



IHS Markit™

Markit iBoxx ABF Index Guide

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1 Markit iBoxx ABF Indices

The Markit iBoxx Asia Bond Fund Index family (iBoxx ABF) is designed to reflect the performance of local currency denominated sovereign and quasi sovereign debt from 8 Asian countries/territories. The index offers a broad coverage of the sovereign and subsovereign bond universe of China, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand, whilst upholding minimum standards of investability and liquidity. The indices are an integral part of the global Markit iBoxx index families, which provide the marketplace with accurate and objective benchmarks by which to assess the performance of bond markets and investments.

The Markit iBoxx ABF Index family is split into three major indices: Overall, Sovereigns, and Sub-sovereigns. These are further broken down into sub-indices based on markets and maturities. All iBoxx indices are priced based on multiple data inputs. The Markit iBoxx ABF indices use multi-source prices as described in the document “Markit iBoxx Pricing Rules” publically available on www.ihsmarkit.com.

Additionally, the index rules and their application will be governed by the Asian iBoxx Oversight Committee. This document covers the index family structure, rules and calculation methodology.

1.1 Index family structure

The figure below provides an overview of the index family structure:

Markit iBoxx ABF Pan-Asia		
Sovereigns	Non-sovereigns	
<ul style="list-style-type: none"> ● China ● Hong Kong ● Indonesia ● South Korea ● Malaysia ● Philippines ● Singapore ● Thailand 	Sub-sovereigns	Corporates
	<ul style="list-style-type: none"> ● Agencies ● Government guaranteed ● Supranationals 	
Market and maturity indices (1-3, 3-5, 5-7, 7-10, 10+, 15+)		

1.2 iBoxx ABF Pan-Asia Net-of-Tax Index

IHS Markit publishes a number of indicative net-of-tax indices in addition to the standard gross total return indices. The Markit iBoxx ABF Pan-Asia Net-of-Tax Index is an indicative net-of-tax version of the Markit iBoxx ABF Pan-Asia index. The index follows the selection, weighting, rebalancing and governance methodology of the Markit iBoxx ABF Pan-Asia index but is calculated in a net of

withholding tax version. In addition to the iBoxx ABF Pan-Asia Net-of-Tax index, market also publishes net-of-tax indices for all PHP local currency indices. The net-of-tax calculations are specified in chapter 5.2.

1.3 Publication of the index

For all indices, end-of-day closing values are calculated and distributed once daily after the close of trading in the market. The indices are calculated every day except on holidays common to all Asian markets. In addition, the indices are calculated with the previous trading day's close on the last calendar day of each month if that day is not a trading day. IHS Markit publishes an index calculation calendar which is available in the indices section on www.ihsmarkit.com under Calendar. The Markit iBoxx ABF Index follows the 'Asia' holiday calendar.

Bond and index analytical values are calculated each trading day using the daily closing prices. Closing index values and key statistics are published at the end of each business day in the indices section on www.ihsmarkit.com for registered users.

Index data is also available from the main information vendors, including Bloomberg and Thomson Reuters.

2 Bonds selection rules

Bond selection criteria are applied consistently across all eight currencies and markets. The constituents of the local currency indices are the basis for the Pan-Asia index.

The following criteria are used to determine the index members:

- Bond Type
- Issuer Type
- Issuer domicile
- Credit Rating
- Bond life at issuance
- Time to Maturity
- Amount outstanding

2.1 Bond type

Only bonds with predetermined cash flows are eligible for the indices.

In particular, bonds with the following characteristics are included:

- Fixed, zero coupon, compound coupon and step-up coupon bonds
- Sinking funds and amortizing bonds with a fixed redemption schedule

Bonds with any of the following attributes are excluded from the indices:

- Bonds with embedded call or put options
- Floating rate notes and other fixed-to-floater bonds
- Bonds with warrants
- Convertibles
- Undated bonds
- Index-linked and credit-linked notes
- Retail bonds. The list of retail bonds is updated every month and published on www.ihsmarkit.com under Indices News.
- Private placements. The list of private placements is updated every month and published on www.ihsmarkit.com under Indices News. Currently, this affects mainly older Malaysian bonds that were issued exclusively to government pension funds, as well as a handful of Philippine bonds that may not be held by more than ten investors at the same time.
- Collateralized bonds. This applies to both sovereign and quasi-sovereign issuers.

For retail bonds and private placements, publicly available information is not always conclusive and the classification of a bond as a retail bond or a private placement will be made at IHS Markit's discretion based on the information available at the time of determination. IHS Markit may consult with the specific Index Advisory Committees to review potential retail bonds or private placements. Any

bond classified as retail or private placement is added to the list of excluded private placements and retail bonds. The list is published on www.ihsmarkit.com under Indices News for future reference and to ensure decision's consistency.

In instances where a new bond type is not specifically excluded or included according to the published index rules, IHS Markit will analyse the features of such securities in line with the principles set out in 2.1 of this guide. IHS Markit may consult the specific Index Advisory Committees. Any decision as to the eligibility or ineligibility of a new bond type will be published and the index rules will be updated accordingly.

Bonds that are denominated in one currency but pay either the coupon or the principal in a different currency are not considered for the indices.

2.2 Issuer type

Only sovereign and sub-sovereign bonds are eligible for the indices. The bond classification criteria are detailed in Section 3 of this document.

2.3 Issuer Domicile

With the exception of supranationals, all issuers – or in the case of a finance subsidiary the issuers' guarantor – need to be domiciled in one of the eight ABF constituent markets:

- China, People's Republic of
- Hong Kong, Special Administrative Region
- Indonesia, Republic of
- Korea, Republic of
- Malaysia
- Philippines, Republic of
- Singapore, Republic of
- Thailand, Kingdom of

2.4 Credit Rating

Domestic central government debt does not require a rating. In order to ensure high credit quality of the index, most quasi-sovereign bonds need to be rated investment grade. Ratings from the following three credit rating agencies are considered for the calculation of the iBoxx Rating:

- Fitch Ratings
- Moody's Investor Service
- S&P Global Ratings

Investment grade is defined as BBB- or higher from Fitch Ratings and S&P Global Ratings and Baa3 or higher from Moody's Investor Service.

If a bond is rated by more than one of the above agencies, then the iBoxx rating is the average of the provided ratings. The rating is consolidated to the nearest rating grade. Rating notches are not used. For more information on how the average rating is determined, please refer to the iBoxx Rating Rules. The methodology can be found on www.ihsmarket.com under *Methodology*.

Prior to 30 September 2006, the lowest rating was used. During the transition period from 30 September 2006 to 30 June 2007, the lowest rating was still used to determine whether a bond is investment-grade rated.

Supranationals need to have at least an AA- rating.

Unrated bonds or issuers from investment-grade markets are only eligible for the index, if they fall into the following quasi-sovereign categories:

- Government-guaranteed
- Financial agencies, provided it can be ascertained that the issuer has strong links to and support from the central government (e.g. a reduced risk weighting for the purpose of calculating capital adequacy ratio for commercial banks, senior government representation on the company board etc.). The decision whether to include unrated financial agencies is taken on a case-by-case basis.

Quasi-sovereigns from sub investment-grade rated markets are excluded from the indices unless they have an investment-grade rating. The applicable sovereign debt rating is the best rating of the Fitch, Moody's and Standard & Poor's local currency debt ratings.

2.5 Bond Life at Issuance

All bonds must have a minimum bond life of 18 months at issuance. The minimum life is measured from the first settlement date to the maturity date of the bonds and is rounded to the nearest month.

2.6 Time to Maturity

All bonds must have a remaining time to maturity of one year at any re-balancing date. The time to maturity is calculated from the re-balancing date to the final maturity date of the bond by using the native day count convention of the bond.

For sinking funds and amortizing bonds, the average life is used instead of the final maturity to calculate the remaining time to maturity.

2.7 Amount outstanding

All bonds require a specific minimum amount outstanding in order to be eligible for the indices. The cut-off level for amount outstanding is currency specific. Different amounts may apply for sovereign and sub-sovereign debt.

The following table shows the minimum amount outstanding for regular bonds in each market:

Market	Currency	Sovereigns	Quasi-sovereigns
China	CNY*	20,000,000,000	10,000,000,000
Hong Kong	HKD	500,000,000	500,000,000
Indonesia	IDR	2,000,000,000,000	1,000,000,000,000
Korea	KRW	1,000,000,000,000	100,000,000,000
Malaysia	MYR	2,000,000,000	500,000,000
Philippines	PHP	5,000,000,000	3,000,000,000
Singapore	SGD	500,000,000	200,000,000
Thailand	THB	20,000,000,000	2,000,000,000

Amount outstanding cut-off levels for sovereigns and sub-sovereigns are generally different, in order to reflect differences in the average issue size. However, in markets where the sovereign cut-off level is already low, the sub-sovereign cut-off has not been lowered further.

*Offshore Renminbi (Dim Sum) bonds are not eligible for the index.

2.7.1 Limit on the number of issues per quasi sovereign issuer

There are no restrictions on the number of issues for sovereign debt. In order to increase the investability of the index and to maintain a high degree of issuer diversification, the number of issues for each quasi-sovereign issuer (as identified by the Bloomberg ticker) is limited to 5 issues per currency. If more than five bonds denominated in the same currency qualify for inclusion in the indices, a liquidity ranking is used to decide which bonds have greater liquidity, and thus which bonds are included in the index. The liquidity ranking is based on three factors:

- Size (amount outstanding)
- Age (time since issuance)
- Time to maturity
- Existing index constituents

A z-score is used to determine the relative liquidity of a bond versus other bonds from the same issuer. For each bond per issuer and each factor, a z-score is calculated.

The same calculation is performed for the time to maturity and the age of the bond. Time to maturity and age of the bond are calculated as described in chapters.

Existing index constituents – An incumbency premium of 10% for current index constituents which reduces index turnover by ensuring that potential new inclusions have a significantly better underlying liquidity score than current index constituents. The score allocated is 1 for the existing index constituent and 0 for potential new constituents.

The combined z-score attaches a weight of:

- 0.5 to the amount outstanding
- -0.2 to the age (as younger is more liquid)
- 0.2 to the time to maturity of individual bonds
- 0.1 for existing index constituents

The consolidated ranking factor for a bond is determined by adding and weighting the three z-scores:

$$z_i^* = 0.5z_i(AO) + 0.2z_i(TTM) - 0.2z_i(Age) + 0.1(EC)$$

Where:

$z_i(Age)$ is the age z-score of bond i

$z_i(AO)$ is the amount outstanding z-score of bond i

$z_i(TTM)$ is the time-to-maturity z-score of bond i

EC is the Existing Index Constituent z_i^* Ranking factor of bond i

The top five bonds by combined z-scores are included in the indices.

3 Bond classification

All bonds are classified based on the principal activities of the issuer and the main sources of the cash flows used to pay coupons and redemptions. In addition, a bond’s specific collateral type or legal provisions are evaluated. Hence, it is possible that bonds issued from different subsidiaries of the same issuer carry different classifications.

The issuer classification is reviewed regularly based on updated information received by IHS Markit, and status changes are included in the indices at the next rebalancing if necessary.

Where the sector classification of a specific entity is not very clear due to the diversified business of the entity, a decision will be made at IHS Markit’s discretion. IHS Markit will assign the IHS Markit classification according to its evaluation of the business risk presented in the security prospectus and annual reports, if available. IHS Markit will also compare the classification to peers in the potential sectors, and IHS Markit may consult with the Index Advisory Committees. Membership lists including bond classifications are published on the FTP server and in the indices section of www.ihsmarkit.com for registered users.

3.1 Overall Bond Classification Scheme

Level 3*	Level 4	Level 5	Level 6
Sovereigns & Sub-Sovereigns	Regions	*	*
	Government guaranteed	*	*
	Supranationals	*	*
	Agencies	*	*
		Financial Agencies	Development Banks
			Export-Import Banks
			Financial Sector Support
			Housing & Mortgages
			Strategic Investments
		Infrastructure & Transport Agencies	*
		Airports	
		Industrial & Rural Development	
		Marine	
		Rail	
		Roads	
		Railroad	

Public Utilities	Electricity
	Gas
	Oil
	Water

*Level 1 is Country of Issue, and Level 2 is Government vs. Non-Government. Government bonds do not have any further classification.

3.2 Government

Government bonds are bonds issued by central governments in their domestic currency.

3.3 Quasi-sovereign Bonds

Quasi-sovereign bonds are split into “sub-sovereign” bonds and “sovereign” bonds.

3.3.1 Sub-sovereign bonds

Sub-sovereign bonds are issued by entities with explicit or implicit government backing due to legal provision, letters of comfort or the public service nature of their business. The issuer requires strong central government ownership if its bonds are not explicitly guaranteed by the central government.

The four main sub-sovereign categories are:

- Agencies
- Government-guaranteed
- Regions
- Supranationals

For Chinese quasi sovereigns, only policy banks and issuers which are explicitly guaranteed are considered as quasi sovereigns. State owned enterprises (SOEs), whether central government or local government owned are not considered eligible.

3.3.2 Sovereign bonds

Debt issued by one of the 8 EMEAP central governments in one of the 8 EMEAP currencies other than its domestic currency is classified as “Sovereigns” in the quasi-sovereign index. Bonds issued in currencies other than the 8 EMEAP currencies are not eligible for the indices.

3.4 Agencies

Agencies are entities whose major business is to fulfil a government-sponsored role to provide public, non-competitive services. Often, such business' scope is defined by a specific law, or the issuer is explicitly backed by the government. There are three main categories of agency:

- Financial
- Infrastructure & transport
- Public utilities

In principle, the business scope and legal provisions in combination with strong government ownership determine whether an issuer is a quasi-sovereign or a corporate. In addition, the rating differential between government and quasi-sovereign is also taken into consideration. For instance, a considerable rating differential (e.g. three notches) below the sovereign suggests that the issuer does not belong in the quasi-sovereign sector.

3.4.1 Financial

Financial agencies provide support for a specific segment of the financial market, financial assistance to a specific group of customers or general development financing. Companies managing strategic central government investments in select industries also qualify. Financial agencies need to be clearly linked to the central government. Local government sponsored agencies are not eligible.

1. Development banks are entities providing:
 - General financing for development projects, e.g.:
 - > China Development Bank
 - > Korea Development Bank
 - > Bank Pembangunan & Infrastruktur
 - Or Financial access/support for specific customer segments such as agriculture or small business, e.g.:
 - > Korea Agricultural Finance
 - > Small Business Corp
 - > Small and Medium Enterprise Development Bank of Thailand
2. Export-import banks are entities created to support foreign trade, e.g.:
 - > Export-Import Bank of China
 - > Export-Import Bank of Korea
3. Entities supporting the stability or development of the housing market by supporting the private housing and/or mortgage market of a country, e.g.:
 - > Cagamas
 - > Hong Kong Mortgage Corp.
 - > Housing Development Board of Singapore
 - > Korea National Housing Corp.
 - > National Housing Authority of Thailand

4. Agencies set-up to restructure or to stabilise the banking or insurance industry, e.g.:
 - > Korea Deposit Insurance Co.
 - > Pengurusan Danaharta Nasional Bhd
5. Strategic investment holding companies, whose main business is the management of central government investments in strategic industries, are eligible. Local government sponsored investment holdings do not qualify, due to uncertainty about their financial support. In addition, the link between the central government and the investment holding must be firmly established through ownership AND business scope. Strategic investment holdings that currently qualify for the indices include:
 - > Khazanah Nasional Bhd.
 - > Temasek

3.4.2 Infrastructure and Transport

Infrastructure & transport agencies are entities that manage vital public infrastructure projects.

1. Airport authorities and airports, e.g.:
 - > Hong Kong Airport Authority
 - > Kuala Lumpur International Airport
2. Industrial parks or rural infrastructure developments, e.g.:
 - > KARICO
3. Railroads and/or public transport services, e.g.:
 - > Mass Transit Corp.
 - > Korea Rail Network Authority
 - > Syarikat Prasarana Negara Bhd.
 - > Mass Rapid Transit Authority
4. Road infrastructure, e.g.:
 - > Korea Highway Corp.

Commercial providers of transportation services, such as airlines or private transportation businesses, are not eligible, even if they are majority government-owned. Privately owned and operated infrastructure projects are also not eligible.

3.4.3 Public Utilities

Public utilities are the final major group of agencies. Public utilities provide basic infrastructure, such as electricity, gas or water. However, a significant amount of competition is already apparent in the utilities sector. Therefore, public utilities need to be majority government-owned and strategic utilities, rather than small players. Sectors such as telecommunication, that are already highly commercialised, are excluded from the indices.

National government-owned oil companies are considered as quasi-sovereign within public utilities. Currently, two companies have issued debt:

- Petronas

The main utilities are:

(i) Electricity, e.g.:

- China State Grid
- Singapore Power
- EGAT

(ii) Gas and (iii) water, e.g.:

- Metropolitan Waterworks Authority

(iv) Oil, e.g.:

- Petronas

3.5 Government Guaranteed

Bonds from issuers that are explicitly guaranteed by a central government are classified as “Government guaranteed” and are eligible for the indices. Guaranteed bonds and issuers are classified into that category, even though the underlying issuer may be a quasi-sovereign in itself.

3.6 Regions

Local government bonds issued by local or regional governments are eligible only if they are explicitly guaranteed by the central government.

3.7 Supranational

Supranational issuers are entities owned and/or supported by more than one central government.

Examples in the current index universe include:

- Asian Development Bank
- European Investment Bank
- International Bank for Reconstruction & Development

3.8 Classification review procedure

The issuer classification is reviewed regularly and status changes are included in the indices at the next rebalancing.

3.9 Treatment of subordinated debt from quasi-sovereign issuers

The qualification requirements for subordinated debt are stricter than for senior debt. Subordinated debt from quasi-sovereigns is only eligible for the indices if it is explicitly guaranteed, or if the government guarantee for the issuer includes subordinated debt. All other subordinated debt issued by quasi-sovereign issuers is viewed as corporate debt and is excluded from the indices.

4 Market Weights

4.1 Background

The iBoxx ABF indices cover a variety of markets with small, medium and large bond markets. Simply weighting by market capitalization would skew the index profile heavily in favour of the two biggest markets (China and Korea) and reduce the weight of smaller debt markets (e.g. Hong Kong or Singapore), which are more developed, more liquid and accessible for investment. Therefore the standard index construction approach is unsuitable for Pan-Asian debt and would prevent investors from obtaining a sizeable exposure to the underlying bond markets.

4.2 Market Weight Composition

The indices are fundamentally weighted with the weight of each market determined from a number of factors:

- Local bond market size (S)
- Sovereign local debt rating (R)
- GEMLOC Investability Indicator (G)

The baseline for the fundamental weighting assumes an equal weight allocated to each market subject to market size considerations. The baseline weight for small bond markets is set at 50% of the weight allocated to regular markets. For this purpose, the size of each market is defined as the size of the domestic government bond market comprising all government bonds with a remaining time to maturity of 1 year or more. Markets with a size of less than US\$ 50bn are considered small. Currently Hong Kong is the only market within the iBoxx ABF indices which falls into the “small” category.

Comparison of the new and old rules:

Comparison	From 31 October 2016	Until 31 October 2016
Baseline weight methodology	Equal weight across regular markets. Small markets are allocated 50% of the weight of regular markets.	Equal weight across all markets
Baseline weight	Regular markets: 13.33% Small markets: 6.67%	12.5%

The individual factors are described below.

4.3 Adjustment factors

Local bond market size

Local bond market size is defined as the size of the local bond market in USD. Where available, figures published by the Asian Development Bank on www.asianbondsonline.adb.org or local official sources are used. Otherwise, the iBoxx Asian Technical Committee is polled and the consolidated average is used.

Sovereign local debt rating:

The best (highest) local currency long-term debt rating from Fitch, Moody's and S&P is used for each country. The ratings are converted into rating scores as follows:

AAA/Aaa	8
AA+/Aa1	7
AA/Aa2	6
AA-/Aa3	5
A+/A1	4
A/A2	3
A-/A3	2
BBB+/Baa1	1
BBB/Baa2 and below	0

GEMLOC Investability Indicator:

The GEMLOC Investability Indicator is a transparent measure of investability based on a methodology developed by the World Bank. The GEMLOC Investability Indicator scores markets on a set of 14 subfactors that are aggregated to the overall score. GEMLOC details can be accessed on IHS Markit website at following path.

www.ihsmarkit.com > Rules Benchmark > Global > Global Emerging Market.

Acuity Knowledge Partners acts as a third party in this process and provides IHS Markit with the GEMLOC Investability Indicators updated quarterly every year.

Calculation of the adjustment:

Each factor is normalized using the following method:

$$F_{i,j} = \frac{f_{i,j}}{\sum_{m=1}^n f_{m,j}} - \frac{1}{n}$$

Where:

$f_{i,j}$ is the original value of factor j in market i

$\hat{f}_{i,j}$ is the normalized value of factor j in market i

n is the number of markets

4.4 Combined Adjustment Factor

Each market's theoretical weight is the sum of the baseline weight and the adjustment factor:

$$AF_i = 0.2S_i + 0.2R_i + 0.6G_i$$

Where:

AF_i is the adjustment factor of market i

R_i is the normalized value of sovereign rating of market i

S_i is the normalized value of bond market size of market i

G_i is the normalized value of the GEMLOC Indicator i

Once the adjustment factors have been determined, each market's weight is the sum of the baseline weight and the adjustment factor:

$$W_i = BW_i + AF_i$$

Where:

AF_i is the adjustment factor of market i

BW_i is the base weight of market i in the iBoxx ABF Pan-Asia index

W_i is the weight of market i in the iBoxx ABF Pan-Asia index

The market weights are rounded to the fourth decimal. The maximum permissible market weight is capped at 25%. If a market has a theoretical weight in excess of 25%, the residual weight is distributed amongst the remaining markets in proportion to their respective weights.

4.5 Review of Individual Market Weights

The review process distinguishes between regular and extraordinary reviews. In order to enhance the stability of the indices and to capture long-term trends within the eight markets, the market weights are reviewed annually at the 31 October re-balancing. The market weights are not changed between review dates unless an extraordinary review is conducted.

The iBoxx Asian Technical Committee or IHS Markit may decide to undertake an extraordinary review of market weights at any monthly re-balancing, if profound changes in one or more of the eight markets suggest that the weights of the markets would change significantly during the review. Examples of such events are a major increase in bond issuance or liquidity, or major regulatory changes that impact the GEMLOC Investability Indicators significantly.

For the 2012 annual review of market weights, a six-month transition period has been implemented to cushion the one-time impact of the methodology change on the market weights. The weights calculated according to the new methodology will be implemented in 6 equal monthly changes starting on 31 October 2012 and ending on 31 March 2013.

For the 2016 annual review of market weights, a six-month transition period has been implemented to cushion the one-time impact of the methodology change on the market weights. The weights calculated according to the new methodology will be implemented in 6 equal monthly changes starting on 31 October 2016 and ending on 31 March 2017.

4.6 Market Weights Calculation prior to 31 October 2012

Prior to 31 October 2012 the baseline weight was adjusted by the following factors:

- Local bond market size (S)
- Turnover ratio (T)
- Sovereign local debt rating (R)
- Market functionality (F)

Turnover ratio

Turnover ratio is a proxy for market liquidity derived from comparing the total transaction size to the market capitalization. The trading volume is sourced from official sources where available, otherwise the consolidated annualized average polled from the iBoxx Asian Technical Committee. Currently, official data is available for all eight markets. The bond market size is described above.

Market functionality

The final market weight factor is a qualitative factor that gauges the relative efficiency of the eight markets. Each market has a score between 0 and 100; each score is rounded to the nearest five. The scores are polled from the iBoxx Asian Technical Committee.

Each market's adjustment factor (AF) was the weighted sum of the four factors above:

$$AF_i = 0.2S_i + 0.2T_i + 0.2R_i + 0.4F_i$$

Where:

AF_i is the adjustment factor of market i

F_i is the normalized value of market functionality of market i

R_i is the normalized value of sovereign rating of market i

S_i is the normalized value of bond market size of market i

T_i is the normalized value of turnover ratio of market i

4.7 Current and Historical Weights

The file containing current and historical weights for the index is available in the indices section on www.ihsmarket.com under *Publications / Rules* for registered users.

5 Index calculation

5.1 Static data and foreign exchange data

Information used in the index calculation is sourced from offering circulars and checked against standard data providers.

FX spot and forward rates are sourced from WM Company. The daily index calculation uses the FX rates from 8am London time.

5.2 Bond net-of-tax-calculation

The net-of-tax calculation follows the Markit iBoxx ABF Pan Asia index rules but clean price, accrued interest and coupons are net of tax based on the corresponding tax rates.

5.2.1 Current Tax Schedule

The net-of-tax index is calculated by applying the withholding tax payable on a bond to all affected cash flows. Capital gains tax and other duties are not considered in the calculation. The tax rates used in the calculation refer to the common withholding tax rate applicable to non-domestic investors and are updated from time to time by IHS Markit due to changes in the markets comprising the index.

The current withholding tax rates used for each market are as per the table below:

Market	Currency	Withholding Tax Rate
China	CNY	0
Hong Kong	HKD	0
Indonesia	IDR	10%
Korea	KRW	15.4%
Malaysia	MYR	0
Philippines	PHP	20%
Singapore	SGD	0
Thailand	THB	0

5.2.2 Net-of-tax index calculation – all markets except Philippines

Net-of-tax local currency indices are as follows:

$$MV(net)_{i,t} = [P_{i,t} + (A_{i,t}(1 - \tau) + XD_{i,t-s}CP_{i,t}(1 - \tau))FA_{i,t}]F_{i,t}N_{i,t}F_{i,t-s}^{Cap}$$

$$CV(net)_{i,t}^{Coupons} = \sum_{t-s < j \leq t} G_{i,j} (1 - \tau) XD_{i,j-1} F_{i,j-1} FA_{t,i,j} N_{i,t-s} F_{i,t-s}^{Cap}$$

$$TR(net)_t = TR(net)_{t-s} \frac{\sum_{i=1}^n MV(net)_{i,t} + CV(net)_{i,t}^{Coupons} + CV_{i,t}^{Redemptions}}{\sum_{i=1}^n MV(net)_{t-s}}$$

Where:

τ is the applicable withholding tax rate

TR(net) means the net of tax index level

(Please see 'Markit iBoxx Bond Calculus' for other annotations)

5.2.3 Net-of-tax calculation for the Philippines

For net-of-tax calculation of PHP-denominated bonds, the tax applies to the yield rather than the coupon payments of the bond. It is performed as described below:

- The gross yield of the bond is calculated using gross cash flows and prices.
- The net yield is calculated by multiplying the gross yield by (1 – withholding tax rate)
- The net cash flows of the bond are calculated by multiplying all coupons by (1 – withholding tax rate) and leaving the principal redemption cash flows unchanged.
- The net-of-tax price is calculated by discounting the net-of-tax cash flows by the net yield.

The indicative net-of-tax index is calculated as follows:

$$MV(net)_{i,t} = [P_{i,t}^{net} + (A_{i,t}(1 - \tau) + XD_{i,t-s} CP_{i,t}(1 - \tau)) FA_{i,t}] F_{i,t} N_{i,t} F_{i,t-s}^{Cap}$$

$$CV(net)_{i,t}^{Coupons} = \sum_{t-s < j \leq t} G_{i,j} (1 - \tau) XD_{i,j-1} F_{i,j-1} FA_{t,i,j} N_{i,t-s} F_{i,t-s}^{Cap}$$

$$TR(net)_t = TR(net)_{t-s} \frac{\sum_{i=1}^n MV(net)_{i,t} + CV(net)_{i,t}^{Coupons} + CV_{i,t}^{Redemptions}}{\sum_{i=1}^n MV(net)_{t-s}}$$

Where:

P^{net} means the net of tax clean price calculated by net yield

τ is the applicable withholding tax rate

TR(net) means the net of tax index level

(Please see 'Markit iBoxx Bond Calculus' for other annotations)

5.2.4 Market Weights ABF Pan-Asia Net-of-Tax Index

The market weights of the indicative net-of-tax index constituent markets follow the weights in the (gross) Markit iBoxx ABF Pan-Asia index. The notional amount of each bond in the indicative net-of-tax index is the same as in the (gross) Markit iBoxx ABF Pan-Asia index, however due to the effects of taxation; the net-of-tax weight of a market will be different from the original ABF weights and will fluctuate on a month-to-month basis.

$$W_i^{Net} = \frac{\sum_{j \in \text{Markets}} ((P_j^{Net} + A_j^{Net} + XD_j CP_j^{Net}) F_j N_j FX_j)}{\sum_{k \in \text{AllBonds}} ((P_k^{Net} + A_k^{Net} + XD_k CP_k^{Net}) F_k N_k FX_k)}$$

Where:

W_i^{Net} is the net market weight

(Please see 'Markit iBoxx Bond Calculus' for other annotations)

5.2.5 Pan-Asia net-of-tax Index

The net-of-tax sub-indices are aggregated into a net of tax USD unhedged total return index. The net-of-tax aggregate index is calculated as the sum of products of the month-to-date unhedged return of the net-of-tax indices for each individual market and the related market weights, the calculation is as follows:

$$IXR_t^U = IXR_{t-s}^U \sum_{t=1}^8 W_i^{Net} \frac{TR_{i,t}^{Net}}{TR_{i,t-s}^{Net}} \frac{FX_{i,t}^{LCY/CCY}}{FX_{i,t-s}^{LCY/CCY}}$$

Where:

IXR_t^U is the aggregate net-of-tax index level

$FX_{i,t}^{LCY/CCY}$ is the spot exchange rate

(Please see 'Markit iBoxx Bond Calculus' for other annotations)

5.3 Bond prices

For more details please refer to the *Markit iBoxx Pricing Rules* document, available in the *Methodology* section of the iBoxx Documentation page on www.ihsmarkit.com.

5.4 Rebalancing process

All iBoxx ABF indices are re-balanced monthly on the last calendar day of the month after the close of business. Changes to static data, such as ratings, amounts outstanding, etc. are only taken into account if they are publicly known three business days before the end of the month. Changes in rating or amount outstanding on the last two trading days of the month are accounted for at the next re-balancing. New bonds issued must settle before the end of the month and all relevant information must be known at least three trading days before the end of the month.

The classification of existing bonds is also reviewed at each monthly re-balancing, and resulting classification changes are implemented at the re-balancing. This means that quasi-sovereign issuers, which are no longer considered to have a sufficiently close relationship with the government, are reclassified as corporate issuers and subsequently removed from the index at the monthly re-balancing.

Four business days before the end of each month, a preliminary membership list is published on the FTP server and in the indices section on www.ihsmarkit.com under Data ->Bond List Preview for registered users.

Three business days before the end of each month, a membership list with final amount outstanding for each bond is published. This list contains the constituents for the next month.

On the last business day of each month, IHS Markit publishes the final membership with closing prices for the bonds, and various bonds analytics based on the index prices of the bonds.

5.5 Index Data

A sub-index of the iBoxx ABF Benchmark is calculated if at least one bond matches all inclusion criteria. If no more bonds qualify for an index, then its level will remain constant. If at least one bond becomes available again, the index calculation will be resumed and chained to the last calculated level.

Calculation occurs on a daily basis as soon as the prices become available. The indices are calculated on each trading day (Monday to Friday), unless this day is a holiday in each of the eight countries. The indices are also calculated on the last calendar day of each month irrespective of holidays and weekends. If the indices are calculated on a day that is a non-business day in one of the countries, then the prices from the previous trading day will be carried forward and the index will be calculated using those prices and the current accrued interest and coupon payment data.

The calculation of the indices is based on bid prices. New bonds are included in the indices at their respective ask prices when they enter the index family. In the event that no price can be established for a particular bond, the index continues to be calculated based on the last-available price. This might be the case in periods of market stress, or disruption as well as in illiquid or fragmented markets. If the required inputs become impossible to obtain, IHS Markit may consult the specific Index Advisory

Committees at the following rebalancing date. To ensure consistency, decisions taken are made publicly available on a timely basis and IHS Markit has the ability to refer back to previous cases.

On the last trading day of a month, the rebalancing takes place after the daily index calculation for the current month's list, including the calculation of the last calendar day's indices, has been performed.

5.6 Index calculus

For specific index formulas please refer to the *Markit iBoxx Bond Index Calculus* document, available in the *Methodology* section of the iBoxx Documentation page on www.ihsmarkit.com.

5.7 Treatment of the special intra-month events

Data for the application of corporate actions in the indices may not be fully or timely available at all times, e.g. the final call prices for make-whole calls or the actual pay-in-kind percentage for PIK-payment options. In such cases, IHS Markit will estimate the approximate value based on the available data at the time of calculation.

5.7.1 Index and analytics weightings

The iBoxx ABF indices are volume-weighted indices, with a bond's base market value as the weighting factor. The base market value and amount outstanding of a bond are only adjusted within the monthly re-balancing process at the end of each month. However, scheduled redemption payments for amortising bonds and sinking funds are taken into account when they occur, as they are affecting the index return and analytical values. In addition, bonds that are fully redeemed intra-month are also taken into account immediately. Therefore, the indices are calculated using the amount outstanding adjusted for increases as well as repurchases that took place during the month.

Definitions:

- Amortising bonds: Bonds, where the face value is redeemed according to a schedule at more than one redemption date. Interest payments are made on the basis of the outstanding amount of the bond.
- Sinking funds: Bonds, where money is applied periodically to redeem part of the outstanding before maturity. At the redemption dates, the appropriate amount of bonds may either be retired randomly from the outstanding bonds, or (sometimes) may be purchased on the open market and thus retired. Interest payments are made on the remaining outstanding bonds.
- Fully redeemed bonds: Bonds that are fully called or have been completely repurchased prior to or at the calculation date.

The amount issued of a bond does not change when coupons are paid and bonds are redeemed. However, additional tranches and unscheduled repurchases are taken into account to arrive at a suitable basis for the index and the analytics calculation. Consequently, all calculations are based on the adjusted amount outstanding.

5.7.2 Scheduled partial redemptions: sinking funds and amortizing bonds

Amortizing bonds are bonds whose face value is redeemed according to a schedule at more than one redemption date. Interest payments are made on the basis of the remaining outstanding amount of the bond. *Sinking funds* are bonds, where money is applied periodically to redeem part of the outstanding before maturity. At the redemption dates, the appropriate amount of bonds may either be retired randomly from the outstanding bonds, or may be purchased on the open market and thus retired. Interest payments are made on the remaining outstanding bonds.

For the two bond types above, price and accrued interest are quoted and calculated to the actual amount outstanding (par). Scheduled redemptions within the period are taken into account immediately. Coupon payments, however, refer to the scheduled amount outstanding over the last coupon period; scheduled redemptions within the month are not taken into account.

5.7.3 Full redemptions: exercised calls, puts and buybacks

If a bond is fully redeemed intra-month, the bond effectively ceases to exist. In all calculations, the redeemed bond is treated as cash based on the last price, the call price or repurchase price, as applicable. The redemption factor, redemption and the redemption price are used to treat these events in the index and analytics calculation. In addition, the clean price of the bond is set to the redemption price, and the interest accrued until the redemption date is treated as an irregular coupon payment.

5.7.4 Bonds trading flat of accrued

If a bond is identified as trading flat of accrued, the accrued interest of the bond is set to 0 in the total return index calculation and is excluded from the calculation of all bond and index analytical values.

Bonds will be considered trading flat of accrued in any of the following situations:

- a bond has been assigned a default rating and/or
- issuer has announced a failure to pay a coupon and/or
- issuer has announced an intention not to make a payment on an upcoming coupon (grace period).

5.7.5 Multi-coupon bonds

Some bonds have pre-defined coupon changes that lead to a change in the annual coupon over the life of the bond. In all instances, the coupon change must be a fixed amount on top of a fixed coupon, i.e. floating coupon bonds are not eligible for the indices. The two main categories of bonds are step-up bonds and event-driven bonds.

- **Step-up bonds:** These are bonds with a pre-defined coupon schedule that cannot change during the life of the bond. The coupon schedule is used in all bond calculations.
- **Event-driven bonds:** These are bonds whose coupon may change upon occurrence (or non-occurrence) of pre-specified events, such as rating changes, e.g. rating-driven bonds, failure to register (register-driven bonds), or failure to complete a merger (merger-driven bonds). In the calculation of the indices and the analytics, the coupon schedule as of the calculation date is used.

That is to say, any events occurring after the calculation date are ignored in the determination of the applicable coupon schedule. *Example of an event-driven bond:* A bond's rating changes on 31 December 2003 from A- to BBB+ and the coupon steps up from 6% to 6.25% from 1 March 2004 onward. The coupon dates are 1 October and 1 April each year. The correct coupon schedule for the bond and index calculations is date dependent. The index calculation on 20 December 2003 uses the 6% coupon for the whole life of the bond, while the calculation on 31 January 2004 uses a 6% coupon for the current coupon period to 29 February 2004, and a 6.25% coupon for all later interest payments. The index calculation on 20 March uses a 6% coupon until 29 February, a 6.25% coupon for the remainder of the current coupon period and a 6.25% coupon for all future coupon payments. The index calculation after 1 April uses a 6.25% coupon.

5.7.6 Ex-dividend conventions

Some markets have ex-dividend conventions. Ex-dividend means that the next coupon is detached from the bond several days in advance of the coupon payment date. The date on which the next coupon is detached is the ex-dividend date and the period between the ex-dividend date and the coupon payment date is the ex-dividend period. If a bond is in the ex-dividend period, the next coupon payment will not be paid to a buyer of this bond, but will be paid to the original bond holder.

The indices and analytics calculations take ex-dividend conventions into account. During the ex-dividend period, the accrued interest of the bond is negative, while the next coupon payment is held separate in the variable coupon adjustment. If the bond enters the index during the ex-dividend period, then the next coupon payment and the coupon adjustment will not accrue to the index. However, if the bond was already in the index, the next coupon payment needs to be included in the total return calculations. This is controlled via the ex-dividend indicator which is 0 if the bond enters the index during the current ex-dividend period and 1 if not. The same treatment is also applied to all analytics calculation, i.e. the first cash flow is excluded from the calculations if the bond enters during the current ex-dividend period.

5.8 Index history

The index history starts on 31/12/2000. All indices have the value of 100 on 31/12/2004.

5.9 Settlement conventions

All iBoxx indices are calculated using the assumption of T+0 settlement days.

5.10 Data publication and access

The table below summarizes the publication of Markit iBoxx ABF Index in the *Indices* section of the IHS Markit website www.ihsmarkit.com for registered users and on the FTP server.

Frequency	File Type	Access
Daily	Underlying file – Bond level	FTP Server
	Indices files – Index level	FTP Server / IHS Markit website / Bloomberg (index levels only)
Weekly	Preview components	FTP Server / IHS Markit website
Daily from T+1	Forwards	FTP Server
Monthly	End of month components	FTP Server / IHS Markit website
	XREF files	FTP Server

5.11 Index review

The rules for the indices are reviewed once per year during the annual index review process to ensure that the index provides a balanced representation of the local currency debt markets of the economies covered by the indices. Decisions made following the Annual Index Review will be published on www.ihsmarkit.com under *Indices News* shortly after a committee has been held. The publication will contain a detailed overview and timelines for implementation of the rules changes.

6 Governance and Regulatory Compliance

IHS Markit Benchmark Administration Limited (IMBA UK) is the Index Administrator of iBoxx indices. Information on IMBA UK's governance and compliance approach can be found [here](#) . This document covers:

- Governance arrangements, including external committees
- Input data integrity
- Conflicts of interest management
- Market disruption and Force Majeure
- Methodology changes and cessations
- Complaints
- Errors and restatements
- Reporting of infringements and misconduct
- Methodology reviews
- Business continuity

The rules for the index are reviewed at least once per year during the public annual index review consultation process. Decisions made following feedback from market participants, the annual index review and External Advisory Committees will be published on www.ihsmarkit.com shortly after the EACs have been held. The publication will contain a detailed overview and timelines for implementation of any rules changes.

7 Changes to the Changes to the iBoxx ABF Index Family

31 Oct 2020	<p>Annual Index Review 2020</p> <ul style="list-style-type: none"> ● Update of ABF market weights
31 Oct 2019	<p>Annual Index Review 2019</p> <ul style="list-style-type: none"> ● Update of ABF market weights
31 Oct 2018	<p>Annual Index Review 2018</p> <ul style="list-style-type: none"> ● Update of ABF market weights
31 Oct 2017	<p>Annual Index Review 2017</p> <ul style="list-style-type: none"> ● Update of ABF market weights
31 Oct 2016	<p>Annual Index Review 2016</p> <ul style="list-style-type: none"> ● Methodology change for the annual market weights review: Introduction of reduced baseline weight for small markets ● Update of ABF market weights
31 Oct 2015	<p>Annual Index Review 2015</p> <ul style="list-style-type: none"> ● Change of ABF market weights ● Update of liquidity ranking calculation for bonds from sub-sovereign issuers
01 May 2015	<p>ABF Pan-Asia Net-of-Tax Index added</p>
01 Oct 2014	<p>Index restatement, complaints sections added. Additional clarifications on bond eligibility, classification and corporate actions.</p>
25 Sep 2014	<p>Annual Index Review 2014</p> <ul style="list-style-type: none"> ● Change of ABF market weights
31 Mar 2014	<p>Markit iBoxx ABF Indices will follow the pricing methodology described in the document 'Markit iBoxx Pricing Rules'</p>
31 Oct 2013	<p>Annual Index Review 2013</p> <ul style="list-style-type: none"> ● Change of ABF market weights
31 Oct 2012	<ul style="list-style-type: none"> ● Annual Index Review 2012 Methodology change of the annual market weights review: Use of GEMLOC Investability indicators instead of market functionality and turnover factors ● Update of the ABF Market weights ● Implementation within six-month transition period
31 Oct 2011	<p>Annual Index Review 2011</p> <ul style="list-style-type: none"> ● Change of ABF market weights
31 Oct 2010	<p>Annual Index Review 2010</p> <ul style="list-style-type: none"> ● Update of ABF market weights ● Change of maximum permissible market weight from 30% to 25%

31 May 2010	Implementation of the MID spot rate usage instead of the ASK spot rate in the index calculations
31 Oct 2009	Annual Index Review 2009 <ul style="list-style-type: none"> ● Update of ABF market weights
31 Oct 2008	Annual Index Review 2008 <ul style="list-style-type: none"> ● Update of ABF market weights ● New pricing rules for Philippine bonds ● Increase of the minimum outstanding requirement for Philippine government bonds from PHP 3 bn to 5 bn
31 Oct 2007	Annual Index Review 2007 <ul style="list-style-type: none"> ● Update of ABF market weights
22 Jun 2007	Introduction of a new date for the annual market weight reviews
31 Jan 2007	Extraordinary review of ABF market weights
30 Sep 2006	Annual Index Review 2006 <ul style="list-style-type: none"> ● Update of ABF market weights ● Clarification of rules for subordinated debt ● Changed rating procedure ● New maturity indices for all markets and the Pan-Asia index as well as a separate Philippine net of tax indices ● New local currency, USD hedged and unhedged index analytics (gross price index, income index, coupon and redemption income indices) ● New bond analytics (market value, notional of bonds in the iBoxx ABF Pan-Asia indices)
30 Sep 2005	Annual Index Review 2005 <ul style="list-style-type: none"> ● Update of ABF market weights
01 Jun 2005	FX rates used in calculation amended to 8am London time from 7am GMT

8 Further information

Glossary of key terms

The Markit iBoxx Glossary document of key terms is available in the *Methodology* section of the iBoxx *Documentation* page on www.ihsmarkit.com.

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