

S&P Factor Indices *Methodology*

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Introduction

Index Objective and Highlights

The S&P Factor Indices are intended to reflect the differences in the inter-commodity spreads (positive or negative) between the corresponding sub-indices constructed from futures contracts.

Each index is comprised of an equally weighted long sub-index and short sub-index and is calculated to reflect the corresponding inter-commodity spread, which is the difference in the daily changes between the value of the Long Sub-Index and the value of the Short Sub-Index.

The indices are calculated on a real-time basis.

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.

Index Construction

Factors and Factor Indices

Each Factor Index is comprised of a long sub-index and a short sub-index. The Long Sub-Index is composed of the long front futures contract. The Short Sub-Index is composed of the short front futures contract. Each Index is calculated to reflect the corresponding inter-commodity spread, which is the difference in the daily changes (positive or negative) between the value of the Long Sub-Index and the value of the Short Sub-Index.

The following factors are represented in the series:

- Equity Risk Premium.** Measures the spread of the return of US stocks over the return of long term Government Bonds. The constituents are:

Long Sub-Index:	S&P 500 Futures Excess Return Index
Short Sub-Index:	S&P US Treasury Bond Futures Excess Return Index
- Non-US Dollar Equity.** Measures the spread of the return of US stocks over the return of the US Dollar Index. The constituents are:

Long Sub-Index:	S&P 500 Futures Excess Return Index
Short Sub-Index:	S&P US Dollar Futures Excess Return Index
- Crude Oil – Equity Spread.** Measures the spread of the return on Crude Oil over the return of US stocks. The constituents are:

Long Sub-Index:	S&P GSCI Crude Oil Index
Short Sub-Index:	S&P 500 Futures Excess Return Index
- Gold – Equity Spread.** Measures the spread of the return of gold over the return of US stocks. The constituents are:

Long Sub-Index:	S&P GSCI Gold Index
Short Sub-Index:	S&P 500 Futures Excess Return Index

S&P Dow Jones Indices calculates an Excess Return (ER) and Total Return (TR) version of each of the indices described below.

- S&P US Equity Risk Premium Index.** The construction of the index involves taking a long position in the S&P 500 Futures Excess Return Index and a short position in the S&P US Treasury Bond Futures Excess Return Index.
- S&P 500 Futures Excess Return Index.** The index is constructed from the front-month E-mini futures contract on the S&P 500 index, traded under the symbol ES on the CME.
- S&P US Treasury Bond Futures Excess Return Index.** The index is constructed from the front-month futures contract on the US Treasury Bond, traded under the symbol ZB on the CME.
- S&P 500 Non-US Dollar Index.** The construction of the index involves taking a long position in the S&P 500 Futures Excess Return Index and a short position in the S&P US Dollar Futures Excess Return Index.
- S&P US Dollar Futures Excess Return Index.** The index is constructed from the front-month futures contract on the US Dollar Index, which is traded under the symbol DX on the ICE.

6. **S&P Crude Oil – Equity Spread Index.** The construction of the index involves taking a long position in the S&P GSCI Crude Oil Index and a short position in the S&P 500 Futures Excess Return Index. For construction of the constituent sub-indices, please refer to the S&P GSCI Index Methodology and the S&P 500 Future Excess Return Index (above), respectively.
7. **S&P Gold – Equity Spread Index.** The construction of the index involves taking a long position in the S&P GSCI Gold Index and a short position in the S&P 500 Futures Excess Return Index. For construction of the constituent sub-indices, please refer to the S&P GSCI Index Methodology and the S&P 500 Future Excess Return Index (above), respectively.

Calculation formulae are on the following pages.

Summary of Index Construction

Index	Sub-Indices and Sub-Index Futures Contracts	Exchange (Symbol)	Base Date	Sub-Index Base Weight (%)	Contract Months
S&P US Equity Risk Premium Index	<u>Long Sub-Index:</u> S&P 500 Futures Excess Return Index <u>Long Sub-Index Futures Contract:</u> E-mini Standard and Poor's 500 Stock Price Index Futures	CME (ES)	9/9/1997	100	March, June, September, December
	<u>Short Sub-Index:</u> S&P US Treasury Bond Futures Excess Return Index <u>Short Sub-Index Futures Contract:</u> US Treasury Bond Futures	CME (ZB)	9/9/1997	100	
S&P 500 Non-US Dollar Index	<u>Long Sub-Index:</u> S&P 500 Futures Excess Return Index <u>Long Sub-Index Futures Contract:</u> E-mini Standard and Poor's 500 Stock Price Index Futures	CME (ES)	9/9/1997	100	March, June, September, December
	<u>Short Sub-Index:</u> S&P US Dollar Futures Index <u>Short Sub-Index Futures Contract:</u> US Dollar Index Futures	ICE (DX)	9/9/1997	100	
S&P Crude Oil - Equity Spread Index	<u>Long Sub-Index:</u> S&P GSCI Crude Oil Excess Return Index <u>Long Sub-Index Futures Contracts:</u> Light Sweet Crude Oil Futures	NYMEX (CL)	9/9/1997	100	Roll pursuant to S&P GSCI schedule
	<u>Short Sub-Index:</u> S&P 500 Futures Excess Return Index <u>Short Sub-Index Futures Contract:</u> E-mini Standard and Poor's 500 Stock Price Index Futures	CME (ES)	9/9/1997	100	March, June, September, December
S&P Gold - Equity Spread Index	<u>Long Sub-Index:</u> S&P GSCI Gold Excess Return Index <u>Long Sub-Index Futures Contract:</u> Gold Futures	COMEX (GC)	9/9/1997	100	Roll pursuant to S&P GSCI schedule
	<u>Short Sub-Index:</u> S&P 500 Futures Excess Return Index <u>Short Sub-Index Futures Contract:</u> E-mini Standard and Poor's 500 Stock Price Index Futures	CME (ES)	9/9/1997	100	March, June, September, December

Note:

CME = Chicago Mercantile Exchange, Inc., or its successor.

NYMEX = New York Mercantile Exchange or its successor.

ICE = Intercontinental Exchange, Inc. or its successor.

COMEX = COMEX division of NYMEX or its successor.

Futures Roll

Each Sub-Index, which is constructed from futures contracts, includes a provision for the replacement of the index futures contracts as they approach maturity (also referred to as “rolling” or “the roll”).

Each of the equity index futures contract, the currency index futures contract, and the treasury index futures contract reflects the changes of an underlying financial instrument. Therefore, we refer to these collectively as the financial instrument index futures contracts.

For equity index futures (S&P 500 E-Mini Futures) and currency index futures (US Dollar Futures), this replacement occurs over a one-day rolling period every quarter, which is five days prior to the last trade date of the futures contract. For more information, please refer to the S&P Equity Futures and Currency Futures Indices Methodology at www.spdji.com.

For Treasury index futures (US Long Bond Future), this replacement occurs over a one-day rolling period every quarter, which is the second-to-last business day of the month before the expiration of the futures contract. For example, for a contract that expires in June, the roll date is the second-to-last business day of May.

For commodity index futures contracts (currently gold and oil), the roll convention follows the established S&P GSCI® Methodology, which can be found at www.spdji.com.

With respect to any expiring commodity futures contract, the roll period is typically five (5) S&P GSCI Business Days, beginning on the fifth S&P GSCI Business Day of each calendar month and ending on the ninth S&P GSCI Business Day of such month. S&P GSCI Business Day is defined as a day on which the indices are calculated, as determined by the NYSE Euronext Holiday & Hours schedule. For a more detailed discussion of the rolling of commodity futures contracts please refer to S&P GSCI Methodology.

Calculation of Sub-Index Excess Return

The excess return of each of the sub-indices is calculated from the price change of the underlying futures contract. On any trading date, t , the level of each of the sub-indices is calculated as follows:

$$SubIndex_t = SubIndex_{t-1} * (1 + CDR_{t,t-1}) \quad (1)$$

where:

$SubIndex_{t-1}$ = The Excess Return Index level on the preceding business day, defined as any date on which the index is calculated.

$CDR_{t,t-1}$ = The Contract Daily return, defined as

$$CDR_{t,t-1} = \frac{DCRP_t}{DCRP_{t-1}} - 1, \text{ and}$$

$DCRP$ = The Daily Contract Reference Price of the futures contract. The official close, as designated by the relevant exchange, is used.

Calculation of Factor Index Excess Return

On any trading date, t , each Factor Index is calculated as follows:

$$FactorExcessReturnIndex_t = FactorExcessReturnIndex_{t-1} * (1 + IndexExcessReturn_t) \quad (2)$$

$$IndexExcessReturn_t = (W_{Long} * Return_{Long} - W_{Short} * Return_{Short}) + (W_{Short} - W_{Long}) * \frac{RiskfreeRate}{360} * D_{t,t-1} \quad (3)$$

where:

$FactorExcessReturnIndex_{t-1}$	= The previous day's Index value
W_{Long}	= Weight of long component
$Return_{Long}$	= Daily return of the long component
W_{Short}	= Weight of short component
$Return_{Short}$	= Daily return of the short component
$D_{t,t-1}$	= The number of calendar days between date t and $t-1$
$RiskfreeRate$	= The 3-month T-bill Rate

The last term in equation (3) is the net interest return between reinvesting the short proceeds and the borrowing cost used to take the long position.

With a daily rebalancing, the weights of the long and short sub-indices are reset to 100%.

Calculation of the Index Total Return

For a funded investment, the total return between dates $t-1$ and t include risk free return for the initial cash outlay:

$$IndexTotal Return_t = IndexExcess Return_t + TBR_t \quad (4)$$

TBR is the Treasury Bill Rate, as determined by the following formula:

$$TBR_t = \left[\frac{1}{1 - \frac{91}{360} * TBAR_{t-1}} \right]^{\frac{Delta_t}{91}} - 1$$

where:

$Delta_t$	= Number of calendar days between the current and previous business days.
$TBAR_{t-1}$	= The most recent weekly high discount rate for 91-day US Treasury bills, effective on the preceding business day. Generally the rates are announced by the US Treasury on each Monday. On Mondays that are bank holidays, Friday's rates will apply.

The Total Return index is calculated as:

$$FactorTotal ReturnIndex_t = FactorTotal ReturnIndex_{t-1} * (1 + IndexTotal Return_t) \quad (5)$$

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 Dow Jones Indices Commodities Index Committee maintains the S&P Factor Index Series. The Index Committee may revise index policy covering rules for including currencies, the timing of rebalancing 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

Rebalancing announcements, if needed, are made two days prior to the rebalancing date. The indices are calculated daily when the relevant US futures markets are open for official trading, excluding holidays and weekends.

In situations where an exchange is forced to close early due to unforeseen events, such as computer or electric power failures, weather conditions or other events, S&P Dow Jones Indices' will calculate the value of the index based on most recent futures price published by the exchange. If an exchange fails to open due to unforeseen circumstances, S&P Dow Jones Indices' may determine not to publish the index for that day.

For more information on S&P Dow Jones Indices' announcements, please refer to the [Announcement Policy](#).

Holiday Schedule

The index is calculated daily, throughout the calendar year. The indices follow the NYSE holiday schedule, despite a different schedule for the US Treasury futures (the US Government Bond holiday schedule). If there is a US Government Bond holiday when the NYSE is open, S&P Dow Jones Indices' uses the previous days' Treasury futures contract prices to calculate the current day's index levels.

A complete holiday schedule for the year is available at www.spdji.com.

For information on [Calculations and Pricing Disruptions](#), [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 any 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.

Index	Bloomberg	Reuters
S&P US Equity Risk Premium Excess Return Index	SPUSERPP	.SPUSERPP
S&P US Equity Risk Premium Total Return Index	SPUSERPT	.SPUSERPT
S&P 500 Non-US Dollar Excess Return Index	SPNUSDP	.SPNUSDP
S&P 500 Non-US Dollar Total Return Index	SPNUSDTR	.SPNUSDTR
S&P Crude Oil - Equity Spread Excess Return Index	SPCOESP	.SPCOESP
S&P Crude Oil - Equity Spread Total Return Index	SPCOESTR	.SPCOESTR
S&P Gold - Equity Spread Excess Return Index	SPGDESP	.SPGDESP
S&P Gold - Equity Spread Total Return Index	SPGDESTR	.SPGDESTR
S&P 500 Futures Excess Return Index	SPXFP	.SPXFP
S&P US Treasury Bond Futures Excess Return Index	SPUSTBP	.SPUSTBP
S&P US Dollar Futures Excess Return Index	SPUSDP	.SPUSDP
S&P 500 Futures Total Return Index	SPXFTR	.SPXFTR
S&P US Treasury Bond Futures Total Return Index	SPUSTBTR	.SPUSTBTR
S&P US Dollar Futures Total Return Index	SPUSDTR	.SPUSDTR

FTP

Daily constituent and index level data are 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.

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