S&P ESG Global Macro Indices
Methodology

November 2023

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Introduction

Index Objective

The S&P ESG Global Macro Indices are weighted return indices that measure the performance of a multi-asset class strategy with ESG equity component indices and a risk control overlay. The indices employ economic and market trend signals to determine allocations across component indices representing different asset classes.

Index Family

The S&P ESG Global Macro Indices currently include:

- S&P ESG Global Macro (with Commodity) Index
- S&P ESG Global Macro Index

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' Equity Indices Policies & Practices Methodology	Equity Indices Policies & Practices
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 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.

Eligibility Criteria

Index Eligibility

The universe of eligible asset classes, and the component indices used to represent each, are:

Asset Class	Region	Index
Equities	U.S. Equities	S&P 500 ESG Excess Return Index
	Europe Equities	S&P Europe 350 ESG Excess Return Index (USD)[1]
	Japanese Equities	S&P Japan 500 ESG Excess Return Index (USD) [2]
Fixed Income	U.S. Fixed Income	S&P 10-Year U.S. Treasury Note Futures Excess Return Index
	Europe Fixed Income	S&P Euro-Bund Futures Excess Return Index (USD) [3]
	Japanese Fixed Income	S&P 10-Year JGB Futures Excess Return Index (USD) [4]
Commodities[5]	Global Commodities	S&P GSCI Light Energy 3 Month Forward ER

The excess return versions of the S&P 500 ESG, S&P Europe 350 ESG, and S&P Japan 500 ESG Indices calculate in local currency before conversion into the USD versions. Local cash rates are used to calculate the excess return indices.

Component Index	Asset Class	Sub-Component Indices	Ticker
S&P 500 ESG Excess Return Index (USD)	Equity	S&P 500 ESG Index (USD)	SPXESUP
	Cash[6]	SOFR Overnight + 0.13088% interest rate	SOFRS3M=

Component Index	Asset Class	Sub-Component Indices	Ticker
S&P Europe 350 ESG Excess Return Index (USD)	Equity	S&P Europe 350 ESG Index (EUR)	SPEESEP
	Cash[6]	1-Month EURIBOR interest rate	EURIBOR1MD=
		3-Month EURIBOR interest rate	EURIBOR3MD=
	Exchange Rate	DIRECT US Dollar TO Euro currency (WM Spot)	USDEURFIXM=WM

Component Index	Asset Class	Sub-Component Indices	Ticker
S&P Japan 500 ESG Excess Return Index (USD)	Equity	S&P Japan 500 ESG Index (JPY)	SPJESGJP
	Cash[6]	1-Month TIBOR interest rate	DIBJP1MD=
		3-Month TIBOR interest rate	DIBJP3MD=
	Exchange Rate	DIRECT Japanese Yen TO US Dollar (WM Spot)	USDJPYFIXM=WM

For information on the sub-component indices, please refer to the S&P ESG Index Series Methodology, S&P Global Bond Futures Index Series Methodology, and S&P GSCI Methodology, respectively.

In addition, please refer to S&P Dow Jones Indices' Index Mathematics Methodology for details on excess return index calculations. These documents are available at www.spglobal.com/spdji.

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[1] The S&P Europe 350 ESG Excess Return Index (USD) is the principal hedged USD version of the S&P Europe 350 ESG Excess Return Index based on price return. Please see Appendix I for the calculation of principal hedged currency index levels.

[2] The S&P Japan 500 ESG Excess Return Index (USD) is the principal hedged USD version of the S&P Japan 500 ESG Excess Return Index based on price return. Please see Appendix I for the calculation of principal hedged currency index levels.

[3] The S&P Euro-Bund Futures Excess Return Index (USD) is the principal hedged USD version of the S&P Euro-Bund Futures Excess Return Index. Please see Appendix I for the calculation of principal hedged currency index levels.

[4] The S&P 10-Year JGB Futures Excess Return Index (USD) is the principal hedged USD version of the S&P 10-Year JGB Futures Excess Return Index. Please see Appendix I for the calculation of principal hedged currency index levels.

[5] The S&P ESG Global Macro Index does not include the commodity component.

[6] Cash items are used in calculating the excess return; the indices do not hold cash.

Index Construction

Signals and Market Phase Determination

The S&P ESG Global Macro Indices determine their component index representation based on the combination of economic and market trend signals as shown in the below table.

Signal	Indicator/Equity Benchmark
Economic Signal	OECD G20 Composite Leading Indicator
Market Trend Signal: Number of equity benchmark indices with positive 63-Day Price Return	S&P 500 Index (USD)
	S&P Europe 350 (EUR)
	S&P Japan 500 (JPY)

OECD G20 Composite Leading Indicator ("CLI") is designed to provide early signals of turning points in business cycles showing fluctuation of the economic activity globally around its long-term potential level. The OECD aims for the turning points of the CLI to consistently precede those of the business cycle, typically by 6- 9 months (lead time varies).

CLIs show short-term economic movements in qualitative rather than quantitative terms. The long-term average of the amplitude adjusted CLI is 100 which represents the trend of economic activity. The OECD CLIs are compiled and published on a monthly basis. The input data for a given month "t" is available in month "t+2" and is available at the OECD Data website at *https://stats.oecd.org/Index.aspx?datasetcode=MEI_CLI#*.

The global market phase is determined once a month, based on the latest available value of OECD G20 CLI and the 63-day price returns of the above equity benchmarks as of the second last business day of each month (reference date). The market phase identified is then used to determine the base weight assigned to each of the asset classes and component indices in the following month, starting from the first business day of the following month after market close.

Market Phase Determination		OECD G20 CLI	
		>100	≤100
Number of equity benchmarks with positive 63-day price return	>= 2	Phase 1	Phase 2
	< 2	Phase 3	Phase 4

For more information on the equity indices used for market trend signals, please refer to the respective methodology documents located on our Web site, www.spglobal.com/spdji.

Base Weights Allocation Matrix

Based on the market phase determined at the reference date, a base weight is assigned to each component index for the following month according to the below allocation matrix. The allocation across three regions within equities and fixed income follows the ratio of 3:2:1 for U.S., Europe, and Japan respectively.

S&P ESG Global Macro (with Commodity) Index

Market Phase	Equities	Fixed Income	Commodities
Phase 1	72%	20%	8%
Phase 2	49.5%	45.0%	5.5%
Phase 3	22.5%	75.0%	2.5%
Phase 4	0%	100%	0%

Market Phase	U.S. Equity	Europe Equity	Japan Equity	U.S. Fixed Income	Europe Fixed Income	Japan Fixed Income	Commodity
Phase 1	36%	24%	12%	10%	6.6$\dot{6}$%	3.3$\dot{3}$%	8%
Phase 2	24.75%	16.5%	8.25%	22.5%	15%	7.5%	5.5%
Phase 3	11.25%	7.5%	3.75%	37.5%	25%	12.5%	2.5%
Phase 4	0%	0%	0%	50%	33.3$\dot{3}$%	16.6$\dot{6}$%	0%

S&P ESG Global Macro Index

Market Phase	Equities	Fixed Income
Phase 1	80%	20%
Phase 2	55%	45%
Phase 3	25%	75%
Phase 4	0%	100%

Market Phase	U.S. Equity	Europe Equity	Japan Equity	U.S. Fixed Income	Europe Fixed Income	Japan Fixed Income
Phase 1	40%	26.6$\dot{6}$%	13.3$\dot{3}$%	10%	6.6$\dot{6}$%	3.3$\dot{3}$%
Phase 2	27.5%	18.3$\dot{3}$%	9.1$\dot{6}$%	22.5%	15%	7.5%
Phase 3	12.5%	8.3$\dot{3}$%	4.1$\dot{6}$%	37.5%	25%	12.5%
Phase 4	0%	0%	0%	50%	33.3$\dot{3}$%	16.6$\dot{6}$%

The assigned monthly base weights are then applied to each business day of the following month for the calculation of the leverage factor needed each day to achieve the target portfolio volatility of 5%.

Risk Control Overlay

On each business day of the following month, the prior 60-day and 20-day volatilities of the S&P ESG Global Macro Indices calculate based on the monthly base weights assigned to component indices in that month as of two business days prior. The maximum of the two volatility values is chosen to determine the leverage factor needed to achieve the target volatility of 5%. The leverage factor is capped at 200%. Base weights assigned to component indices are then adjusted by the leverage factor.

Leverage Factor = Min [200%, 5% / Max($VOL_{t,20D}$, $VOL_{t,60D}$)]

Adjusted Base Weights = Base Weights * Leverage Factor

Please note: The number of units calculated for a component index on day *t* after market close is pre-determined based on the index level of the S&P ESG Global Macro Indices, the index level, and adjusted base weight of this component index as of day *t*-2. Therefore, the effective weight allocated to this component index at day *t* is slightly different from its adjusted base weight determined at day t-2.

Index Calculation

The S&P ESG Global Macro Indices are calculated as follows:

$$IndexDailyReturn_t = \sum_{i=1}^{n} W_t^i \left(\frac{Subindex_t^i}{Subindex_{t-1}^i} - 1 \right)$$

where:

W_t^i = The effective weight of Subindex i assigned for time *t*

$Subindex_t^i$ = The index level of Subindex *i* at time *t*

$IndexValue_t = IndexValue_{t-1} * (1 + IndexDailyReturns_t)$

Index Maintenance

Rebalancing

The monthly base weights assigned to component indices are determined once a month at the second last business day of the prior month. However, the leverage factor and adjusted base weights are calibrated daily based on the covariance matrix two days prior. The indices rebalance daily, based on the adjusted base weights and index levels of the index and component indices as of two business days prior.

Currency of Calculation and Additional Index Return Series

The indices are calculated in U.S. dollars.

In addition to the indices detailed in this methodology, additional return series versions of the indices may be available, including, but not limited to the following: 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 the calculation of different types of indices, 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.spglobal.com/spdji.

Base Date and History Availability

Index history availability, base date, and base value are in the table below.

Index	Launch Date	First Value Date	Base Date	Base Value
S&P ESG Global Macro (with Commodity) Index	10/04/2019	08/31/2010	08/31/2010	100
S&P ESG Global Macro Index	10/04/2019	08/31/2010	08/31/2010	100

Index Governance

Index Committee

An S&P Dow Jones Indices Index Committee maintains the indices. All committee members are full-time professional members of S&P Dow Jones Indices' staff. The Committee meets regularly. At each meeting, the Committee reviews pending corporate actions that may affect index constituents, statistics comparing the composition of the index to the market, companies that are being considered as candidates for addition to the index, and any significant market events. In addition, the Committee may revise index policy covering rules for selecting companies, treatment of dividends, share counts 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 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' Equity Indices Policies & Practices Methodology.

Index Policy

Holiday Schedule

The indices are calculated when the U.S., Europe, and Japan equity markets, and the relevant bond futures and commodities markets, are open.

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

Rebalancing

The Index Committee may change the date of a given rebalancing for reasons including market holidays occurring on the scheduled rebalancing date. Any such change will be announced with proper advance notice where possible.

Unexpected Exchange Closures

For information on Unexpected Exchange Closures, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Recalculation Policy

For information on the recalculation policy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

For information on Calculations and Pricing Disruptions, Expert Judgment and Data Hierarchy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

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.spglobal.com/spdji*, 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	Return Type	BBG	RIC
S&P ESG Global Macro (with Commodity) Index	Excess Return	SPEGMAUP	---
S&P ESG Global Macro Index	Excess Return	SPEGMXUP	---

Index Data

Daily constituent and index level data are available via subscription.

For product information, please contact S&P Dow Jones Indices, www.spglobal.com/spdji/en/contact-us.

Website

For further information, please refer to S&P Dow Jones Indices' Web site at *www.spglobal.com/spdji*.

Appendix I

Excess Return Calculation

The USD versions of the S&P Europe 350 ESG Excess Return Index, S&P Japan 500 ESG Excess Return Index, S&P Euro-Bund Futures Excess Return Index, and S&P 10-Year JGB Futures Excess Return Index are calculated on a principal hedged basis. The calculation is:

$$IndexDailyReturn(USD)_t = \left(\frac{IndexValue(LOC)_t}{IndexValue(LOC)_{t-1}} - 1\right) * \left(\frac{ExchangeRate(USD/LOC)_t}{ExchangeRate(USD/LOC)_{t-1}}\right)$$

where:

$ExchangeRate(USD/LOC)_t$ = U.S. dollars per local currency at time t

$IndexValue(LOC)_t$ = The index level in local currency at time t

$IndexValue(USD)_t = IndexValue(USD)_{t-1} * (1 + IndexDailyReturns(USD)_t)$

For information on excess return index calculations, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.

Appendix II

Methodology Changes

Methodology changes since October 4, 2019, are as follows:

Change	Effective Date (After Close)	Methodology Previous	Methodology Updated
Economic Indicator Replacement	04/24/2023	OECD Total Composite Leading Indicator	OECD G20 Composite Leading Indicator
USD Interest Rate Replacements	12/17/2021	2-Month US Dollar LIBOR interest rate 3-Month US Dollar LIBOR interest rate	SOFR overnight + 0.13088%
EUR and JPY Interest Rate Replacements	11/19/2021	2-Month ICE LIBOR JPY interest rate 3-Month ICE LIBOR JPY interest rate 2-Month ICE LIBOR EUR interest rate 3-Month ICE LIBOR EUR interest rate	1-Month TIBOR interest rate 3-Month TIBOR interest rate 1-Month EURIBOR interest rate 3-Month EURIBOR interest

Disclaimer

Performance Disclosure/Back-Tested Data

Where applicable, S&P Dow Jones Indices and its index-related affiliates ("S&P DJI") defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the index is set to a fixed value for calculation purposes. The Launch Date designates the date when the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P DJI defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its data feed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Information presented prior to an index's launch date is hypothetical back-tested performance, not actual performance, and is based on the index methodology in effect on the launch date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. In addition, forks have not been factored into the back-test data with respect to the S&P Cryptocurrency Indices. For the S&P Cryptocurrency Top 5 & 10 Equal Weight Indices, the custody element of the methodology was not considered; the back-test history is based on the index constituents that meet the custody element as of the Launch Date. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate certain ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using "Backward Data Assumption" (or pulling back) of ESG data for the calculation of back-tested historical performance. "Backward Data Assumption" is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as "product involvement") were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on "Backward Data Assumption" please refer to the FAQ. The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific

data points and relevant time period for which backward projected data was used. Index returns shown do not represent the results of actual trading of investable assets/securities. S&P DJI maintains the index and calculates the index levels and performance shown or discussed but does not manage any assets.

Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the Index or investment funds that are intended to track the performance of the Index. The imposition of these fees and charges would cause actual and back-tested performance of the securities/fund to be lower than the Index performance shown. As a simple example, if an index returned 10% on a US $100,000 investment for a 12-month period (or US $10,000) and an actual asset-based fee of 1.5% was imposed at the end of the period on the investment plus accrued interest (or US $1,650), the net return would be 8.35% (or US $8,350) for the year. Over a three-year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US $5,375, and a cumulative net return of 27.2% (or US $27,200).

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