Government Bond Index- Emerging Markets Family of Indices

Rules and Methodology

Global Index Research
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- **The J.P. Morgan Government Bond Index – Emerging Markets (GBI-EM) Indices provide investors with a benchmark that tracks local currency bonds issued by emerging market governments**
- **The GBI-EM closely follows the methodology of our family of GBI Indices, which are widely used as benchmarks for investing in developed government bond markets**
- **The three main composite indices are GBI-EM, GBI-EM Global, and GBI-EM Broad**
- **DIVERSIFIED versions exist for all three composites, where the weightings among the countries are more evenly distributed within the index**
- **The GBI-EM Global Diversified is the most widely tracked benchmark by investors**
- **The GBI-EM complements our EMBI family of indices which covers sovereign external debt and our ELMI+ index which covers short term FX deposits**
- **Returns and statistics are available from January 1, 2002 for the Market Cap Weighted GBI-EM series and from January 1, 2003 for the Diversified versions**

Index overview

The J.P. Morgan Government Bond Index-Emerging Markets (GBI-EM) Indices are comprehensive Emerging Markets debt benchmarks that track local currency bonds issued by Emerging Market governments. The index was launched in June 2005 and is the first comprehensive global local Emerging Markets index.

As Emerging Market governments look increasingly toward their domestic market for sources of finance, investors continue to look more closely at local markets in search for higher yield and greater diversification.

As external debt spreads compress and opportunities seem more appealing in local rates, the likely combination of increasing demand and supply will pave the way for deeper and broader local markets, which the GBI-EM will attempt to capture.

The launch of the GBI-EM was followed by the Diversified versions for GBI-EM and GBI-EM Broad in January 2006. The GBI-EM Global, launched in November 2006 provides a readily investable version of the GBI-EM Broad by excluding China and India.

The GBI-EM Indices are comprised of only those countries from the GBI universe that meet our criteria for an Emerging Market, resulting in 18 countries from four regions. As shown in Table 1, the regional sub-division of the indices consists of Asia, Europe, Latin America, and Middle East/Africa.

Table 1: Universe of Countries for the GBI-EM Indices

Composite Indices:	GBI-EM Broad	GBI-EM Global	GBI-EM
Asia			
China	•		
India	•		
Indonesia	•	•	
Malaysia	•	•	•
Philippines	•	•	•
Thailand	•	•	
Europe			
Hungary	•	•	•
Poland	•	•	•
Romania	•	•	•
Russia	•	•	•
Turkey	•	•	•
Latin America			
Brazil	•	•	•
Chile	•	•	•
Colombia	•	•	•
Mexico	•	•	•
Peru	•	•	•
Middle East/Africa			
Nigeria	•	•	•
South Africa	•	•	•
No. of Countries	18	16	14

Source: J.P. Morgan, Aug 2015.

See page 22 for analyst certification and important disclosures.

Two main composite indices

1) GBI-EM Broad

GBI-EM Broad is the *all-encompassing* index. All eligible countries containing eligible instruments will be included regardless of capital controls, taxes, or access issues.

2) GBI-EM Global

GBI-EM Global is positioned as the *investable* benchmark that includes only those countries that are accessible by most of the international investor base.

The GBI-EM Global *excludes* countries with explicit capital controls, but does not factor in regulatory/tax hurdles in assessing eligibility. Or if significant constraints exist on either:

- the amount of holdings of government bonds by a foreign investor, or
- the purchase or sale of government bonds by a foreign investor, or
- the purchase or sale of spot FX by a foreign investor.

The need for registration of the foreign investor with the local supervisory authorities or notification of transactions is not considered a significant restriction that would warrant exclusion.

3) GBI-EM (Narrow)

The GBI-EM (Narrow) *limits* inclusion to only those countries that are readily accessible and where no impediments exist for foreign investors.

The GBI-EM (Narrow) *excludes* those countries where: Direct access to the local market is difficult, such as:

- Countries that have regulatory or tax conditions that make direct onshore investment difficult.
- Instances where investors who want to gain exposure typically have to use special-purpose vehicles or derivative instruments to overcome regulatory or tax hurdles. Many investors are unable to use such products and therefore would not be able to replicate the index.

The need for registration of the foreign investor with the local supervisory authorities or notification of transactions are not considered significant restrictions that would warrant exclusion.

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Table 2: GBI-EM Indices at a Glance

	GBI-EM Broad/Diversified (Broadest)	GBI-EM Global/Diversified (Investable)	GBI-EM/ Diversified (Replicable)
Country Scope	All countries in the GBI-EM universe	Excludes China and India	Narrower versions of Colombia. Excludes China, India, Indonesia and Thailand
Country Criteria	GNI per capita below the Index Income Ceiling (IIC*) for 3 consecutive years		
		Accessible to majority of foreign investors. Does NOT include markets with capital controls.	Directly accessible. No impediments for foreign investors.
Liquidity Criteria	Daily pricing available	Daily pricing available	Daily pricing available
Instrument Criteria	Fixed coupon and Zero coupon Maturity > 13 months Minimum Face Amount > US$1 bn (local onshore bonds)/US$500 mn (global bonds)		
No. of Countries/Bonds	18/265	16/198	14/157
Index Market Cap	US$1510 billion	US$864 billion	US$717 billion
Inception Date	Dec 31 '01/Dec 31 '02	Dec 31 '01/Dec 31 '02	Dec 31 '01/Dec 31 '02

* 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.

Source: J.P. Morgan, Aug 2015.

Country inclusion criteria

For a country to be eligible for inclusion in our GBI-EM indices, GNI per capita must be below the Index Income Ceiling (IIC) for three consecutive years. J.P. Morgan defines the 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. An existing country may be considered for removal from the index if its GNI per capita is above the IIC for three consecutive years and its long-term local sovereign credit rating (the available rating agencies: S&P, Moody's & Fitch) is A-/A3/A- or above for three consecutive years.

Country additions/removals

The "10/10" rule: Inclusion, exclusion, and recategorization will follow the "10/10" rule, which states that inclusion, exclusion, or recategorization of a country (or instrument type) holding a 10% or larger weight in any of the GBI-EM indices will be staggered over at least a 10-month period.

If the 10/10 rule is triggered by a country in any of the GBI-EM indices, the rebalancing of this country in other GBI-EM indices (should it be necessary) will follow the same 10/10 rule regardless of the country's weight in the other GBI-EM indices.

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Example: Country A with 15% weight impact to the GBI-EM Global needs to be included. Given the weight is greater than 10%, the 10/10 rule is triggered. The inclusion will take place over at least 10 months with at most 1.5% inclusion each month. If Country A also needs to be included in the GBI-EM Broad but the weight is less than 10%, say 6%, it will still take at least 10 months for inclusion with at most 0.6% each month.

Timing (15th of the month rule)

The start of inclusion/exclusion will depend on the timing of the event that has changed the country's status. The timing of the event is defined as the date of an official announcement or notification issued by a government indicating such an event. If the event occurs before the 15th of the current month, the staggered rebalancing will begin on the second rebalancing month from the time of event. If the event occurs on or after the 15th of the current month, the staggered inclusion will begin on the third rebalancing month from the time of event (i.e., if taxes are lifted on or before January 14, the staggered inclusion would begin on the last weekday of February; if taxes are lifted on or after January 15, the staggered inclusion would begin on the last weekday of March).

Re-categorization event during the rebalancing period—"Reversal Event"

A "Reversal Event" is when either a country changes its policy or market conditions change substantially during a rebalancing period, causing a reversal of the initial recategorization of the country. When this occurs, the Index Group will reassess the initial rebalance and alert clients to any change to subsequent rebalancing.

Currency adoption:

Countries undergoing adoption of a hard currency will be removed in 25% decrements, backed out over a 4-month period from the official adoption date. 25% of the eligible outstanding amount will be removed from the index on each rebalancing date, with the final 25% being removed on the rebalance date before or coinciding with the adoption month. This would apply for any country regardless of market size. Please note: If extraordinary market conditions exist, the 4 month period may be extended.

If the official adoption occurs BEFORE the 15th of the month, removal rebalancing will be completed the month prior to adoption. If adoption occurs ON or AFTER the 15th of the month, rebalancing will be completed in the same month.

For example, *If official adoption is on or before January 14th, we will begin removing the country in 25% increments starting the last weekday of August and the country would be fully removed from the index as of the close of business on the last weekday of November; if official adoption is on or after January 15th, we will begin removing the country in 25% increments starting the last weekday of September and the country would be fully removed from the index as of the close of business on the last weekday day of December.*

If the time between an official announcement of adoption and the date of the actual adoption is less than 4 months, the situation would be considered an exceptional event and the rebalancing will be at the discretion of the Index Group.

Re-entry of an excluded country (12-month rule):

Once a country is excluded from the index based on the index eligibility rules, the country will not re-enter for at least 12 months. This clause will apply only when a specific event (e.g. capital controls or taxes) has changed the country status.

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Example: If Country A is removed from the GBI-EM Global/Diversified index completely on January 31st, 2001 of a given year due to explicit capital controls, the country will not re-enter the index before January 31st, 2002 of the following year.

Extraordinary event/market disruption:
When extraordinary or market disruption events occur for a country, the Index Group will use its discretion to ensure the index appropriately reflects these changes at the appropriate time. An intra-month rebalancing may occur in such instances. In all cases, official announcement/result of the event must be available to the public for the index to appropriately implement any update. The lack of an official public announcement will not trigger any intra-month rebalancing.

The removal/adjustment of the weight of a country that is affected will also be at the discretion of the index group based on official public announcements/results.

Comparison with GBI indices
The GBI-EM Index series follows similar logic, methodology and calculations as the GBI Index series. The main difference between these two index families is that the GBI-EM series focuses on tracking local currency Emerging Market instruments, while the GBI series focuses on tracking Developed Market local currency instruments.

Our technical document for the J.P. Morgan Local Market Bond Indices, explaining all calculation and methodology details, may also be used for the GBI-EM Index series.

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. We determine eligibility for local currency issues using the following criteria:

Instrument type

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

Current face amount outstanding

Only instruments with a current face amount outstanding of US$1 billion equivalent for onshore local currency bonds and US$500 million equivalent for global bonds (offshore currency linked bonds) or more will be considered for inclusion. Once included in the benchmark, the size eligibility criteria will only be examined for buybacks and exchanges.

FX rates that will be used for conversion of local currency debt into USD for index eligibility will depend on the specific scenario (Table 3).

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Table 3: Determining the USD equivalent outstanding amount for index eligibility under different scenarios

Corporate Action	Treatment under min. size rule
New Issue	FX rate from issue date is used to convert Local ccy to US$ to test for minimum $1bn eligibility rule.
Taps on a non-index bond	FX rate used in monthly rebalance projections (preview) will be used to calculate US$ equivalent amount outstanding to test for minimum $1bn eligibility.
Taps on an existing Index bond	No change in status, bond remains *eligible* for GBI-EM.
Buy-backs on a non-index bond	No change in status, bond remains *ineligible* for GBI-EM.
Buy-backs on an existing Index bond	FX rate used in monthly rebalance projections (preview) will be used to calculate US$ equivalent amount outstanding to test for minimum $1bn eligibility.

Source: J.P. Morgan
Note: J.P. Morgan EM indices reference official WM/Reuters 16:00 London close

Liquidity

A key feature that distinguishes our indices from other index products is the strict enforcement of liquidity criteria in the selection of instruments. We recognize there cannot be a universal standard of liquidity applicable to the international government bond market. Yet, while the notion of liquidity differs from market to market, J.P. Morgan indices include only securities, which an investor can deal at relatively short notice and for which firm prices exist, subject to the following considerations:

- *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.

For all GBI-EM Indices, we only use the broadest measure of GBI liquidity "Traded." As part of the monthly rebalancing process, J.P. Morgan local market specialists review the bond composition lists and affirm that all bonds reflect the most liquid part of the countries' appropriate government bond markets.

Maturity

At the rebalance date, only bonds with greater than 13 months to maturity are included in the GBI-EM Indices. Bonds with less than 13 months to maturity, adjusted for settlement, are removed from the indices at rebalance date.

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Index weighting methodology

Two differently weighted versions of the GBI-EM Indices are available: GBI-EM Market Cap Weighted and GBI-EM Diversified

GBI-EM Market Cap Weighted

The GBI-EM uses the traditional market-capitalization approach to determine the weight of each country's allocations. The GBI-EM is weighted by the component countries' aggregate normalized market capitalization (dirty price times par outstanding).

GBI-EM Diversified

The alternative version, GBI-EM Diversified, is geared toward managers who want maximum diversification or face limitations to the amount of portfolio exposure they can take to individual issuers.

Our methodology uses only a limited portion of a country's current face amount outstanding for calculating weights. The adjusted face amount used in calculating a country's weight is based on the respective country's relative size in the index and the average size of all countries. As an additional layer of control, the maximum weight of countries is capped at 10%. *(Please refer to the Appendix G for further details).*

Daily production of the GBI-EM Indices

The GBI-EM Indices are produced every weekday of the year. All bond prices are mid-rates and are taken at the close of business for each local market. All principal FX spot and forward rates are supplied by the WM Company at 4:00pm London time. Accrued interest is calculated on a settlement date basis according to country specific market conventions.

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Bond specific calculations and related concepts

Calculations are according to market convention: all calculations including accrued interest, duration, yield, etc., are done according to local market convention using parameters (ex-dividend rules, settlement conventions, etc.) relevant to each specific bond. All calculations are gross of tax and ignore transactions costs.

Table 4: Country Weights in the GBI-EM Indices (%)

Countries	GBI-EM Broad	GBI-EM Broad Div	GBI-EM Global	GBI-EM Global Div	GBI-EM	GBI-EM Div
Brazil	11.37	10.00	19.86	10.00	23.93	10.00
Chile	0.69	1.15	0.08	0.11	0.09	0.30
China	28.22	10.00				
Colombia	2.57	4.24	4.48	6.17	0.26	0.85
Hungary	2.30	3.80	4.02	5.52	4.84	10.00
India	13.89	10.00				
Indonesia	3.78	6.24	6.60	9.08		
Malaysia	3.94	6.51	6.88	9.46	8.29	10.00
Mexico	10.20	10.00	17.83	10.00	21.48	10.00
Nigeria	0.62	1.03	1.09	1.50	1.32	4.24
Peru	0.76	1.26	1.34	1.84	1.61	5.19
Philippines	0.19	0.32	0.34	0.47	0.41	1.32
Poland	5.64	9.32	9.85	10.00	11.87	10.00
Romania	1.19	1.97	2.08	2.86	2.51	8.09
Russia	1.90	3.13	3.31	4.55	3.99	10.00
South Africa	4.99	8.24	8.71	10.00	10.50	10.00
Thailand	3.52	5.81	6.14	8.45		
Turkey	4.22	6.98	7.38	10.00	8.89	10.00
	100.00	100.00	100.00	100.00	100.00	100.00

Source: J.P. Morgan, as of August 2015.

Bond pricing: Security level pricing in the GBI-EM indices is sourced from a third party valuation vendor ensuring transparency and consistency[1]. Accrued interest is calculated according to market convention, on a settlement day basis.

Ex-dividend rules: ex-dividend rules, when applicable, are incorporated into accrued interest calculations, as appropriate, by country. Ex-dividend rules define the last day a bondholder must own a bond in order to receive that bond's next coupon payment, otherwise known as the ex-dividend date.

- During the period between the ex-dividend date and the coupon date, the bond trades "ex-dividend"
- An investor who purchases a bond for settlement between the ex-dividend date and coupon date will not receive that bond's next coupon payment
- During this period, according to market convention, accrued interest becomes negative resulting in a total price at a discount to the clean price and in effect, compensating the investor for the time the bond will be held without interest
- On coupon date, interest will start to accrue for the subsequent coupon payment

[1] Effective June 23rd, 2014 PricingDirect Inc. will become the primary source for J.P. Morgan index bond prices. Please see www.pricing-direct.com for further details.

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Returns and return indices: return indices on individual bonds are calculated on a daily basis and measure bond performance over time:

- Principal return index is based on changes in clean price
- Interest return index is based on changes in accrued interest
- Total return index is based on changes in both clean price and accrued interest

At the individual bond level focus is on total return. The segregation of interest and principal return becomes relevant at the portfolio level. See "Appendix A: Bond Total Return Methodology" on page 15 for more comprehensive detail of the total return calculation for bonds.

Reinvestment of coupons: the J.P. Morgan indices are always fully invested. All coupons received are immediately reinvested back into the local market.

Interest accruals: interest is accrued starting from the bond's dated date up to the first coupon value date. Accrued interest is calculated according to market convention, on a settlement day basis. Interest is accrued by value or settlement date. Weekly, seven days of interest are accrued, including the weekend.

In markets with ex-dividend rules, if a bond is purchased after the ex-dividend date the purchaser will not receive the bond's next coupon. In order to compensate the buyer of the bond, the price paid for the bond must be less than the clean market price, thus, accrued interest will be negative.

Coupon value date: The coupon value date is the trade date associated with settlement on coupon date (the day the coupon is paid). Thus, the coupon value date is the last trade date which an investor may purchase a bond and have that bond settle prior to payment of the subsequent coupon. On coupon value date, accrued interest resets to zero, and accruals begin towards the next coupon.

The relationship between coupon date (the day the coupon is actually paid) and coupon value date is defined by the country specific settlement rules.

Yield: effective annual rate of return, expressed as a percentage. For the J.P. Morgan Government Bond Index body of data, yields are all calculated as yield-to-maturity, which is the discount rate that the present value of future payments equals the price of the security. See "Appendix B: Bond Yield Methodology" for a complete illustration of the methodology we employ to derive bond yield-to-maturity.

Index calculations and conventions

The base for the GBI-EM composite level is: December 31, 2001 = 100.
The base for the GBI-EM Diversified composite level is: December 31, 2002 = 100.

The GBI-EM rebalances on the last weekday of each month. Bonds comprising the indices are required to have more than 13 months remaining to maturity on rebalance day for inclusion in the index. GBI-EM indices rebalance on the last weekday of the

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month[2]. If FX rates from WM Reuters are unavailable on the last weekday of the month (i.e. Good Friday), indices are rebalanced on the previous business day.

The GBI-EM is weighted by the component countries' aggregate normalized market capitalization (dirty price times par outstanding). The weights change monthly on each rebalance day, and those weights remain active for the remainder of that month. In compiling the weights for the maturity sectors, only those bonds whose remaining maturity lies within the bounds of the sector are included.

Accrued interest is assigned to the bonds in the GBI-EM according to the specific convention of each country's market, and this interest is settlement adjusted. (More specific detail on these conventions provided in the regional section of the document.)

Daily indicative pricing for each security and FX rate is closely scrutinized and are reconciled using market movements and other pricing sources as guidance. As necessary, an established alternate source will be used to maintain the integrity of daily index calculations. On any given calculation day, if the primary source is unable to provide a quote, the Index Group reserves the right to consider the use of an appropriate alternate source for index inputs, such as pricing and FX. If a permanent switch for the primary third party pricing source is necessary, clients will be notified in advance prior to any official switch.

Index levels and statistics are calculated for the above aggregates, as well as (remaining) maturity sectors of 1-3 years, 3-5 years, 5-7 years, 7-10 years and 10+ years.

GBI-EM levels are available hedged and unhedged for five major currencies: USD, EUR, GBP, DKK, JPY. For more detailed information, see Appendix C for a summary of "Total, Principal and Interest Return Calculation Methodology for Countries/Markets;" Appendix D "Index Return Calculation Methodology for Aggregates;" and Appendix E "Hedge Indices for Countries and Aggregates."

[2] Up through October 1st, 2013, GBI-EM indices rebalanced on the first weekday of the month. As of October 31st, 2013 the indices switched to an end of month rebalance schedule.

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Sources of GBI-EM data

GBI-EM information is available through a variety of sources, which makes tracking and benchmarking this index very easy for investors.

J.P. Morgan MorganMarkets Research Website

www.morganmarkets.com

Users can access J.P. Morgan's Bond Index website using their MorganMarkets ID and password (these can be obtained from J.P. Morgan sales representative). This site provides comprehensive index information, available for download: daily bond level pricing, composition files and index statistics, such as yield, duration, maturity, and market weight.

DataQuery

http://dataquery.jpmorgan.com

A web-based application for reporting and analyzing research data. Bond Index information is available using this tool, which enables users to view and download index levels, returns and statistics at individual market and aggregate levels.

Bloomberg and Reuters

Bloomberg page JPMX; Reuters page EMBI01

Aggregate and individual market index levels are available in unhedged and hedged currencies. Yield, duration, convexity and maturity are available for each market. Local unhedged index levels for several maturity sectors are also published here.

Monthly publications

The monthly *EMBI Monitor* will post top level, regional as well as composition data after each rebalance.

Available metrics for Bonds

For each bond we calculate the following additional metrics:

- Total return
- Yield to maturity
- Macaulay duration
- Modified duration
- Convexity
- Remaining maturity

Available metrics for countries/aggregates

For each of the country and aggregate indices we calculate the following metrics:

- Total return
- Principal return

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- Interest return
- FX return
- Macaulay duration
- Modified duration
- Convexity
- Remaining maturity
- Yield (duration weighted)
- Coupon (duration weighted)

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GBI-EM regions and countries

Table 5 summarizes the local market conventions for the countries belonging to the GBI-EM indices. For further information on the individual markets see J.P. Morgan's Emerging Markets *Local Markets Guide,* published September 2012

Table 5: Market Conventions for GBI-EM Countries

Regions	Country	Inception Date	Settlement Convention	Interest Rate Accrual Convention
Asia	China	31-Dec-03	T+1	Actual/365
	India	31-Dec-01	T+1	30E/360
	Indonesia	31-Dec-02	T+2	Actual/Actual
	Malaysia	31-Dec-01	T+2	Actual/365
	Philippines Globals	30-Sep-10	T+3	30/360
	Thailand	31-Dec-01	T+2	Actual/365
Europe	Hungary	31-Dec-01	T+2	Actual/Actual
	Poland	31-Dec-01	T+2	Actual/Actual
	Romania	28-Feb-13	T+2	Actual/Actual
	Russia	31-Jan-05	T+0/T+3	Actual/365 / 30/360
	Turkey	31-Mar-04	T+1	Actual/365
Latin America	Brazil	31-Dec-01	T+1	Business/252
	Brazil Globals	30-Sep-05	T+3	30/360
	Chile	31-Oct-02	T+1	Actual/365
	Chile Globals	31-Aug-10	T+3	30/360
	Colombia	31-Dec-02	T+0	Actual/365
	Colombia Globals	28-Feb-05	T+3	Actual/365
	Mexico	31-Dec-01	T+2	Actual/360
	Peru	30-Nov-06	T+2	Actual/360
Middle East/Africa	Nigeria	28-Sep-12	T+2	Actual/Actual
	South Africa	31-Dec-01	T+3	Actual/Actual

Source: J.P. Morgan, August 2015.

GBI-EM Asia

China: *(Inception date: Dec-31-03)* State Treasury bonds are issued by the Chinese Ministry of Finance. Coupons are semi-annual for some bonds, annual for others; all yields are quoted at annual rates. The day count convention used is Actual/365, and bond settlement is T+1. There is no ex-dividend rule.

India: *(Inception date: Dec-12-01)* The Government of India Securities are issued by the Reserve Bank of India. These bonds accrue on 30E/360 day count basis. The coupons are paid semi-annually, bonds trade ex-dividend one day before the coupon payment date, and settlement is T+1.

Indonesia: *(Inception date: Dec-31-02)* Indonesian Treasuries are issued by the Ministry of Finance of Indonesia. Bonds accrue on a Actual/Actual basis, and settle T+2. These bonds do not trade ex-dividend and there is a single payment at maturity. Currently, Indonesian Treasuries are not available in the GBI-EM Narrow series.

Malaysia: *(Inception date: Dec-31-01)* Malaysian Government bonds are issued by the Republic of Malaysia. Coupon payment is semi-annual. The accrual basis is Actual/365, and settlement is T+2. There is no ex-dividend rule for these instruments.

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Philippines Globals: *(Inception date: Sep-30-10)* Global Peso Notes are government bonds issued by the Treasury specifically for foreign investors. They accrue interest on a 30/360 basis with a T+3 settlement. At the moment only the Globals make up the Philippines component in the GBI-EM. They are a part of all variants of the GBI-EM.

Thailand: *(Inception date: Dec-31-01)* Issued by the Ministry of Finance, Thai government bonds in the GBI-EM accrue on an Actual/365 basis. Thai governments have semi-annual coupons, trade ex-dividend 10-14 days before the coupon payment date, and settle T+2. Currently Thai government bonds are not available in the GBI-EM Narrow series.

GBI-EM Europe

Hungary: *(Inception date: Dec-31-01)* Hungarian Treasury Bonds included in the GBI are issued by the Hungarian Ministry of Finance. The interest accrual basis is Actual/Actual. Coupons are paid annually, and settlement is T+2.

Poland: *(Inception date: Dec-31-01)* Part of the GBI-EM Broad Index since 2001, the current GBI-EM Polish market consists of bonds issued by the Polish Ministry of Finance. Two-year bonds are generally zero-coupon bonds, while longer dated ones have fixed-coupons. Interest accrues on an Actual/Actual basis. Polish Treasury Bonds carry annual coupons and settle on a T+2 basis.

Romania: *(Inception date: Feb-28-2013)* Government securities issued by the Ministry of Finance are placed through the National Bank of Romania. Issues accrue interest on an actual/actual basis. Coupons are paid annually with settlement of T+2.

Russia: *(Inception date: Jan-31-05)* The Russian index covers the OFZ-PD (Federal Loan fixed-coupon market) bonds, issued by the Russian Ministry of Finance. The day count convention is Actual/365, and coupons for some issues pay out each 364 days. Bonds do not traded ex-dividend, and settle same day (T+0). The Euroclearable '18s are also included in all variants of the GBI-EM. It is issued under UK law, rather than local law as is the case for the OFZ's. Also, unlike the OFZ's, this bond accrues interest on a 30/360 basis and settles T+3.

Turkey: *(Inception date: Mar-31-04)* The Turkish Treasury is the issuer of Turkish fixed-coupon Treasuries and T-bills. Interest accrues on an Actual/365 basis. For Treasury bonds, coupons are semi-annual, and there is no ex-dividend rule. Both bonds and bills settle T+1 at the end of the day and T+0 before noon Istanbul time; we will use the former (T+1) as our price quotes are as of end-of-day.

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GBI-EM Latin America

Brazil: *(Inception date: Dec-31-01)* Brazilian NTN-F's (fixed rate, coupon bearing) and LTN's (zero coupon) bonds are issued by the National Treasury. They settle T+1 and follow a Business/252 accrual basis. There is no ex-dividend rule. Local issues are only a part of the GBI-EM Broad and GBI-EM Global series.

Brazil Globals: *(Inception date: Sep-30-05)* The Brazilian Government also issues global bonds denominated in Brazilian Real which settle in USD. Interest and principal are paid in US dollars converted by the Central Bank PTAX 800 offer of two days before payment dates (two days of market open both in São Paulo and New York). Accrual follows a 30/360 convention and settles T+3. Global issues are in all variants of the GBI-EM.

Chile: *(Inception date: Oct-31-02)* A majority of local market debt issued by the Central Bank of Chile is denominated in Chilean UF (Unidad de Femento). This unit is adjusted daily by the CPI inflation, but bonds are still settled in Chilean Peso. These bonds are only available in the GBI-EM Broad Series. Interest accrues on an Actual/365 basis, settles T+1 and pays coupons semi-annually.

Chile Globals: *(Inception date: Aug-31-10)* The Central Bank of Chile also issues global bonds settled in USD. These bonds are a part of all benchmark variants of the GBI-EM. Interest accrues on a 30/360 basis, settles T+3 and pays coupons semi-annually.

Colombia: *(Inception date: Dec-31-02)* Fixed rate local TES are currently the largest portion of Colombian local government securities. These bonds are found in both the GBI-EM Broad and GBI-EM Global, but not in the GBI-EM Narrow. Interest accrues on an Actual/365 basis, settles T+0, and pays coupons annually.

Colombia Globals: *(Inception date: Feb-28-05)* Colombia also issues Global TES which are issued under NY law and denominated in Colombian pesos; settlement occurs in US dollars. Global TES are included in all variants of the GBI-EM. Interest accrues on an Actual/365 basis, settles T+3 and pays coupons annually.

Mexico: *(Inception date: Dec-31-01)* Mexican bonds, primarily MBonos, are issued by the Mexican Ministry of Finance. Interest accrues on an Actual/360 basis. The bonds settle T+2 and coupons are paid semi-annually.

Peru: *(Inception date: Nov-30-06)* Peruvian government bonds, known as *Soberanos*, were added to the GBI-EM indices in late 2006 after successful debt management techniques by the country's government. Interest accrues on an Actual/360 basis and bond settlement convention is T+2.

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GBI-EM Middle East/Africa

Nigeria: *(Inception date: Sep-28-2012)* The Nigeria Debt Management Office issues fixed rate Federal Government of Nigeria (FGN) bonds. Interest accrues on an actual/actual basis. Coupons are semi-annual and settle T+2.

South Africa: *(Inception date: Dec-31-01)* Currently, South Africa's bonds used in the GBI-EM are issued by the Republic of South Africa. Interest accrues on an Actual/Actual basis, coupons are semi-annual and settle T+3.

Characteristics of the GBI-EM Indices

J.P. Morgan's Indices are defined by the following key characteristics:

Representative	Aims to span and weight the appropriate markets, instruments and issues that reflect opportunities available to international investors.
Investable and Replicable	Includes only securities in which an investor can deal at short notice and for which firm prices exist.
Accurate and Reliable	Index return calculations reflect the actual changes in the value of a portfolio consisting of the same securities.
Daily and Timely	Available on a next day basis so managers can measure performance immediately and make adjustments to investment strategy.
Flexible	Flexible enough to accommodate the needs of individual portfolio managers whose specific objectives and constraints can not be met by a general index.
Transparent	Index methodology is fully documented and made available to investors. The composition of the indices is well known and available to clients to facilitate replication strategies.

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Appendix A: Bond Total Return Methodology

A. Standard Case

The total return for an individual bond between days (t-1) and (t) is calculated as shown below:

$$Total\ Return_t = \left(\frac{P_t + A_{v(t)}}{P_{t-1} + A_{v(t-1)}}\right) - 1$$

$Total\ Return_t$	Total return value on day t, incorporating both principal and interest
P_t	Local market closing clean price of a bond on day t
$A_{v(t)}$	Accrued interest for a bond on day t; it is calculated up to, but excluding the value date v(t)
t	Current market day
t_{-1}	Previous market day determined by the market's holiday calendar

Accrued interest for a bond is based on the following formula:

$$A_{v(t)} = \frac{C_{v(t)} * d_{v(t)}}{d_y}$$

$C_{v(t)}$	Next coupon to be paid on a bond after the value date v(t)
$d_{v(t)}$	Number of days of accrued interest used to calculate : it can be zero or negative
d_y	Number of days in a year according to a bond's day count convention

Total return *indices* for individual bonds are calculated as shown below

$$Index_t = Index_{t-1} * Total\ Return_t$$

$C_{v(t)}$	Index value on day t

B. On Coupon Value Date

On coupon value date, the accrued interest for specific bond is reset to zero. On that date, the coupon value will be added into calculation of the total return and the associated index.

$$Total\ Return_t = \left(\frac{P_t + C_{v(t)}}{P_{t-1} + A_{v(t-1)}}\right) - 1 \qquad Index_t = Index_{t-1} * \left(\frac{P_t + C_{v(t)}}{P_{t-1} + A_{v(t-1)}}\right)$$

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Appendix B: Bond Yield Methodology

Calculation of yield to maturity in the GBI indices is a two step process. First, the following equation is solved iteratively for the discount rate (r):

$$P + A = \sum_{n}^{i=1} \left(\frac{C_i}{b}\right) * \left[1 - \sum f_k\right] * r^{t_i} + \sum f_i R_i * r^{t_i} + f_F * (R_F + A_F) * r^{t_F}$$

P	Clean Price
A	Accrued interest through the value date
r	Discount rate
b	Bond coupon payments per annum
d_t	Number of days from settlement to coupon payment i (final payment if $i = F$)
d_y	Number of days in the year
t_i	Time to the ith cash flow expressed in coupon periods:
N	Number of coupon payments left
F	Indicator for final redemption if $F>N$ (else, ignore this term)
C_i	Annual coupon rate in the ith period (percentage of face value)
f_i	Fraction of current amount outstanding redeemed on the ith coupon payment date (or on the final redemption date if $i = F$):
R_i	Redemption price on the ith coupon payment date (or on the final payment date if $i = F$)
A_F	Additional accrued interest from the final coupon date N to the final redemption date F

Once the discount factor is obtained, the true yield is calculated as follows:

$$Yield = 100 + \left[\frac{1^{\left(\frac{1}{b}\right)}}{r} - 1\right] * b$$

where b = basis of yield quote (b = 1 = annual, b = 2 = semi-annual, etc.)

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Appendix C: Total, Principal and Interest Return Calculation Methodology for Countries/Markets

A. Total Return

Total return for a portfolio of bonds between days (*t*-1) and (*t*) is calculated as shown below. Portfolios are assumed to be composed of bonds and markets in proportion to their respective total market value. Market value is calculated using total price (including both the clean price and the accrued interest) and the par amount outstanding.

Coupon payments are accounted for by individual bond as described in the previous section. On coupon value date the accrued interest will be set to zero (the Boolean statement below will evaluate to true) and the coupon payment will be added in to the total return.

$$Total\ Return_t = \sum_{n=1}^{bonds}\left[\left(\left(\frac{P_{n_t} + A_{n_{v(t)}}\langle if\ A_{v(t)} < A_{v(t-1)}\rangle + C_{v(t)}}{P_{n_{(t-1)}} + A_{n_{v(t-1)}}}\right) - 1\right) * \frac{ParOuts_{n_t}}{ParOuts_{n_{t-1}}}\right]$$

Total return *indices* are calculated as shown below:

$$T.R.Index_t = T.R.Index_{t-1} * Total\ Return_t$$

n	Indicates a given bond within the market portfolio. *"n"* moves from 1 to "bonds," with "bonds" being the last bond in the portfolio.
$ParOuts_t$	Par value outstanding in local currency. This value remains constant through a given month. This value is rebalanced for new issues, retiring issues and auctions as part of the month end process.
$\langle if\ A_{v(t)} < A_{v(t-1)}\rangle$	Equals 1 if the boolean expression is true; otherwise, it equals zero. This boolean will be true when *t* is equal to coupon value date and accrued interest is reset to zero.
$Total\ Return_t$	Total return value on day *t*, incorporating both principal and interest.
$Index_t$	Index value on day t

B. Principal Return

Returns calculated using principal only are calculated as shown below. Again, portfolios are assumed to be composed of bonds and markets in proportion to their respective total market value. Only clean prices are used, accrued interest is ignored.

$$Principal\ Return_t = \sum_{n=1}^{bonds}\left[\left(\left(\frac{P_{n_t}}{P_{n_{(t-1)}}}\right) - 1\right) * Outstanding_{n_t}\right]$$

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$$P.R.Index_t = P.R.Index_{t-1} * Principal\ Return_t$$

$Principal\ Return_t$	Principal return value on day t, incorporating principal only
$Index_t$	Index value on day t

C. Interest Return

Returns calculated using interest only are calculated as shown below:

$$Interest\ Return_t = Total\ Return_t - p_{t-1} * Principal\ Return_t$$

$$p_{t-1} = \sum_{n=1}^{bonds} \frac{P_{t-1}}{P_{t-1} + A_{v(t-1)}}$$

$$I.R.Index_t = I.R.Index_{t-1} * Interest\ Return_t$$

p_{t-1}	Ratio of aggregate principal only (clean prices) to aggregate dirty price (clean price plus accrued interest)
$Interest\ Return_t$	Interest return value on day t, incorporating interest only
$Index_t$	Index value on day t

Appendix D: Index Return Calculation Methodology for Aggregates

For aggregate indices the following formula illustrates the way we calculate total, principal and interest returns:

$$Index\ Return_t = \sum_{n=1}^{countries} \left[\left(\left(\frac{I_{n_t}}{I_{n_{(t-r)}}} \right) - 1 \right) * Portfolio\ Weight_{n_{t-r}} \right]$$

The three return *indices* are calculated as shown below:

$$Index_t = Index_{t-r} * Index\ Return_t$$

n	n Indicates a given country within the aggregate. "n" moves from 1 to "countries," with "countries" being the last country in the aggregate
$Portfolio\ Weight_{n_{t-r}}$	Weight of country n in the aggregate portfolio. This number is fixed over the month, using weights calculated on the last rebalance day (last weekday of the month), shown as t-r. Thus, on rebalance day, the weights used are not the new weights generated that day, but from the last rebalance day. The weight itself is the currency-normalized dirty weight value (market capitalization based on the dirty price) divided by the comparable dirty-weight value of the entire aggregate portfolio

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$Index\ Return_t$	Total, principal or interest return value on day *t*
I_{n_t}	Index value for country *n* on day *t*
$I_{n_{(t-r)}}$	Index value for country *n* on the last rebalance day
$Index_t$	Aggregate total, principal or interest value on day *t*
$Index_{t-r}$	Aggregate total, principal or interest value on the last rebalance day

Appendix E: Hedge Indices for Countries and Aggregates

Hedge indices assume a one-month currency forward contract which begins on rebalance day and ends on the following months rebalance day. The daily return is calculated as follows:

$$Hedge\ Return_t = \left[\frac{TR_t * SP_t}{TR_{t-1} * SP_{t-1}} * \left(\left[\frac{FB_{t-r,t+k} - FO_{t,t+k}}{SP_{t-r} * (1 - Y_{t,t+k})}\right] * \left[1 + \frac{C_t}{D_t/P_t} * \frac{d_{t+k}}{d_y}\right]\right)\right]$$

$Hedge\ Return_t$	Hedge return for the value date
TR_t	Total return index for the value date
TR_{t-1}	Total return index for rebalance date
SP_t	Currency spot rate (bond local currency vis à vis the hedge currency) for the value date
SP_{t-1}	Currency spot rate for rebalance date
$FB_{t-r,t+k}$	Bid forward rate on rebalance date
$FO_{t,t+k}$	Ask forward rate for the value date to the end of the forward contract
$Y_{t,t+k}$	Ask euro deposit rate for the value date to the end of the forward contract
C_t	Average coupon on rebalance date
P_t	Par weight on rebalance date
D_t	Dirty weight on rebalance date
d_{t+k}	Number of days of accrued interest in the month
d_y	Number of days of accrued interest in the year

The hedge index is then calculated as follows:

$$Hedge\ Index_t = Hedge\ Index_{t-r} * Hedge\ Return_t$$

The aggregate Hedge indices are calculated using an aggregation method identical to that explained in Appendix D, *Index Return Calculation Methodology for Aggregates* section above.

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Appendix F: Index Income Ceiling (IIC) calculation

J.P. Morgan has introduced what is called an "Index Income Ceiling" (IIC), defined as the income level that is adjusted every year by the growth rate of the World GNI per capita, provided by the World Bank as "GNI per capita, Atlas method (current US$) annually." Once a country has GNI per capita below or above the IIC level for three consecutive years, the country eligibility will be determined.

- We have established the base IIC level in 1987 to match the World Bank High Income threshold at US$6,000 GNI per capita.
- Every year, growth in the World GNI per capita figure is applied to the IIC, establishing a new IIC that is dynamic over time.
- This approach ensures that our cutoff for index removal is adjusted by the World income growth rate, and not by the inflation rate of a smaller sample of Developed economies.
- This metric essentially incorporates real global growth, global inflation, and currency exchange rate (current USD-denominated) changes.

Essentially, the introduction of the IIC establishes a higher, more appropriate threshold for country eligibility in the GBI-EM family of indices.

Table 6: Index Income Ceiling (IIC) calculation

	(Anchored from) 1987		2008	2009	2010	2011
Previous Method						
WB HI Threshold	$6,000	....	$11,905	$12,195	$12,275	$12,475
Rate of change				2.4%	0.7%	1.6%
New Method						
JPM IIC*	$6,000	....	**$16,220**	**$16,204**	**$16,952**	**$17,726**
based on **World GNI per cap**	$3,215					
Rate of change				-0.1%	4.6%	4.6%

* $IIC_{t+1} = IIC_t$ * "World GNI per cap"$_{t+1}$ / "World GNI per cap"$_t$,
IIC_{1987} = World Bank HI_{1987} = $6000

Source: J.P. Morgan and the World Bank

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Appendix G: GBI-EM Diversification Methodology

The GBI-EM diversification methodology anchors on the average size (debt stock) of countries in the index and the debt stock of the largest country in the index. To calculate the diversified (adjusted) face amount for each country, we define:

$$\text{Index Country Average } (\mathbf{ICA}) = \frac{\sum(\text{Ctry Face Amount})}{\text{No.of Countries in the index}}$$

Based on the ICA, the diversified face amount for any country in the index is derived according to the following rules:

1. The largest country based on face amount will be capped at double the average country debt stock in the index (**ICA*2**). This is the maximum threshold and sets the scale to determine the diversified face amounts of other countries in the index.

2. If a county's debt stock is below the index country average (ICA), the entire amount will be eligible for inclusion.

3. Countries whose debt stock falls between the index country average (ICA) and double the average (ICA * 2) will be linearly interpolated.

The below formula summarizes the calculation of diversified country face amount:

$$\text{Diversified Country Face Amount}=$$

$$\begin{cases} \text{ICA} * 2 & \text{, if } \text{FA}_{max} \\ \text{ICA} + \dfrac{\text{ICA}}{\text{FA}_{max} - \text{ICA}} * (\text{Ctry FA} - \text{ICA}) & \text{, if Ctry FA} > ICA \\ \text{Ctry FA }, & \text{, if Ctry FA} \leq \text{ICA} \end{cases}$$

, where Ctry FA represents the non-diversified country face amount and FA_{max} represent the Face Amount of the Largest Country.

A sample diversified index portfolio

In Table , there are 8 countries in a hypothetical portfolio with various face amounts ranging from US$5 billion to US$150 billion. The Index country average (ICA) is then calculated as US$60 billion (the total debt stock of the portfolio divided by the number countries). Subsequently, the cap of the largest country (Country A) in the index is set at double ICA level, which is US$120 billion.

For countries D through H, their face amounts are either at or below the ICA, and thus their diversified face amount outstanding is equal to the country's entire debt stock. On the other hand, country A, which is the largest country in the portfolio, will be capped at double the ICA. Meanwhile, countries B and C are above the ICA but are smaller than the largest country in the index; consequently their face amounts are linearly interpolated between ICA and double the ICA. The eligible debt stock for countries B and C are US$110 billion and US$80 billion, respectively.

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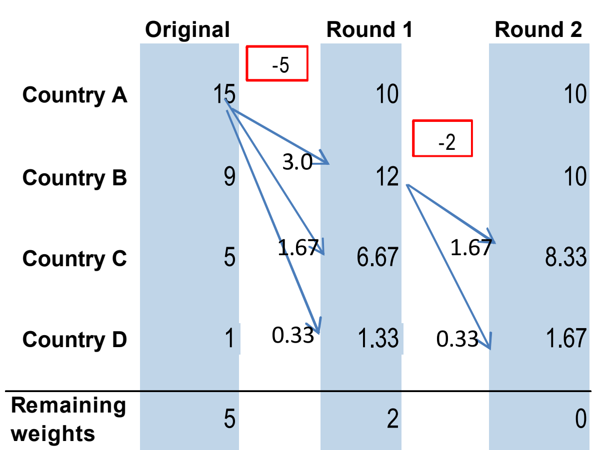
Table 7: The face amounts of countries above the ICA are linearly interpolated between average and maximum (largest country)

Ctry ($ bn)	Non-div Face Amt		Div Face Amt	Explanation
Ctry A	150	>ICA	120	Country with the largest amount outstanding is capped at double ICA level, which equals to 60*2 = 120
Ctry B	135	> ICA	110	Linear interpolation between ICA (60) and double ICA (120). 60+ (135-60) * 60 / (150-60)
Ctry C	90	> ICA	80	Linear interpolation between ICA (60) and double ICA (120). 60+ (90-60) * 60 / (150-60)
Ctry D	60	<=ICA	60	unchanged
Ctry E	20	<=ICA	20	unchanged
Ctry F	10	<=ICA	10	unchanged
Ctry G	10	<=ICA	10	unchanged
Ctry H	5	<=ICA	5	unchanged

Source: J.P. Morgan

Subsequently, the diversified (adjusted) face amount determined using the above step is then converted to a market value (based on dirty price), which is then converted to an index weight percentage based on the proportion of the total index market capitalization that the country represents. In addition, country weights will be capped at 10% (15% in the case of GBI-EM Global Div IG-only). Any excess weight above the cap will be redistributed to smaller countries that are below the cap to limit concentration risk. Instrument level weights are then determined by pro rata allocation of diversified country weights according to the market capitalization of each instrument within the country.



**Assumes the remaining 70% of weights are capped at10%, for 7 countries.*

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