

## J.P. Morgan ESG Green Social & Sustainability IG EUR Bond (TR) Index

### Methodology and Factsheet

#### Highlights

The J.P. Morgan ESG (JESG) Green Social & Sustainability (GSS) IG EUR Bond (TR) Index tracks investment grade green, social, and sustainability bonds, denominated in EUR, across developed and emerging markets with an emphasis on green bonds that are aligned in achieving the goals within the Paris Agreement (i.e. Certified Climate Bonds). The index applies an ESG scoring and screening methodology that tilts toward issuers with greater ESG qualities and, at the instrument level, 'Certified Climate Bonds'. The index leverages the labelled green, social, and sustainability bond datasets from the Climate Bonds Initiative, in addition to their Certified Climate Bonds Standard that identifies those green bonds that are aligned in achieving the goals within the Paris Agreement. The returns and statistics are available since December 2014.

#### Index Criteria

	Hard Currency Bonds	Local Currency Government Bonds
<b>Eligible currencies</b>	EUR	EUR
<b>Minimum Amount Outstanding</b>	EUR: €500MM	Local currency bonds: €1 billion
<b>Minimum Maturity</b>	For inclusion: Bonds should have minimum 2 years remaining to maturity Remain in the index: A bond remains eligible for the index as long as it has 6 months remaining to maturity	
<b>Issuer</b>	Sovereign (i.e. external law), Quasi-sovereign (100% government owned or guaranteed), Corporate, or Supranational	Sovereign only
<b>Country</b>	All countries are eligible	EMU countries where EUR denominated local government bonds are liquid, accessible and investible by international investors. The below table mentions the current list of eligible currencies.
<b>Instrument Type</b>	Only green, social, and sustainability bonds, as labelled by Climate Bonds Initiative, are eligible	
	<u>Include:</u> Bullet, fixed-rate or zero coupon bonds. Perpetuals, callable or puttable bonds are permitted.  <u>Exclude:</u> Floating rate, hybrid, step-up, PIK, amortizers, Sukuk bonds, municipal bonds, structured bonds, collateral trust and equipment trust bonds, bonds with non-transparent cash flows or atypical indices used to reset coupons, etc.	Bullet, fixed-rate or zero coupon bonds
<b>Collateral</b>	<u>Exclude:</u> covered, mortgage backed, asset backed, bank guaranteed	-
<b>Rating</b>	Only investment grade instruments are eligible. An instrument is classified as investment grade when the middle rating from S&P, Moody's, and Fitch is investment grade (i.e. BBB- equivalent or above). When a rating from only two agencies is available, the lower has to be investment grade; and when only one agency rates a bond, that single rating has to be investment grade	

Source: JPMorgan Chase & Co.

## JESG Overlay Criteria

<b>ESG Providers &amp; GSS Bond Certification Authorities</b>	Sustainalytics RepRisk Climate Bonds Initiative
<b>JESG Scoring methodology</b>	JESG issuer scores are a 0-100 percentile rank calculated based on normalized raw ESG scores from third-party research providers Sustainalytics and RepRisk. An issuer's finalized JESG score incorporates a 3-month rolling average. See <i>Appendix: ESG Methodology</i> for more details.
<b>JESG Integration methodology</b>	The JESG scores are divided into five bands that are used to scale each issuer's baseline index market value, with the band rebalance occurring with a one-month lag. See <i>Appendix: ESG Methodology</i> for more details.
<b>Treatment for Certified Climate Bonds</b>	"Certified Climate bonds", as per Climate Bonds Initiative's Climate Bonds Standards V3.0, will receive one band upgrade (unless they are already in Band 1). See <i>Appendix: ESG Methodology</i> for more details.
<b>Ethical exclusions &amp; Negative Screening</b>	Bonds issued by non-sovereign issuers earning revenue from Nuclear Energy, Oil & Gas, Oil Sands, Thermal Coal, Tobacco, or Weapons, or not in adherence with UNGC Principles will not be eligible. Issuers with JESG scores less than 20 (i.e. in Band 5) will also be ineligible for inclusion.
<b>Frequency of JESG Rebalance</b>	Rebalance actions related to the JESG overlay will be conducted once a quarter at the quarter-end date.

Source: JPMorgan Chase & Co.

## Index Characteristics & Methodology

<b>Pricing</b>	Mid prices are taken from a third party pricing source, PricingDirect.
<b>Aggregate Return</b>	Index level total return is calculated as a market value-weighted average of bond returns using mid prices.
<b>Rebalancing</b>	Rebalances occur on the last weekday of the month.
<b>Coupon Treatment</b>	All coupons received are immediately reinvested into the index.
<b>FX Rates</b>	All FX rates used for hedged/unhedged returns are as of 4pm London time provided by WM/Reuters.
<b>Hedging Strategy</b>	Assume a 1-month currency forward position that begins on rebalance day and ends on next rebalance day.
<b>Weighting</b>	Market capitalization based weighting, renormalized based on JESG Band scalar with a 10% issuer cap applied.

Source: JPMorgan Chase & Co.

## Local Currency Government Bonds – Eligible Countries/Currencies

Country	Currency	Country	Currency
Austria	EUR	France	EUR
Belgium	EUR	Germany	EUR
Netherlands	EUR	Ireland	EUR
Portugal	EUR	Italy	EUR
Finland	EUR	Spain	EUR

Source: J.P. Morgan, as of May 31st

## Defining the Index Universe

Eligibility for the index will be determined on a continuous basis by monitoring the index criteria. Only those green bonds that meet the criteria for Climate Bonds Initiative's (CBI) green labelled database will be eligible for inclusion into the index. Similarly, only social and sustainability bonds that meet the criteria for CBI's Social and Sustainability database will be eligible for inclusion.

Country of risk for the instruments in the index will be determined based upon the below considerations:

1. The country with the largest source of revenue. Guarantees by other entities including subsidiaries or holding companies in other countries will also be considered.
2. The headquarters or the location of the issuer's majority assets will also be considered.

## New Issue Timing

A new issue that meets the index criteria is added at the month-end rebalancing provided it is present in CBI's database by the 15<sup>th</sup> of the month. Bonds entering the database after the 15<sup>th</sup> of the month will enter the index during the subsequent month-end rebalance.

## ESG Methodology

The index applies J.P. Morgan ESG (JESG) issuer scores to adjust the market value of index constituents from the baseline J.P. Morgan Green, Social, & Sustainability Bond Index. JESG issuer scores are a 0-100 percentile rank calculated based on normalized raw ESG scores from third-party research providers Sustainalytics and RepRisk. An issuer's finalized JESG score incorporates a 3-month rolling average. Corporate issuers with no coverage by either third-party research provider default to their region-sector JESG score. The JESG scores are divided into five bands that are used to scale each issue's baseline index market value, with the band rebalance occurring with a one-month lag.

JESG Score Bands	Scalar
Band 1: Score > 80	1.00
Band 2: 60 < Score <= 80	0.80
Band 3: 40 < Score <= 60	0.60
Band 4 20 < Score <= 40	0.40
Band 5: Score <= 20	0.00

If an instrument is categorized as a 'Certified Climate Bond' by the Climate Bonds Initiative, the security will receive a one-band upgrade. Certified bonds by issuers already in Band 1 will not receive any further upgrades. Non-sovereign issuers considered non-adherent with United Nations Global Compact (UNGC) principles by both Sustainalytics and RepRisk, or with direct revenue exposure to nuclear energy, oil & gas, oil sands, thermal coal, tobacco, or weapons will be excluded from the index. Issuers with JESG scores less than 20, i.e. in Band 5, will be ineligible for inclusion within the JESG index.

## Appendix

The following is a description of our methodology for calculating aggregate returns at the index level. The returns calculated are total return, price (clean) return, interest (coupon) return, treasury return, spread (excess) return, and FX (spot) return.

Total return is a means of representing the economic benefit of holding a security or portfolio position. In its simplest form, it is based on the “cash in/cash out” notion – i.e., what is paid for the security at the initial purchase versus what is received at its sale. The means of calculating the total return on a basket containing various instruments is an extension of the single-instrument total return framework.

### Index Total Return

The total return is a representative measure of the performance of the underlying instruments between day  $t - 1$  and day  $t$ . At its most basic, the index total return of a multi-currency portfolio can be explained by five components: price return, interest return, treasury return, spread return, and spot return.

Assume that the portfolio of securities is composed of bonds and markets in proportion to their respective total market value. Market value in this case is calculated using the amount outstanding, as well as the total price inclusive of accrued interest and principal payments. The rate of return for any day can be attributed in one of two ways:

1. Using the clean and coupon returns:

$$\text{Total Rate of Return} = (1 + \text{Price Rtn})(1 + \text{Interest Rtn})(1 + \text{Spot Rtn}) - 1$$

2. Or, alternatively, using the treasury and excess returns:

$$\text{Total Rate of Return} = (1 + \text{Treasury Rtn})(1 + \text{Spread Rtn})(1 + \text{Spot Rtn}) - 1$$

Analytic	Field Name in DataQuery	Description
<b>Return Analytics</b>		
Total Return	CumTotRet	(see above)
Price Return	StatClnRtnRateMid	(see above)
Interest Return	StatsIntRet	(see above)
Spread Return	StatExcessReturnMid	(see above)
Treasury Return	DailyTsyReturnMid	(see above)
<b>ESG Analytics</b>		
ESG JPM Rank	ESGScore	Proprietary J.P. Morgan computed ESG score
ESG Band	ESGBand	ESG band designation
<b>To Worst Analytics</b>		
Yield (to worst)	StatYldWrstRateMid	The lowest potential Yield on a callable security or the highest potential yield on a puttable security. The corresponding date at which this Yield is realized is referred to as the Worst Date, and is the driver for all other To Worst analytics.
Spread (to worst)	StatStpSprRateMid	The Spread Over the Treasury Zero Curve corresponding to the Worst Date. This is the basis point spread over the Treasury Zero Curve that will discount cash flows such that the Present Value will equal the Settlement Price, reflective of the Worst Date.
Modified Duration (to worst)	YTMModDurToWrstMid	A measure of the change in settlement price for a 100 bps shift in the underlying government bond Cash Coupon Curve and reflective of all cash flows to the Worst Date. It is calculated by shifting the government bond Cash Coupon Curve by 100bps up and down and calculating settlement price under each scenario.
Spread Duration (to worst)	EffSpreadDuration_Wrst	A measure of the change in settlement price for a 100 bps shift in the underlying government bond Zero Coupon Curve and reflective of all cash flows to the Worst Date. It is calculated by shifting the government bond Zero Curves by 100bps up and down and calculating settlement price under each scenario.
Spread Convexity (to worst)	EffSpreadConvexity_Wrst	A measure of the sensitivity of Spread Duration to a 100 bps shift in the underlying government bond Zero Coupon Curve and reflective of all cash flows to the Worst Date. It is calculated by shifting the government bond Zero Curves by 100 bps up and down and calculating settlement price under each scenario.
Average Life (to worst)	Avg_Life_Wrst	Average length of remaining time before the bond's principal is repaid (or when optionality is executed) as measured at the To Worst Date.
<b>Base Analytics</b>		
Index Dirty Price (mid)	StatValStlOrgAmtMid	Dirty mid price including adjustments for amortization and capitalization
Market Value (ESG adj.)	MktCap	Market Value (ESG methodology adjusted)
Face Amount	FaceAmtOS	Amount outstanding
Coupon	AM_ACT_PAY	Current coupon rate
Accrued interest	AM_INT_PRD	Accumulated interest since last payout
Amortization amount	AM_AMORT	Aggregated amortized principal amount

Remaining Maturity (days)	StatsDaysToMat	Number of business days from trade date to maturity date
Current Yield	StatClnRtnRateMid	Current yield
Number of bonds	Num_Bonds	Number of bonds in the index

Source: J.P. Morgan

For any questions or for additional information, please contact [index.research@jpmorgan.com](mailto:index.research@jpmorgan.com).

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