchmark indices are calculated by S&P Dow Jones Indices based on the closing price of the individual constituents of the index as set by their primary exchange. Closing prices are received by S&P Dow Jones Indices from one of its third party vendors and verified by comparing them with prices from an alternative vendor. The vendors receive the closing price from the primary exchanges. Real-time intraday prices are calculated similarly without a second verification.

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.

GSCI is a registered trademark of The Goldman Sachs Group, Inc. (“Goldman”) and has been licensed for use by S&P Dow Jones Indices. The S&P GSCI index is not created, owned, endorsed, sponsored, sold or promoted by Goldman or its affiliates and Goldman bears no liability with respect to such index or data related thereto. Goldman provides no guarantee as to the accuracy and/or the completeness of the S&P GSCI index or any data related thereto.