

iBoxx EUR Liquid Indices Methodology

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iBoxx € Liquid Indices

The iBoxx € Liquid Indices consist of a subset of the bonds from the iBoxx EUR index family of benchmark indices. The index rules have been designed to offer targeted coverage of the overall market with emphasis on liquidity to be suitable for over the counter (OTC) and exchange-traded derivatives, and Exchange Traded Funds (ETFs). The indices are an integral part of the global suite of iBoxx Liquid Indices which provide the marketplace with liquid and invest-able versions of the broader iBoxx benchmark index families.

Broad benchmark indices generally consist of a large number of bonds, especially within the corporate sector. Portfolio managers tracking an index from the broad benchmark iBoxx EUR index family will therefore incur substantial costs in attempting to replicate or hedge the individual bonds in the portfolio. Furthermore, bonds with special features or smaller amounts outstanding usually suffer from illiquid trading, resulting in relatively large bid-ask spreads.

The iBoxx € Liquid Indices are intended to address these deficiencies by limiting the number of bonds per index and excluding special bond types, thus reducing tracking and hedging costs.

All iBoxx indices are priced based on multiple data inputs. The iBoxx € Liquid Indices use multisource prices as described in the document *iBoxx Pricing Methodology* publicly available at www.spglobal.com/spdji.

This document covers the index family structure, rules and calculation methodology.

Index Family Structure

The iBoxx € Liquid index family is comprised of three different index sub-groups: sovereigns, subsovereigns, and corporates. Four maturity buckets (extra short, short, medium and long) are published for the iBoxx € Liquid Sovereigns Indices. The iBoxx € Liquid Sovereigns Global is a weighted aggregation of the iBoxx € Liquid Sovereigns Short Index, the iBoxx € Liquid Sovereigns Medium Index and the iBoxx € Liquid Sovereigns Long Index.

In addition, five capped iBoxx € Sovereign (Capped) Indices in which the weight of any given country is capped at 20% are calculated.

The iBoxx € Liquid Agencies/Supranationals AAA Index includes the most liquid government-backed bonds with an AAA rating.

The Corporates index sub-group is further classified into sectors. In addition to the iBoxx € Liquid Corporates Index, the corporates index group includes separate indices for financial (iBoxx € Liquid Financials) and non-financial bonds (iBoxx € Liquid Non-Financials), as well as rating indices for both groups.

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

Index family structure

iBoxx € Liquid Overall		
iBoxx € Liquid Sovereigns	iBoxx € Liquid Non-Sovereigns	
	iBoxx € Liquid Sub-Sovereigns	iBoxx € Liquid Corporates
<ul style="list-style-type: none"> iBoxx € Liquid Sovereigns Indices 	<ul style="list-style-type: none"> iBoxx € Liquid Agencies/Supranationals AAA 	<ul style="list-style-type: none"> iBoxx € Liquid Corporates

		<ul style="list-style-type: none"> • iBoxx € Liquid Corporates - Sector Indices • iBoxx € Liquid Financials Indices • iBoxx € Liquid Non-Financials Indices
<p>Rating and maturity indices (AAA, AA, A, BBB) (1.5-2.5, 1.5-10.5, 2.5-5.5, ,5.5-10.5, 10.5+)</p>		

Bond Selection Rules

The following selection criteria are used to determine the index constituents:

- Bond type
- Credit rating
- Time to maturity
- Amount outstanding
- Age (time since first settlement date)
- Maximum of Minimum Lot Size / Maximum of Minimum Increment

Bond Type

Only fixed-rate bonds whose cash flow can be determined in advance are eligible for the indices. The indices are comprised solely of bonds. T-Bills and other money market instruments are not eligible. The iBoxx € Liquid Indices include only Euro and legacy currency denominated bonds. The issuer's domicile is not relevant.

In particular, bonds with the following characteristics are included:

- Fixed coupon bonds ("plain vanilla bonds")
- Zero-coupon bonds
- Step-up bonds
- Callable bonds with American options
- Senior fixed-to-floater bonds
- Event-driven bonds, such as rating- or tax-driven bonds
- Bonds with call options where the first and subsequent call dates are on a date when the bond is otherwise no longer eligible for the index
- Subordinated financial debt with a contingent conversion feature at the point of non-viability, in line with the capital adequacy requirements of Basel III
- Senior bank bonds with call options where the first call date is 25 months or less prior to final maturity

The following bond types are specifically excluded from the indices:

- Perpetual bonds
- Sinking funds and amortizing bonds
- Other callable and undated bonds
- Floating rate notes
- Other fixed-to-floater bonds
- Optionally and mandatory convertible bonds from non-financial issuers
- Subordinated financial debt with mandatory contingent conversion features that are based on an

observable trigger, or with any conversion options before the first call date, is ineligible for the index

- Collateralized Debt Obligations (CDOs) and bonds collateralized by CDOs
- Bonds with differences between accrual and coupon payment periods and monthly-paying bonds
- Retail bonds
- Private placements
- Extended bonds as defined under section 'Maturity extension' in this document

For retail bonds and private placements, publicly available information is not always conclusive and the classification of a bond as a retail bond or private placement will be made at S&P DJI's discretion based on the information available at the time of determination. Partial private placements where information on the specific amounts publicly placed and privately placed can be ascertained are included in the indices with the amount publicly placed. If the amount publicly placed is below the cut-off, the bond is not included in the indices. Any bond classified as retail or private placement is added to the list of excluded private placement and retail bonds. The list is published at www.spglobal.com/spdji for future reference and to ensure consistency.

In instances where a new bond type is not specifically excluded or included according to the published index rules, S&P DJI will analyze the features of such securities in line with the principles set out Bond Type section of this Methodology. S&P DJI may consult specific Index 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.

Credit Rating

All bonds in the iBoxx € Liquid Indices must have an iBoxx Rating of 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. Bonds with an RD/SD rating are excluded from the iBoxx € Liquid Indices.

If more than one of the above agencies rates a bond, then the iBoxx rating is the average of the provided ratings. The index consolidates ratings to the nearest rating grade and does not use rating notches. For more information on how the average rating is determined, please refer to the *iBoxx Rating Methodology* document available at <https://www.spglobal.com/spdji/en/> under *Methodology*.

Prior to Jan. 1, 2008, the lowest rating was used as the iBoxx Rating.

Time to Maturity

To qualify for the iBoxx € Liquid Indices all eligible bonds must have a remaining time to maturity of at least 1.5 years (1.25 years for Sovereigns) measured from the respective rebalancing date to the maturity date. The time to maturity for substitutes is measured from the substitution date to the maturity date of the bond.

Bonds in a liquid index with a remaining time to maturity of less than 1.5 years (1.25 years) will be excluded from the indices at the next rebalancing.

The expected remaining life is expressed in years and calculated as follows:

- For plain vanilla bonds, the expected remaining life of the bond is its time to maturity, calculated as the number of days between the last calendar day of the current month and its maturity.
- For senior callable bank bonds the first call date will be regarded as the workout date. The rule for setting the workout date will not apply to make-whole calls or calls that are less than 12 months prior to maturity.

Maturity Sub-indices

The sovereign bonds are assigned to buckets according to their remaining time to maturity. To take into account the current issuance pattern by Eurozone governments, the maturity bands for the Sovereigns indices are defined as: Extra short (1.25 – 3.0 years), Short (1.5 – 5.5 years), Medium (5.5 – 10.5 years) and Long (more than 10.5 years). The iBoxx € Liquid Sovereigns Capped Indices have the following maturities: 1.5 – 10.5 years, 1.5 – 2.5 years, 2.5 – 5.5 years, 5.5 – 10.5 years and 10.5+ years.

The 1.25 to 3.0-year maturity range comprises all bonds with a remaining maturity of 1.25 to 2.99 years. The other ranges have been set accordingly.

Amount Outstanding

All bonds require a specific minimum amount outstanding in order to be eligible for the indices, as shown below. The figures indicate minimum amount outstanding.

Minimum amount outstanding

Issuer type	Minimum amount outstanding
Sovereigns	EUR 2 billion (EUR 4 billion for the iBoxx € Liquid Sovereigns Capped Indices)
Corporates	EUR 750 million
Other bonds	EUR 1 billion

Bonds subject to a tender offer (i.e. where the issuer has announced its intention to buy back, tender or call parts or the whole amount of a bond) will not be eligible for any non-sovereign liquid EUR index, in case the results of the tender are not publicly known three business days before the end of the quarterly rebalancing month. If a bond under a tender offer is already in a liquid index, it will be removed at the next regular quarterly rebalancing. This rule is not applicable to the iBoxx € Liquid Sovereigns Indices.

Age

The age of the bond is measured from the first settlement date of the bond to the current quarterly rebalancing date. The age of substitutes is measured from the first settlement date to the substitution date of the bond.

Bonds older than four years are excluded from the iBoxx € Liquid Sovereign Indices at the next rebalancing.

The age of bonds for the iBoxx € Liquid Sovereigns Capped 10.5+ is not restricted.

For the iBoxx € Liquid Agencies/Supranationals AAA Index, bonds older than two years are excluded from the index.

For the iBoxx € Liquid Corporates Indices bonds that are currently part of the index and that are older than four years are excluded from the liquid indices. For the bonds that are currently not part of the index membership maximum age criterion is set to three years. The minimum age difference required for exchanges of bonds from the same issuer is two years.

Maximum of minimum lot size and maximum of minimum increment

The maximum permissible minimum lot size for Non-Sovereign bonds in the iBoxx € Liquid Indices is EUR 100,000. The upper limit for the minimum increment is EUR 1,000.

Minimum Run

For the iBoxx € Liquid Corporates Indices each bond has a minimum run of one year. The minimum run supersedes the age and ranking criteria. The amount outstanding criterion supersedes minimum run.

If a bond in the iBoxx € Liquid Corporates Indices is in its minimum run but it has remaining time to maturity less than 1.25 years on the rebalancing date, the minimum run rule is disregarded and the bond is excluded from the index at the rebalancing.

Index Size, Issuer Ordering and Bond Selection

To facilitate replication, the index has a maximum number of issuers. This chapter describes the selection procedure that is applied to determine the most liquid bonds for the iBoxx € Liquid Indices.

Index Size

The maximum number of bonds in each index is:

Index size

Index Name	Number of bonds
iBoxx € Liquid Sovereigns Extra Short	10
iBoxx € Liquid Sovereigns Short	10
iBoxx € Liquid Sovereigns Long	10
iBoxx € Liquid Sovereigns Medium	10
iBoxx € Liquid Sovereigns Global	30
iBoxx € Liquid Sovereigns Capped 1.5 - 10.5	25
iBoxx € Liquid Sovereigns Capped 1.5 - 2.5	15
iBoxx € Liquid Sovereigns Capped 10.5+	15
iBoxx € Liquid Sovereigns Capped 2.5 - 5.5	15
iBoxx € Liquid Sovereigns Capped 5.5 - 10.5	15
iBoxx € Liquid Agencies/Supranationals AAA Index	20
iBoxx € Liquid Corporates	40
iBoxx € Liquid Corporates Rating Indices (AAA,AA,A,BBB)	20
iBoxx € Liquid Financials	20
iBoxx € Liquid Financials Rating Indices (AAA,AA)	20
iBoxx € Liquid Non-Financials	20
iBoxx € Liquid Non-Financials Rating indices (AA, A, BBB)	20

Minimum Number of Bonds

An index is calculated if there are at least three bonds available that match all index criteria. If less than three bonds qualify for an index, then the index level will remain constant. Should at least three bonds qualify again, the index calculation is resumed from the last calculated level.

Ranking Criteria

Should more than the maximum number of bonds be available for an index, ordering criteria are applied in order to rank the eligible bonds for the iBoxx € Liquid Indices

The following five criteria are applied:

1. Minimum lot size of EUR 50,000 or less
2. Higher amount outstanding

3. More recent first settlement date
4. Longer time to maturity
5. Higher rating
6. Lower coupon

These criteria are applied to each pair of bonds in the order stated above until a difference can be established (i.e. if two bonds have the same amount outstanding and the same first settlement date, but one has a longer time to maturity, then criteria 1 to 4 are applied, but 5 and 6 are not). With the help of the ranking criteria, a bond hierarchy can be defined, with the bond that has the highest amount outstanding and minimum size below or equal to EUR 50,000 at the top of the hierarchy.

Limit on number of bonds from any issuer in an index

The number of bonds from an issuing institution that may enter an index is limited.

No iBoxx € Liquid Sovereigns or iBoxx € Liquid Corporates Index will have more than one bond from the same issuer.

The number of bonds from the same country is limited to 5 in the iBoxx € Liquid Sovereigns Capped 1.5-10.5 Index and to 3 in the other iBoxx € Liquid Sovereigns Capped Indices.

There is no limit on the number of bonds from the same issuer in the iBoxx € Liquid Sovereigns Indices.

Weighting

The indices are market-value-weighted, with the exception of the iBoxx € Liquid Corporates Index and the iBoxx € Liquid Sovereigns Capped Indices. The detailed weighting procedure is described in Index weighting.

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 S&P DJI, and status changes are included in the indices at the next rebalancing if necessary.

Where the sector classification of a specific entity is not clear due to the diversified business of the entity, a decision is made at S&P DJI's discretion. S&P DJI assigns the classification according to its evaluation of the business risk presented in the security prospectus and annual reports, if available. S&P DJI also compares the classification to peers in the potential sectors. Membership lists including classification are published on the FTP server and in the *Indices* section of the webpage for registered users.

Sovereigns

Bonds issued by a central government of a member country of the Eurozone and denominated in Euro or in a pre-Euro currency. The bonds are further broken down into Issuer Country.

Sub-sovereigns

Bonds issued by entities with explicit or implicit government backing due to legal provision, letters of comfort, or the public service nature of the issuer's business. The issuer requires a strong central government ownership/relationship if its bonds are not explicitly guaranteed by the central government.

The five main sub-sovereign sectors are:

- **Agencies:** Bonds issued by entities with a major focus on government-sponsored, public, noncompetitive services. The issuers are financial in nature and carry out government policies through special development programs, often explicitly government-backed or with a business scope defined by a specific law.
- **Supranationals:** Bonds issued by supranational entities, i.e. entities that are owned by more than one central government (e.g. World Bank, EIB).
- **Public Banks:** Bonds issued by publicly owned and backed banks that provide regular commercial banking services (e.g. NV Bank Nederlandse Gemeenten).
- **Regions:** Bonds issued by local governments (e.g. Isle of Man).
- **Other Sub-Sovereigns:** All remaining bonds considered sub-sovereign, classified into the following three main categories:
 - **Non-Financials:** Bonds issued by entities from the non-financial sector with an explicit or strong implicit debt guarantee from the state. The issuer's credit rating is closely correlated to the sovereign rating and expresses a strong credit uplift based on a high level of government support. S&P DJI expects the issuer's credit rating to be no worse than on par or two notches below the sovereign rating. A 'strong implicit guarantee' means the issuer is 100% owned by the state or public sector with its debt consolidated into state public debt, or the issuer has preexisting access to government financing or funding derived from tax revenues. State-owned issuers that are profit-oriented, provide competitive services, and operate under a regulatory framework are considered Corporates.

- *Guaranteed Financials*: A specific bond issued by a private sector financial institution that is irrevocably guaranteed by a government. Most of these bonds are issued under programs set-up after the 2008 financial crisis.
- Bonds issued by unguaranteed institutions with an irrevocable and explicit guarantee by a central government that covers amount and timeliness of all interest and principal payments until the maturity of the bond.

Corporates

Bonds issued by public or private corporations. Corporate bonds are further classified into Financials and Non-Financials bonds and then into their multiple-level economic sectors, according to the issuer's business scope. The category insurance-wrapped is added under Financials for corporate bonds whose timely coupon and/or principal payments are guaranteed by a special mono-line insurer such as AMBAC or MBIA. The sector overview is shown in the table below.

Overview of iBoxx Corporates Sectors

	Economic Sector	Market Sector	Market Sub-Sector
Financials	Core Financials	Banks	Banks
		Insurance	Life Insurance
	Nonlife Insurance		
	Financial Services	Financial Services	Equity Investment Instruments
			General Financial
		Insurance-wrapped	*
	Real Estate	Real Estate	Real Estate Investment & Services
			Real Estate Investment Trusts

	Economic Sector	Market Sector	Market Sub-Sector		
Non-Financials	Basic Materials	Basic Resources	Forestry & Paper		
			Industrial Metals		
			Mining		
	Consumer Goods	Chemicals	Automobiles & Parts	Chemicals	
				Automobiles & Parts	
		Food & Beverage	Personal & Household Goods	Beverages	
				Food Producers	
				Household Goods	
		Consumer Services	Education	Media	Academic & Educational Services
					Media
	Food & Drug Retailers				
	General Retailers				
	Energy	Oil & Gas	Renewable Energy	Travel & Leisure	
				Oil Equipment / Services & Distribution	
		Oil & Gas Producers			
	Health Care	Health Care	Health Care	Health Care Equipment & Services	
				Pharmaceuticals & Biotechnology	
	Industrials	Construction & Materials	Industrial Goods & Services	Construction & Materials	
				Aerospace & Defense	
				Electronic & Electrical Equipment	
				General Industrials	
				Industrial Engineering	
				Industrial Transportation	
	Technology	Technology	Technology	Support Services	
				Software & IT Services	
	Telecommunications	Telecommunications	Telecommunications	Technology Hardware & Equipment	
				Integrated Telecommunications	
Utilities	Utilities	Utilities	Wireless Telecommunications		
			Electricity		
			Gas / Water & Multiutilities		

Additional Classification

Corporate debt is further classified into senior and subordinated debt. Bank senior debt structure additionally differentiates between Bail-in and Preferred bonds. The Bail-in classification captures all senior notes which are subject to write-down or conversion into a subordinated instrument on the occurrence of a resolution event, as well as senior bank debt issued by bank holding companies.

Hybrid capital issued by banking and insurance institutions is further detailed into the respective tiers of subordination.

The market information on the tier of subordination for insurance capital is often less standardized and clear than the equivalent issues by banks. In these cases, the classification is based on the maturity, coupon payment and deferral provisions of the bond from the offering circulars of the bonds. The table below displays the seniority classification of debt issued by both financial and non-financial sectors.

Overview of seniority levels

Market Sector	Seniority Level 1	Seniority Level 2	Seniority Level 3	
Bank	SEN	Preferred	*	
		Bail-in	*	
	SUB	T2 (post-Jan '13 issuances)	T2 callable	
			T2 non-callable	
		T2 (pre-Jan '13 issuances)	LT2 callable	
			LT2 non-callable	
			UT2	
T1	T1 step			
	T1 non-step			
Insurance	SEN	*	*	
	SUB	T3	*	
		T2 dated	T2 dated callable	
			T2 dated non-callable	
		T2 perpetual	*	
T1	*			
Other sectors	SEN	*	*	
	SUB	Other	Hybrid** Non-hybrid	

** Bonds will be required to fulfill the following criteria to be considered hybrids:

- Subordinated
- Deferrable coupons
- First non-call period ≥ 5 years
- Either perpetual or 'long-dated', where 'long-dated' is defined as > 25 years of the time to maturity at issuance

Index Calculation

Static Data

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

Bond Prices

For more details, please refer to the *iBoxx Pricing Methodology* document, available in the *Methodology* section of the webpage at www.spglobal.com/spdji.

Rebalancing Process

The indices are rebalanced every quarter at the end of February, May, August and November. The indices are rebalanced on the last calendar day of the month after the last index calculation. Rebalancing also takes place if the last day of the month falls on a non-business day.

Changes to amounts outstanding are only taken into account if they are publicly known three business days before the end of the month. Changes in ratings are only taken into account if they are publicly known two business days before the end of the month. New bonds issued are taken into account if they are publicly known to settle until the last calendar day of the month, inclusive, and if their rating has become known at least three trading days before the end of the month.

The rebalancing procedure for the iBoxx € Liquid Indices is analogous to the rebalancing of the iBoxx EUR Benchmark indices.

A preliminary membership list is published on the 6th calendar day of the month (moved to the next business day in case of holiday/weekend).

Four business days before the end of each month, another preliminary membership list is published on the FTP server.

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 maximum number of constituents for the next month.

Two business days before the end of each month, the rating information for the constituents is updated and the list is adjusted for all rating changes which are known to have taken place two trading days before the end of the month. Bonds which are known to have been upgraded to investment grade two trading days before the end of the month are not included in the membership, but bonds which are known to have been downgraded to sub-investment grade two trading days before the end of the month do get excluded from the membership.

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

Index Weighting

All liquid indices bonds are included in the index with their amount outstanding at the last rebalancing, or in the case of substitutes, the fictitious amount outstanding calculated. For the iBoxx € Liquid Sovereigns Index and for the iBoxx € Liquid Corporates Index additional calculations are applied. In addition, the weight of a country in the iBoxx € Liquid Sovereigns Capped indices is capped at 20%.

iBoxx € Liquid Sovereigns Index weighting

The iBoxx € Liquid Sovereign Global Index is a weighted aggregation of the iBoxx € Liquid Sovereigns Short, the iBoxx € Liquid Sovereigns Medium and the iBoxx € Liquid Sovereigns Long Index. The index weighting is determined three business days before rebalancing based on the market value of the bonds in the iBoxx € Sovereigns and the iBoxx € Sovereigns High Yield with corresponding term to maturity for each of the three indices. The market value of all bonds within the term to maturity brackets is aggregated as basis for the weight determination:

$$MV_{SH} = \sum_{i=1}^n (P_{i,t-s} + A_{i,t-s} + \chi D_{i,t-s} \cdot CP_{i,t-s}) \cdot N_{i,t-s}$$

for bonds with a term to maturity between 1.5 and 5.5 years;

$$MV_M = \sum_{i=1}^n (P_{i,t-s} + A_{i,t-s} + \chi D_{i,t-s} \cdot CP_{i,t-s}) \cdot N_{i,t-s}$$

for bonds with a term to maturity between 5.5 and 10.5 years; and for bonds with a term to maturity of more than 10.5 years;

$$MV_L = \sum_{i=1}^n (P_{i,t-s} + A_{i,t-s} + \chi D_{i,t-s} \cdot CP_{i,t-s}) \cdot N_{i,t-s}$$

for bonds with a term to maturity of more than 10.5 years;

The sum of the market values of all three indices is the basis for weight determination:

$$MV_{Total} = MV_{SH} + MV_M + MV_L$$

The weights for each index are determined as ratio of notional index market value and the sum of all notional index market values.

$$\omega_{SH} = \frac{MV_{SH}}{MV_{Total}} \quad \omega_M = \frac{MV_M}{MV_{Total}} \quad \omega_L = \frac{MV_L}{MV_{Total}}$$

The individual bonds weights of the three indices are multiplied by the index weights to derive the global bond weighting.

For the Capped Sovereign indices, the weight of a country in an index is capped at 20%. If the weight of a country is capped, then the weighting of each bond from the country is reduced according to its relative weight. If less than five countries are available, all countries are equally weighted.

iBoxx € Liquid Corporates Index weighting

Due to significant differences in the average issue size of financial and non-financial bonds, the amount outstanding of the bonds in the iBoxx € Liquid Corporates Index is adjusted by a sector specific factor:

$$AF_r = \frac{MS_r}{\sum_{i \in r} N_i} \cdot 10^{12}$$

The adjustment factor is the market share in the benchmark index (rounded to a full percentage point) divided by the total amount outstanding of all bonds from the respective sector in the liquid index. This ensures that the initial market share of a sector in the liquid index equals that for the benchmark index.

Therefore, the weighting of a bond in the iBoxx € Liquid Corporates Index is as follows:

$$W_i = AF_r \cdot N_i$$

Thus each bond retains its relative weight within each sector. The weights of bonds from the two sectors are different to account for the differences in the average issue size.

However, the weighting W_i for the iBoxx € Liquid Corporates Index needs to be adjusted by the dirty price of the bond to derive a suitable adjusted volume for the index calculation:

$$O_i = \frac{W_i}{(P_{i,t-s} + A_{i,t-s} + XD_{i,t-s} \cdot CP_{i,t-s})}$$

Hence, a bond will enter a liquid index with:

$$O_i = \begin{cases} \frac{N_i}{W_i} & \text{Normal iBoxx EUR Liquid Indices} \\ \frac{N_i}{(P_{i,t-s} + A_{i,t-s} + XD_{i,t-s} \cdot CP_{i,t-s})} & \text{iBoxx EUR Liquid Corporates Index} \end{cases}$$

Market share and adjustment factor are recalculated at each quarterly rebalancing.

Rebalancing Procedure

In a first step the selection criteria are applied to determine an eligible universe for the iBoxx € Liquid Indices:

- Bond ratings and amounts outstanding are applied as of three business days before the rebalancing date
- A bond remains in its respective maturity bucket until the next rebalancing
- Only bonds with a first settlement date on or before the rebalancing date are included in the selection process

Once the eligible bond universe has been defined, the ranking criteria are employed to determine a distinct hierarchy of bonds in the universe.

Bonds enter the respective index according to their rank in the hierarchy (with the highest rank entering first) until the maximum number of bonds per index has been reached. This does not apply to the iBoxx € Liquid Corporates Index where a special procedure is applied.

Bond selection for the iBoxx € Liquid Corporates distinguishes between Financials and Non-Financials. The basis for bond selection is the market share of the two sectors in the iBoxx EUR Corporates benchmark index. The market share is defined as the percentage share of the total market capitalization of all bonds from a sector in the iBoxx € Corporates Benchmark Index.

$$MS_r = \frac{\sum_{i \in r}^n (P_{i,t-s} + A_{i,t-s} + CP_{i,t-s}) \cdot O_{i,t-s}}{\sum_{i \in F+N}^n ((P_{i,t-s} + A_{i,t-s} + CP_{i,t-s}) \cdot O_{i,t-s})}$$

where:

$A_{i,t-s}$	Accrued interest of bond i on the last calendar day of the previous month
$CP_{i,t-s}$	Value adjustment of next coupon payment of a bond i because of its ex-dividend period; if none: the value is 0
MS_r	Market share of sector r
$O_{i,t-s}$	Adjusted weight of a bond i in the index
$P_{i,t-s}$	Closing price of a bond i on the last trading day of the previous month
n	Number of bonds comprised in the index
r	F (Financials); N(Non-Financials)

The market share is determined after the benchmark index rebalancing one month prior to the iBoxx € Liquid Index rebalancing. For example, for the August 31 rebalancing the market share is determined on July 31. The data used are:

- Closing prices from the benchmark indices at the rebalancing date
- New constituents list

The market share is used to determine the number of bonds from each of the two sectors. The calculated market share is rounded to the nearest full 2.5%. The result is multiplied by 40. The resulting figure is the number of bonds to be selected from the Financials and the Non-Financials sector.

Within each sector, the necessary number of bonds is selected according to their rank in the hierarchy, beginning with the bond with the highest rank. If fewer eligible bonds than required are available for one of the sectors, then all eligible bonds from that sector will enter the index. The number of bonds from the other sector will remain unchanged. As a result, the number of issuers from each sector is split according to the market share in the benchmark index.

Weekly Preview

In addition to the regular rebalancing, a preview list (including sector classification for new bonds) is published each Friday of the rebalancing month with predicted changes to the index constituents at the next rebalancing. The preview list includes the next month's index constituents and shows bonds joining or leaving the indices at the next rebalancing, based on information available on such Fridays.

The first weekly preview will be published on the Friday of the rebalancing month that is at least three business days after the preceding month-end.

Index Data

The calculation of the indices is based on bid prices. New securities are included in the indices at their respective ask prices when they enter the index family. If no price can be established for a particular security, 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, S&P DJI may consult market participants prior to the next rebalancing date. Decisions are made publicly available on a timely basis and S&P DJI may refer back to previous cases.

The iBoxx EUR Liquid Indices are computed and disseminated Monday to Friday once per minute between 9:00 a.m. and 5:15 p.m. CET. The indices are calculated every day except on common European bank holidays. The indices are based on real-time prices. The indices are also calculated on the last calendar day of each month irrespective of holidays and weekends. If the index is calculated on a

day that is a non-business day, 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 rebalancing takes place after close of market on the last trading day of a rebalancing month.

Index Calculus

For specific index formulas please refer to the *iBoxx Bond Index Calculus Methodology* available at www.spglobal.com/spdji.

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, S&P DJI will estimate the approximate value based on the available data at the time of calculation.

Index adjustments between scheduled rebalancings

Coupon changes

While most index adjustments are made during the quarterly rebalancing procedure, coupon changes will be effective immediately and the indices are adjusted in the same way.

Bonds no longer in benchmark index

Bonds may drop out of the Liquid index at the end of a month, because they have left the benchmark indices. In this case they are replaced by suitable substitutes, or the proceeds are invested in existing bonds.

Cash investment

Cash from coupon payments and proceeds from bonds that could not be used to buy other suitable bonds is invested in the money market at the end of each month.

Monthly bond substitution between scheduled rebalancings

Bonds can leave the iBoxx € Liquid Indices universe due to:

- Default of the issue or issuer
- Rating downgrade to sub-investment grade of the issue or issuer
- Reduction in the amount outstanding due to repurchases below threshold level
- Other reasons

Bonds dropping out of the benchmark index will also leave the liquid index at month-end. The procedures described below are applied only if a bond has left a liquid index between rebalancing dates.

Substitution list

At the end of the month, the eligible bond universe for the coming month is compiled and published for all liquid indices in accordance with the selection and ranking criteria. These are applied to establish a hierarchy within the eligible bond universe. For each index, all bonds already in the index are eliminated from the hierarchy, resulting in a substitution list for each index.

In case of multiple substitutions, all substitutes and deleted bonds are ranked in order to assign one specific substitute to each deleted bond. Ranking criteria from section 2 are applied. The assignment is essential for the determination of the fictitious amount outstanding.

Bond substitution

If the bonds are no longer in the iBoxx EUR Corporates benchmark index, they will also leave the liquid indices. For each bond that has left, another bond will become a substitute and enter the index. The proceeds from the sale of a dropped bond are invested in its substitute. The substitute will have a fictitious amount outstanding:

$$O_{\text{substitute}} = \frac{(P_{\text{dropped}}^b + A_{\text{dropped}}) \cdot O_{\text{dropped}}}{P_{\text{substitute}}^a + A_{\text{substitute}}}$$

where:

A_{dropped}	Accrued interest of a dropped bond
$A_{\text{substitute}}$	Accrued interest of a substitute bond
O_{dropped}	Amount outstanding of a dropped bond
$O_{\text{substitute}}$	Fictitious amount outstanding of a substitute bond
$P_{\text{substitute}}^a$	Ask price of a substitute bond
P_{dropped}^b	Bid price of a dropped bond

The substitute will have a notional amount outstanding based on formula above.

In the iBoxx EUR Liquid indices a substitute bond enters the index at the ask price.

In the event that no substitute is available, the proceeds from the sale of the dropped bond are invested as cash.

Monthly cash reinvestment between scheduled rebalancing dates

Cash from received coupons and non-substituted bonds is reinvested at the end of each month in the money market until the end of the following month. Cash from earlier months is also re-invested at the end of each month at the 1-month EURIBOR minus 12.5 basis points. At the next scheduled rebalancing cash is invested back in the index.

Maturity Extension

Maturity Extension for Perpetual Bonds Without a Reset Date

Maturity	Coupon/call structure	Workout date at issuance	Updated Workout date if not called
Perpetual	Fixed/ Callable	Assume first call date as workout date	Extend workout date until the assumed next call date - 5 years from first call date*.

*Assumes the terms allow for a redemption at the new assumed maturity date.

Maturity Extension for Perpetuals & Dated Fixed-to-Fixed Bonds With a Reset Date

Maturity	Coupon/Call structure	Workout Date at issuance	Updated Workout date if not called
Perpetual	Reset*/Callable	Assume first call date as workout date	Extend workout date until the end of the next reset date*

Maturity	Coupon/Call structure	Workout Date at issuance	Updated Workout date if not called
Dated	Reset/Callable	Assume reset date as workout date	Extend workout date until the end of the next reset date or final maturity date*

*Assumes the bond terms allow for a redemption at the new assumed maturity date

Determination of Benchmarks

Benchmark spreads are calculated for every constituent bond as the difference between the annual or semi-annual yield of the bond and the annual or semi-annual yield of its benchmark. The benchmark assignment for the bonds is reviewed monthly. Benchmarks for the bonds in the iBoxx EUR Liquid Indices are equivalent to the benchmarks for the respective bonds in the iBoxx EUR Benchmark universe.

A benchmark bond of the iBoxx EUR Benchmark universe is defined as the most liquid and low risk bond in each of the maturity bands listed below.

The procedure starts at first running a regression algorithm on all bonds in the iBoxx Eurozone index in order to determine the benchmark curve, and bonds with a positive spread to the curve are eliminated. The procedure is then repeated until one of the following is met:

1. R-square above 0.99
2. Standard deviation of yield-spread to curve is less than 3.5 bps
3. Number of bonds left is between 15 and 40.

The bonds remaining after running the procedure above are assigned to Sets A or B depending on their age. An eligible bond is assigned to Set A within a maturity band if it is not older than two years. Otherwise, it is assigned to Set B. The age of a bond is calculated from the first settlement date to the current rebalancing date. The largest bond (by amount outstanding) of all bonds in Set A is selected as the respective benchmark for each defined maturity band. If Set A is empty, then the most recently issued bond of Set B is chosen as the respective benchmark of the band.

Maturity bands are defined as follows:

Benchmark Maturity Bands	Bond Maturity
1 year	< 1.5 years
2 years	1.5 to < 2.5 years
3 years	2.5 to < 3.5 years
4 years	3.5 to < 4.5 years
5 years	4.5 to < 5.5 years
6 years	5.5 to < 6.5 years
7 years	6.5 to < 7.5 years
8 years	7.5 to < 8.5 years
9 years	8.5 to < 9.5 years
10 years	9.5 to < 12.5 years
15 years	12.5 to < 17.5 years
20 years	17.5 to < 25 years
Long	≥ 25 years

For every bond in the iBoxx EUR indices, the benchmark bond with the closest maturity is selected as a benchmark. Therefore, the chosen benchmark is not necessarily the same as the benchmark for the maturity band of the bond. If the time to maturity distance of a bond to its two neighboring benchmarks is exactly the same, then the benchmark bond with the closer coupon is chosen. If the coupon distance of the two neighbouring bonds is also exactly the same, then the younger of the two benchmark bonds is chosen.

Index History

The Index history starts on 31 December 1998. The indices have a base value of 100 on that date.

Settlement Conventions

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

Calendar

S&P DJI publishes an index calculation calendar available on www.spglobal.com/spdji under *iBoxx Indices Calendars*. This calendar provides an overview of the index calculation holidays of the iBoxx bond index families each year.

Publication of the Index

The iBoxx € Liquid Indices are computed and disseminated once per minute between 9:00 am and 5:15 pm CET every day except on common European bank holidays.

Bond and index analytical values are calculated end of day Monday to Friday using that day's closing prices. In addition, bond and index analytical values are calculated using the previous trading day's closing prices on the last calendar day of each month if that day is not a regular trading day as well as on common bank holidays as published in the iBoxx index calculation calendar. This index calculation calendar is available at www.spglobal.com/spdji under *iBoxx Indices Calendars*. Index data is also available from the main information vendors.

Closing index values and key statistics are published at the end of each calculation day in the *Indices* section of the website for registered users. In addition, midday fixing levels for bond prices and indices are also published.

Data Publication and Access

The table below summarizes the publication of the indices at www.spglobal.com/spdji for registered users and on the FTP server.

In addition to the indices detailed in this methodology, other indices covered by this document may be available. For a list of available indices, please refer [here](#).

Table: Frequency, File type and Access

Frequency	File Type	Access
Daily	Underlying file – Bond level	FTP Server
	Indices files – Index level	FTP Server / website / BBG for index levels only
T-4, T-3, T-2	Preview components	FTP Server / website
Monthly	End of month components	FTP Server / website
	XREF files	FTP Server

Annual Index Review

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

Index Governance

Index Committee

An S&P Dow Jones Indices Index Committee maintains the indices. All committee members are full-time professionals at S&P Dow Jones Indices. Meetings are held regularly. The Index Committee oversees the management of the indices, including determinations of intra-rebalancing changes, maintenance and inclusion policies, and other matters affecting the maintenance and calculation of the indices.

In fulfilling its responsibilities, the Index Committee has full and complete discretion to (i) amend, apply, or exempt the application of index rules and policies as circumstances may require and (ii) add, remove, or by-pass any bond in determining the composition of an index.

The Index Committee may rely on any information or documentation submitted to it or gathered by it that the Index Committee believes to be accurate. The Index Committee reserves the right to reinterpret publicly available information and to make changes to the indices based on a new interpretation of that information at its sole discretion. All Index Committee discussions are confidential.

The Index Committee is separate from and independent of other analytical groups at S&P Global. In particular, the Index Committee has no access to or influence on decisions by S&P Global Ratings analysts.

S&P Dow Jones Indices' Index Committees reserve the right to make exceptions when applying the methodology if the need arises. In any scenario where the treatment differs from the general rules stated in this document or supplemental documents, clients will receive sufficient notice, whenever possible.

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

For more information on index governance policies, please refer [here](#).

Methodology Changes

February 27, 2026	Annual Index Review 2025 <ul style="list-style-type: none"> Update to eligibility of bonds to include senior fixed-to-floater bonds
March 31, 2025	Annual Index Review 2024 <ul style="list-style-type: none"> Update to eligibility of bonds with American call options
May 01, 2024	Annual Index Review 2023 <ul style="list-style-type: none"> Update to Agencies' Classification Definition <ul style="list-style-type: none"> Updated definition of 'Agencies' <ul style="list-style-type: none"> Updated definition for 'Other Sub-Sovereigns'
Aug. 31, 2023	Annual Index Review 2022 <ul style="list-style-type: none"> Treatment of distressed debt exchanges Introduction of new economic sector classification "Energy" with new market sector classification "Renewable Energy" Maturity extension section added
June 30, 2022	<ul style="list-style-type: none"> Monthly forward start date updated from 10th calendar day to 6th calendar day
March 31, 2022	Annual Index Review 2021 <ul style="list-style-type: none"> Introduction of new market sector classification "Education" with market sub-sector classification "Academic & Educational Services"
Dec. 31, 2021	<ul style="list-style-type: none"> Mentions of iBoxx € Liquid Non-Financials Economic Sector indices have been removed. The indices had been discontinued effective December 2020
Sep. 1, 2021	<ul style="list-style-type: none"> Monthly forward start date updated from 12th calendar day to 10th calendar day
March 31, 2021	<ul style="list-style-type: none"> Governance and Regulatory Compliance section added
July 31, 2020	Annual Index Review 2019 <ul style="list-style-type: none"> Introduction of updated corporate classification schema Implementation of updated Bank Tier Classification Updates as part of the changes in definition and treatment of hybrid bonds
Jan. 31, 2020	Annual Index Review 2019 <ul style="list-style-type: none"> Definition update of 'Other Sub-Sovereigns' classification Addition of German structural covered bonds as eligible bond type under 'Covered bonds' Inclusion of zero coupon bonds into EUR Liquid indices
Sep. 30, 2018	Annual Index Review 2018 <ul style="list-style-type: none"> Treatment of bond rating upgrades on t-2 Clarification on bond eligibility during tender Clarification of treatment of called bonds

July 31, 2017	Annual Index Review 2017 <ul style="list-style-type: none"> • Inclusion of Senior Callable Bank bonds • Classification of Insurance Tier 3 notes
Nov. 30, 2016	Annual Index Review 2016 <ul style="list-style-type: none"> • Update of seniority levels for iBoxx indices
Nov. 30, 2016	Annual Index Review 2015 <ul style="list-style-type: none"> • Eligibility of subordinated financial debt with a contingent conversion feature at the point of non-viability
May 1, 2015	Annual Index Review 2014 <ul style="list-style-type: none"> • Change to iBoxx tier classification of subordinated debt issued by insurance entities
Dec. 1, 2014	<ul style="list-style-type: none"> • iBoxx EUR index family starts following the pricing methodology described in 'Markit iBoxx Pricing Rules' • Index restatement and complaints sections added • Additional clarifications on bond eligibility, classification and corporate actions
Feb. 28, 2014	<ul style="list-style-type: none"> • Rule change for the minimum lot size of the bonds eligible for the iBoxx € Liquid Non-Sovereigns Indices, linked with an additional ranking criterion
Aug. 31, 2012	<ul style="list-style-type: none"> • The maximum age rule change for the iBoxx € Liquid Corporates Indices
Dec. 20, 2011	<ul style="list-style-type: none"> • Introduction of iBoxx € Liquid Germany Sovereigns & Sub- Sovereigns Liquid Index
May 18, 2009	<ul style="list-style-type: none"> • Change to the treatment of bonds under tender in the iBoxx € Liquid Indices
Dec. 1, 2008	<ul style="list-style-type: none"> • Introduction of additional rules for iBoxx € Liquid Corporates Indices
Feb. 1, 2006	<ul style="list-style-type: none"> • Introduction of iBoxx € Liquid Sovereigns Extra Short Index • Introduction iBoxx € Liquid Sovereigns Global Index
Dec. 1, 2005	<ul style="list-style-type: none"> • Change in the upper limit for minimum lot size • Change in the amount outstanding cut-off for Corporate bonds
July 1, 2005	<ul style="list-style-type: none"> • Implementation of Annual Index Review 2005 • Introduction of gross price and income index analytics • Exclusion of retail bonds
March 1, 2005	<ul style="list-style-type: none"> • Clarification of exclusion of callable hybrid bank/insurance debt in chapter 2.1.
Jan. 1, 2004	<ul style="list-style-type: none"> • Calculation of iBoxx Benchmark spreads
Dec. 1, 2003	<ul style="list-style-type: none"> • Modification of iBoxx rebalancing procedure
Oct. 1, 2003	<ul style="list-style-type: none"> • Expansion of iBoxx EUR Liquid key data for cash payment • Revision of the calculation method of portfolio analytics
Sep. 1, 2003	<ul style="list-style-type: none"> • Separate Publication of iBoxx index ISINs
May 6, 2003	<ul style="list-style-type: none"> • Clarification about inclusion of new bonds in the index in chapter 2.1. • Correction of coupon income index calculation formula
Oct. 23, 2002	<ul style="list-style-type: none"> • Introduction of Markit iBoxx EUR Liquid indices for Sovereigns, Sub-Sovereigns and Corporates

Further Information

Client support

For client support please contact index_services@spglobal.com.

Formal complaints

Formal complaints should be emailed to spdji_compliance@spglobal.com.

Please note: spdji_compliance@spglobal.com should only be used to log formal complaints.

General index inquiries

For general index inquiries, please contact index_services@spglobal.com.

ESG Disclosures

EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY ¹		
1	Name of the benchmark administrator.	S&P Dow Jones Indices Limited
2	Underlying asset class of the ESG benchmark.²	N/A
3	Name of the S&P Dow Jones Indices benchmark or family of benchmarks.	iBoxx Benchmark Statement
4	Do any of the indices maintained by this methodology take into account ESG factors?	No
Appendix latest update:		May 2023
Appendix first publication:		May 2023

1. The information contained in this Appendix is intended to meet the requirements of the European Union Commission Delegated Regulation (EU) 2020/1817 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the minimum content of the explanation of how environmental, social and governance factors are reflected in the benchmark methodology and the retained EU law in the UK (The Benchmarks (amendment and Transitional Provision) (EU Exit) Regulations 2019).

2. The 'underlying assets' are defined in European Union Commission Delegated Regulation (EU) 2020/1816 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the explanation in the benchmark statement of how environmental, social and governance factors are reflected in each benchmark provided and published.

Disclaimer

Performance Disclosure/Back-Tested Data

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

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

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

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

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

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