

# Government Bond Index-Emerging Markets Global CORE (GBI-EM Global CORE)

## Methodology and Factsheet

### Highlights

The GBI-EM Global Diversified Core (GBI-EM Global Core) is designed to track the performance of bonds issued by emerging market governments and denominated in the local currency of the issuer. The GBI-EM Core is designed to be investible and is based on the well-established methodology and composition of the flagship GBI-EM Global index. The enhancement of the GBI-EM Global Core is the application of a minimum country weight of 1% (floor) based on the country's eligible debt outstanding, alongside a maximum country weight of 10% (cap). The index includes only those countries that are accessible by most of the international investor base and selects bonds from each of the emerging market countries set forth below that are fixed-rate, domestic currency government bonds.

### Index Criteria

<b>Instrument Type:</b>	Local currency denominated fixed coupon instruments.
<b>Remaining Maturity:</b>	<b>Inclusion:</b> Greater than 2.5 years remaining maturity on rebalance date. <b>Exclusion:</b> Less than 6 months remaining maturity on rebalance date.
<b>Amount Outstanding:</b>	Local issues with a current face amount outstanding of \$1 billion or more, as well as Global issues with \$500 million or more are considered for inclusion.
<b>Currency:</b>	All eligible currencies are available within the set of eligible countries.
<b>Country Eligibility:</b>	<b>Index Entry:</b> A country's GNI per capita must be below the JPMorgan defined Index Income Ceiling (IIC) <sup>1</sup> for 3 consecutive years, or the Index PPP Ratio (IPR) <sup>2</sup> is below the emerging market threshold for 3 consecutive years. <b>Index Exit:</b> A country's GNI per capita is above the Index Income Ceiling (IIC) for three consecutive years; the country's long term local currency sovereign credit rating (the available ratings from all three agencies: S&P, Moody's & Fitch) is A-/A3/A- (inclusive) or above for three consecutive years; and its IPR is above the emerging market threshold for 3 consecutive years.
<b>Capital Controls:</b>	The GBI-EM Global Core Index excludes countries with explicit capital controls but does not factor in regulatory/tax hurdles in assessing eligibility, unless such regulatory or tax hurdles significantly hinder investors' ability to replicate the index.

### Index Characteristics and Methodology

<b>Pricing:</b>	Bid and Ask prices are taken from a third-party pricing source <sup>3</sup> as of local market close.
<b>Aggregate Return:</b>	Index/Country level total return is calculated as a market-weighted average of bond returns using mid prices.
<b>Rebalancing:</b>	Rebalances on the last weekday of the month. If FX rates from WN Reuters are unavailable on the last weekday of the month (i.e. Good Friday), indices are rebalanced on the previous business day.
<b>Coupon Treatment:</b>	All coupons received are immediately reinvested into the index.

<sup>1</sup> J.P. Morgan defines the Index Income Ceiling (IIC) as the GNI per capita level that is adjusted every year by the growth rate of the World GNI per capita, Atlas method (current US\$), provided by the World Bank annually.

<sup>2</sup> J.P. Morgan defines the Index Purchasing Power Parity Ratio (IPR) as GDP (current prices, USD) / GDP (current prices, PPP dollars), from the one-year lagged GDP data available in the IMF World Economic Outlook.

<sup>3</sup> **PricingDirect Inc.**, a market-based professional valuation service and a wholly owned subsidiary of JPMorgan Chase & Co, is utilized as the primary source for instrument level pricing ensuring transparency around pricing sourcing and consistency/accuracy of index constituent valuations.

<b>FX Rates:</b>	All FX rates used for hedged/unhedged returns are as of 4pm London time provided by WM/Reuters.
<b>Holiday Calendar:</b>	Local market calendar.
<b>Credit Rating:</b>	Median of S&P/Moody's/Fitch Rating.
<b>Weighting:</b>	Diversified, market capitalization based weighting subject to a maximum weight of 10% (cap) and minimum weight of 1% per country.

## Defining the universe of GBI-EM instruments

The GBI-EM consists of regularly traded, fixed-rate, domestic currency government bonds which international investors can readily access. The index excludes countries where local market investing is subject to explicit capital controls, but eligibility consideration does not factor in regulatory/tax hurdles.

Eligibility for local currency issues is determined using the following criteria:

### Instrument type

The GBI-EM indices only include fixed coupon instruments; Floating rate and capitalizing/amortizing bonds are not eligible for index inclusion. Additionally, bonds with callable, puttable, or convertible features are not part of the indices.

### Liquidity

A key feature that distinguishes our indices from other index products is the strict enforcement of liquidity criteria in the selection of instruments. Yet, while the notion of liquidity differs from market to market, J.P. Morgan indices include only securities, subject to several considerations including but not limited to:

- *Pricing:* Bonds must trade with enough frequency to prevent stale price quotations.
- *Availability:* Bonds must be regularly traded in size at acceptable bid-offer spreads and readily redeemable for cash. A reasonable two-way market must exist for the instrument to be included in the index portfolio.
- *Replication costs:* Investors should be able to replicate the index without incurring excessive transaction costs.

## Index Methodology

The GBI-EM Global Core Index series uses similar logic and calculations as the flagship GBI-EM Global Index series. Any changes in the composition of the flagship index will also be reflected in the Global Core. The weighting methodology for the Global Core includes a dynamic cap/floor scheme, which utilizes the GBI-EM Global Diversified alongside an optimizer algorithm. Specifically, if a market exceeds 1% in the GBI-EM GD for two consecutive months, a 150bps spread is applied for cap/floors. For markets at or below 1% for two consecutive months, a 100bps spread is used. If the 1% threshold is crossed in non-consecutive periods, the latest recorded spread is applied. Finally, a maximum overlay ensures that caps do not exceed 10% or fall below 1% in the GBI-EM Core.

After caps/floors have been determined, perform an optimization on country weights given constraints below.

### Optimization Function

$$\sum_{i=0}^N x_i^2 - \gamma w_i x_i$$

Where we have that,

- $w_i$  equals the undiversified weight of country  $i$  in the GBI-EM Global
- $x_i$  represents the weight of the country in the GBI-EM Core
- $\gamma$  (hyper-parameter) represent a fixed linear scalar that controls the distribution of the weighting algorithm – default set to 200.

### Methodology Constraint(s)

- $\sum_{i=0}^N x_i = 100$ , where the sum of all the country weights must sum to 100.
- $\forall f_i \leq x_i \leq c_i$ , where the weight of each country in the GBI-EM Core, must fall within the cap ( $c_i$ ) and floor ( $f_i$ ) computed from our GBI-EM Core framework (inclusive).

Country cap/floor determination is further outlined in accordance with the consecutive month buffer below.

<b>New Country (Pre)</b>	<b>Phased-in over more than one month</b>	Weight will be proportional to the phase-in weight in the GBI-EM Global Diversified. After phase-in has completed weighting will follow GBI-EM Core methodology in relation to market size.
	<b>Phased-in one month</b>	Market will follow the GBI-EM Core weighting methodology in relation to market size
<b>Removing Country</b>	<b>Phased-out over more than one month</b>	Weight will be proportional to the phase-out weight in the GBI-EM Global Diversified
	<b>Phased-out one month</b>	Market will follow the GBI-EM Global Diversified in removal from the index
<b>Existing Country</b>	<b>Market weight in GBI-GD &gt; 1.00% for 2-months</b>	Cap/Floor determined with $\pm 150$ bps spread, with 1% and 10% cap/floor maximums.
	<b>Market weight in GBI-GD <math>\leq</math> 1.00% for 2-months</b>	Cap/Floor determined with $\pm 100$ bps spread, with 1% and 10% cap/floor maximums.
	<b>Otherwise, and not new country addition</b>	Cap/Floor determined with last relevant bps spread, with 1% and 10% cap/floor maximums.
<b>New Country (Post)</b> <i>After phase-in has completed weighting will follow the cap/floor Core methodology</i>	<b>Market weight in GBI-GD &gt; 1.00%</b>	Cap/Floor determined with $\pm 150$ bps spread, with 1% and 10% cap/floor maximums.
	<b>Market weight in GBI-GD <math>\leq</math> 1.00%</b>	Cap/Floor determined with $\pm 100$ bps spread, with 1% and 10% cap/floor maximums.

## Global Index Research

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