

S&P Dow Jones Indices

A Division of **S&P Global**

S&P GSCI Risk Weight *Methodology Supplement*

May 2018

Introduction

Index Objective and Highlights

The S&P GSCI Risk Weight is designed to measure the broad commodities market while assigning weights based on the contribution of each commodity sector to the overall index risk.

The index takes into account the contribution of each commodity sector to the overall index risk in order to avoid concentration in any one sector and build the most diversified index in terms of individual sector risk contributions.

The S&P GSCI Risk Weight Methodology Supplement

This methodology supplement uses various terms from the S&P GSCI Methodology. Where not specifically noted otherwise in this document, the rules of the S&P GSCI 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 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.

For information on:

- *Quality Assurance*
- *Internal Reviews of Methodology*
- *Calculations and Pricing Disruptions*
- *Expert Judgment*
- *Data Hierarchy*
- *Unexpected Exchange Closures*

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

Weighting Scheme

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

The five sectors in the S&P GSCI Risk Weight are the same as the sectors in the S&P GSCI. The representative indices are as follows:

- S&P GSCI Energy ER
- S&P GSCI Industrial Metals ER
- S&P GSCI Precious Metals ER
- S&P GSCI Agriculture ER
- S&P GSCI Livestock ER

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

The Sector Weights are determined monthly on the third S&P GSCI Business Day, defined as two days prior to the S&P GSCI Roll Period. The index is rebalanced during the monthly five day S&P GSCI Roll Period.

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

Determination of the Risk Contribution from each Commodity Sector. The marginal risk contribution is defined as the change in volatility of the overall index induced by an infinitesimal increase in the weight of that sector.

Mathematically, it can be summarised 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:

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

$$\text{cov}(r_i, r_j) = \text{Covariance between sector } i \text{ and } j$$

$$\text{cov}(r_i, r_{PORT}) = \text{Covariance between sector } i \text{ and the entire index}$$

The risk contribution from each sector is equal to the product of its weight and its respective marginal risk contribution.

$$RC_i = \varpi_i \times MRC_i$$

Determination of Weights of Individual Sectors. The individual sector weights are solved using a numerical optimization technique, with the aim of minimizing, as far as possible, the variance of the risk contributions from all of the commodity sectors. The maximum sector weight is capped at 33%. Any excess over 33% is redistributed to the remaining sectors based on their risk contribution.

Determination of Weights of Individual Commodities. Individual commodities within a sector are weighted according to their respective Contract Production Weights (CPWs) defined in the most recent *S&P GSCI Methodology*. The CPWs are updated annually and instituted during the January roll.

Rolling Scheme

The contract rolling schedule of the index follows the roll calendar of the S&P GSCI Methodology, unless otherwise stated.

For the S&P GSCI Dynamic Roll Risk Weight Index, the contract rolling schedule of the index follows the dynamic roll contract selection of the S&P GSCI Dynamic Roll Index.

Capping

The rules detailed in the *S&P GSCI Capped Component 35/20 Methodology Supplement* are implemented on a quarterly basis.¹

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.

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	Reuters
S&P GSCI Risk Weight	SPGSRW	.SPGSRW
S&P GSCI Risk Weight ER	SPGSRWP	.SPGSRWP
S&P GSCI Risk Weight TR	SPGSRWTR	.SPGSRWTR
S&P GSCI Dynamic Roll Risk Weight	SPGSDRW	.SPGSDRW
S&P GSCI Dynamic Roll Risk Weight ER	SPGSDRWP	.SPGSDRWP
S&P GSCI Dynamic Roll Risk Weight TR	SPGSDRWT	.SPGSDRWT

¹ 35/20 is a means of identifying a two tiered capping model. It does not connote compliance with any regulatory regime or guideline.

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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