

**S&P GSCI Crude Oil
Annual Roll Index
*Methodology Supplement***

January 2019

Introduction

Index Objective and Highlights

The S&P GSCI Crude Oil Annual Roll Total Return Index measures the total return from an unleveraged investment in the same rolling WTI Crude Oil future contract included in the S&P GSCI Crude Oil Index.

The index is calculated on a basis similar to the S&P GSCI, but modified to apply once each year a change to the December futures contract. The modification occurs during the designated October roll period.

The S&P GSCI Crude Oil Annual Roll Index Methodology Supplement

This methodology supplement uses various terms from *the S&P GSCI Index 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' Index Mathematics Methodology	Index Mathematics Methodology

This methodology supplement 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 supplement. Any changes to or deviations from this methodology supplement are made in the sole judgment and discretion of S&P Dow Jones Indices so that the index continues to achieve its objective.

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
- Internal Reviews of Methodology
- Calculations and Pricing Disruptions
- Error Corrections
- Expert Judgment
- Data Hierarchy
- Unexpected Exchange Closures

Please refer to S&P Dow Jones Indices' Commodities Indices Policies & Practices document.

Value of the Index

On any given day, the value of the index is equal to the total dollar weight of the index divided by a normalizing constant, which assures the continuity of the index over time. The total dollar weight of the index is the total dollar weight of the underlying commodity – the WTI Crude Oil futures contract. The dollar weight of the index on any given day is equal to the product of:

- the daily contract reference price,
- the appropriate contract production weight (CPW) and,
- the appropriate “roll weights” needed during a roll period (discussed below).

On any given day, the daily contract reference price used in calculating the dollar weight of the commodity futures contract is the most recent daily contract reference price made available by the relevant trading facility. The daily contract reference price for the most recent prior day will be used if the trading facility is closed or otherwise fails to publish a daily contract reference price on that day. In addition, if the trading facility fails to make a daily contract reference price available or publishes a daily contract reference price that, in the reasonable judgment of S&P Dow Jones Indices reflects manifest error, the relevant calculation will be delayed until the price is made available or corrected. However, if the price is not made available or corrected by 4:00 PM ET, S&P Dow Jones Indices may determine the appropriate daily contract reference price for the applicable futures contract for purposes of the relevant calculation of the value of the index, if it deems such action to be appropriate under the circumstances.

Calculation of the Index

The value of the index on any S&P GSCI Business Day is equal to the product of (i) the value of the index on the immediately preceding S&P GSCI Business Day, (ii) one plus the sum of the contract daily return and the Treasury bill return on the hypothetical investment in the index on the S&P GSCI Business Day on which the calculation is made, and (iii) one plus the Treasury bill return on the hypothetical investment in the index for each non S&P GSCI Business Day since the immediately preceding S&P GSCI Business Day. We use the term S&P GSCI Business Day to mean each day on which S&P Dow Jones Indices offices in New York City are open for business. The value of the index has been normalized such that its hypothetical level on January 16, 1995 was 100.

In formulaic terms:

$$Index TR_d = IndexTR_{d-1} * (1 + CDR_d + TBR_d) * (1 + TBR_d)^{days}$$

where *days* is the number of non S&P GSCI Business Days since the immediately preceding S&P GSCI Business Day.

Contract Daily Return

On any given day, the contract daily return is equal to the applicable daily contract reference price on the WTI Crude Oil contract multiplied by the CPW and the appropriate “roll weight,” (Total Dollar Weight Obtained) divided by the total dollar weight of the index on the preceding day (Total Dollar Weight Invested), minus one.

In formulaic terms, the Contract Daily Return is calculated as follows:

$$CDR_d = \frac{TDWO_d}{TDWI_{d-1}} - 1$$

$$TDW_d = CPW * (CRW1_d * DCRP1_d + CRW2_d * DCRP2_d)$$

Where:

d = the S&P GSCI Business Day on which the calculation is made

$CRW1$ = the Contract Roll Weight of the First Nearby Contract Expiration

$CRW2$ = the Contract Roll Weight of the Roll Contract Expiration

$DCRP$ = the Daily Contract Reference Price of each respective Contract Expiration

The “roll weight” of the WTI Crude Oil commodity future reflects the fact that the positions in futures contracts must be liquidated and rolled forward into more distant contract expirations as they approach expiration. If actual positions in the relevant markets are rolled forward, the roll would likely need to take place over a period of a few days. Since the index, like the S&P GSCI, is designed to replicate the performance of actual investments in the underlying contracts, the rolling process incorporated in the index takes place over the first (1st) to fifth (5th) S&P GSCI Business Days of October (referred to as a “roll period”). On each day of the roll period, the “roll weights” of the current contract and the next contract (the next contract as designated by the index rules) into which it is rolled are adjusted so that the hypothetical position in the contract that is included in the index is gradually shifted from the current contract expiration to the next contract expiration.

The S&P GSCI Crude Oil Annual Roll Index follows the following roll schedule:

- Crude Oil is rolled only to the December contract annually during the October roll period

As mentioned above, the index also alters the standard S&P GSCI “roll period”. Instead of rolling 20% per day of the underlying commodity exposure over the 5th to 9th S&P GSCI Business Day of each month, the S&P GSCI Crude Oil Annual Roll Strategy Index rolls 20% per day of the underlying commodity exposure over the 1st to 5th S&P GSCI Business Day of the month of October.

If on any day during a roll period any of the following conditions exists, the portion of the roll that would have taken place on that day is deferred until the next day on which such conditions do not exist:

- No daily contract reference price is available for a given contract expiration;
- Any such price represents the maximum or minimum price for such contract month, based on exchange price limits (referred to as a “Limit Price”);
- The daily contract reference price published by the relevant trading facility reflects manifest error, or such price is not published by 4:00 PM ET. In that event, S&P Dow Jones Indices may, but is not required to, determine a daily contract reference price and complete the relevant portion of the roll based on such price; provided that if the trading facility publishes a price before the opening of trading on the next day, S&P Dow Jones Indices will revise the portion of the roll accordingly; or
- Trading in the relevant contract terminates prior to its scheduled closing time.

If any of these conditions exist throughout the roll period, the roll will be affected in its entirety on the next day on which such conditions no longer exist.

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.

Tickers

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

Index	Bloomberg
S&P GSCI Crude Oil Annual Roll Index Spot	SPGCCLA
S&P GSCI Crude Oil Annual Roll Index Excess Return	SPGCCLAP
S&P GSCI Crude Oil Annual Roll Index Total Return	SPGCCLAT

S&P Dow Jones Indices' Contact Information

Contact Information

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

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