Swiss Index

Methodology Rulebook Governing Bond Indices

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SMI INDICES®

Table of Content

1 Introduction

This document is an integral part of the Swiss Index Rules. The Swiss Index Rules are outlined in a Methodology Rulebook for Equity and Real Estate Indices, Bond Indices, Strategy Indices and Swiss Reference Rates. This is the Methodology Rulebook governing Bond Indices. The initial section 'General principles' outlines the guiding principles underlying the rulebook and the application of the rules. The next section provides an overview of the definitions used in this rulebook. It is followed by a section on the calculation of indices and the outlines on the maintenance of index components, composition. The document closes with sections on correction policy, governance, external communication and trademark protection.

2 General Principles

This rulebook is based on the general principles stated below. SIX uses the principles as an orientation and guiding principles for unforeseen circumstances that are not covered by the rulebook or in case of doubt.

- **Representative:** The development of the market is represented by the index.
- **Tradable:** The index components are tradable in terms of issuer size and market.
- **Replicable:** The development of the index can be replicated in practice with a portfolio.
- **Stable:** High index continuity.
- **Rule-based:** Index changes and calculations are rule-based.
- **Projectable:** Changes in rules are applied with appropriate notification period (usually at least 2 trading days) – no retrospective rule changes.
- **Transparent:** Decisions are based on public information.

3 Definitions

3.1 Instrument Definitions

SIX offers indices which replicate the development of a weighted group of instruments. Since the underlying instruments of the indices described in this rulebook are bonds, their attributes are defined underneath:

Term	Definition
Callable Bond	Bonds that can be redeemed early are callable bonds. They can be redeemed at the issuer's discretion at a predefined call date.
Coupon Structure	Bonds which yield the same interest on a yearly basis are called fixed coupon or straight bonds. Other coupon structures may be zero coupon bonds which do not pay interest or floating rate notes where the interest varies depending on an agreed reference rate. Bonds can change from a fixed to a floating coupon structure.
Corporate Action	A corporation uses a corporate action to amend its shareholder capital. Corporate actions may be but are not limited to increase of nominal amount or the calling of a bond. Corporate actions which have an effect on index calculation parameters are considered within the index calculation process.
Instrument Currency	Each bond is issued in a specific currency.
Domicile	Each bond has a domicile. Bonds with a domicile in Switzerland and in the principality of Liechtenstein are categorized as 'Domestic' and bonds with a different domicile are categorized as 'Foreign'.
Nominal Amount	The nominal amount is the total issue size of the bond. In other words, the nominal amount is the capital raised by the issuer.
Price	Bonds are traded as a relative fraction of their face value in "percent". Due to the less liquid nature of bond markets the price of the instrument is based on the order book of SIX Swiss Exchange. Bid and ask quotes or mid-prices are used in the index calculation process. All prices are clean prices without accrued interest.
Residual Term	In this rulebook the shorter term of Time to First Call and Time to Maturity is the Residual Term of the bond.
SBI Composite Rating	SIX assigns to each bond a SBI Composite Rating from AAA to BBB which states the creditworthiness of a bond. The rating used in the indices is rule-based and taking into consideration several external ratings. The classification process of the SBI Composite Rating is further described in Appendix 1.
Sector Code	Every bond is assigned a sector code which is based on the FTSE Russel ICB Fixed Income International Classification (ICB FI). The aim of ICB FI is to have a centrally valid definition in place of how bonds are to be grouped based on the business activity of the issuer. A general overview of ICB FI can be found in Appendix 4.
Time to First Call	The Time to First Call of a bond is the time period between now and the first possible call date of the bond.
Time to Maturity	The Time to Maturity of a bond is the time period between now and the expiration date of the bond.

3.2 Bond Index Definitions

Regarding bond indices, this document is using the following definitions:

Term	Definition
Base Date	The Base Date is the date when the Base Value is set. Usually this happens at the launch of the index.
Base Value	The Base Value of an index is the value it is standardized to. It is common to set a Base Value to 100 or 1000.

Term	Definition
Cut-off Date	The data to select the index components from its universe is fixed at the cut-off date. Changes to the data that occur after the close of that trading day are only considered at the subsequent index review.
Effective Date	Ordinary and extraordinary index adjustments are considered in the index calculation from the effective date onward.
Filter	Filters are applied to the SBI index in order to create sub-indices. The available filters are ‘Classification’, ‘Issue Size’, ‘Domicile’, ‘Residual Term’ and ‘SBI Composite Rating’. For each filter predefined options are available. The filters are described in detail in section 8.
Index	An index measures the development of a defined market. The market is represented by the index components with defined characteristics and selected accordingly with the filters.
Index Component	All instruments which are part of the index are its index components forming the index composition.
Index Composition	The index composition consists of the index components. The components are selected by applying the selection rules of the index.
Index Standardization	The index level is standardized to a base value at the base date. From this date on, the index level is constantly updated by incorporating market movements and corporate actions into the index level.
Index Type	Each index is calculated as a price, total return, yield and duration type. All types share the same index composition. Further details can be found in section 4.1.
Instrument	An instrument is issued by an issuer to raise capital. An issuer can emit different kind of instruments including equities and bonds. In this rulebook the term ‘instrument’ solely refers to issued bonds.
SBI Eligibility Criteria	The eligibility criteria are a set of conditions which a bond needs to fulfil to be selected for the SBI index. The conditions are outlined in section 7.
SBI Index Universe	The index universe is a group of instruments which share common characteristics. The index universe is the basis to select the index composition.

4 Calculation of Index Values

4.1 Laspeyres Formula

SIX measures most of its indices based on a formula which goes back to Prof. Etienne Laspeyres who was ordinarius for Political Economy at the University of Basel from 1864 to 1866. Prof. Laspeyres' invention measures the change of value in a basket of goods relative to its value at inception.

Conceptionally the index formula to calculate index levels (I) at a given point in time (t) divides a market value (M) by a divisor (D) looks as follows:

$$I_t = \frac{M_t}{D_t}$$

Legend:

I	Index value
M	Market value
D	Divisor
t	Time

The divisor is used twofold: First, it is used to standardize the index value to a meaningful size at inception of the index. It is carried forward over time from the day when the base value of the index was set. Second, it is used to outbalance external effects that lead to shifts in market value (ΔM) throughout the life of the index.

$$D_t = \frac{M_{t-1} - \Delta M_t}{I_{t-1}}$$

Legend:

ΔM	Change in market value

Those effects usually have the form of corporate actions and have a defined effective date. Therefore the divisor might be adjusted on a day to day basis and held constant within a day. The new divisor is calculated on the evening of the day before the corporate action takes effect.

4.1.1 Theoretical Adjustments of Corporate Actions

Depending on the index type a corporate action may affect the market value of an instrument which leads to an adjustment in the divisor as stated in equation in section 4.1 in terms of $M_{t-1} - \Delta M_t = M_t$. Those effects are usually predictable and must be accounted for at their effective date in the sense of a market expectation. The change of market value in the index is the sum of the changes in the index components:

$$\mathrm{\Delta M_t} = \sum_{\mathrm{i=1}}^{\mathrm{n}} \mathrm{\Delta M_{i,t}}$$

To comply with the market expectation, different adjustments are applied for ΔM_i. More details on and examples of corporate actions are explained in section 4.1.4.

4.1.2 Price Return Index

The bond price index formula measures the price development of the bonds in its index basket. To calculate a bond index a weight factor is valued with a price. In this rulebook only CHF bonds are considered and therefore no currency conversion has to be taken into account:

$$I_t = \frac{M_t}{D_t} = \frac{\sum_{i=1}^{n} w_{i,t} p_{i,t}}{D_t}$$

Legend:

w	Nominal amount
p	Price

A bond (i) is weighted by its nominal amount (w). It is usually held constant within a trading day. The nominal amounts of the bonds are valued with their clean price (p) by multiplication to receive the market value.

4.1.3 Gross Return Index

Compared to the Price Return Index, the Gross Return Index is different in two aspects: The price used to calculate the market value and the reinvestment of coupons into the index, which is explained in the section below.

To calculate the market value the following formula is used:

$$M_t = \sum_{i=1}^{n} w_{i,t} \left(p_{i,t} + \tau_{i,t} C_{i,1}\right)$$

Legend:

τ	Fraction of current coupon period in %
C	Upcoming coupon in %
w	Nominal amount
p	Price

The nominal amount (w) of the bond (i) is multiplied by its clean price (p) corrected for the accrued interest for a given day. To receive the accrued interest, the upcoming coupon payment (C) is multiplied by the fraction of the current coupon period as a result of dividing the days since the most recent payment with the days within the coupon period. This calculation is based on the 30/360 days model where each month has 30 days and one year has 360 days.

4.1.4 Practical Application of Corporate Actions

There are two standard corporate actions for which the index divisor is adjusted. Those are coupon payments and the change in the nominal amount of a bond instrument.

Coupon Payments

Coupon payments are adjusted only in Gross Return Indices and always treated as gross amounts, including the withholding tax portion. The change in market value for a coupon is defined as:

$$\Delta M_i = \left(p_i + \tau_{i,t} C_{i,1} - p_i'\right) w_i$$

At the ex-date the coupon period changes to the next one. Therefore τ drops from 1 to 0 and no more accrued interest is added to the clean price for the past period because the coupon is detached from the asset. To offset this effect, the divisor is adjusted for the coupon amount assuming a reinvestment into the index.

Following this logic, the adjusted close is equal to the clean price of the bond:

$$p_i' = p_i + 0 C_{i,2}$$

Therefore the index adjustment and effect can be summarized as follows:

	Price Return Index	Gross Return Index
Index adjustment	None	$\Delta M_i = \left(p_i + \tau_{i,t} C_{i,1} - p_i'\right) w_i$
Effect on divisor	→	↘

Change in Nominal Amount

A change in market value based on a change in the nominal amount of a bond is adjusted for both, Price and Gross Return Indices. It is assumed that the increase or decrease has no effect on the market price.

$$\Delta M_i = \left(w_i - w_i'\right) p_i$$

The change in the nominal amount is adjusted on the next ordinary index review.

	Price Return Index	Gross Return Index
Index adjustment capital increase	$\Delta M_i = (w_i - w_i')p_i$	$\Delta M_i = (w_i - w_i')p_i$
Effect on divisor of capital increase	↗	↗
Effect on divisor of capital decrease	↘	↘

4.2 Specific Fixed Income Indices

4.2.1 Yield Index

The yield is used to calculate the returns of an investment into a bond based on today's market price if it was held until Maturity or First Call. On an index level the weighted average yield over all bonds in the index is considered.

For the Yield index calculation only the Yield to Worst (YTW) is considered which is the lower of Yield to Maturity (YTM) and Yield to First Call (YTC). The problem to be solved therefore can be expressed in the following equation where the current price including accrued interest is set into relation to the expected cash flows of the bond:

$$p_{i,t} + \tau_{i,t}C_{i,T=1} = \left(\sum_{T=1}^{R_{i,t}} \frac{\frac{C_{i,T}}{n}}{\left(1+\frac{YTW_i}{n}\right)^{T-\tau_{i,t}}}\right) + \frac{FV_i}{\left(1+\frac{YTW_i}{n}\right)^{R_{i,t}-\tau_{i,t}}}$$

Legend:

R	Residual Term
C	Coupon in %
n	Coupon payments per year
τ	Fraction of current coupon period in %
FV	Face value
p	Price

Subject to

R is either TTM or TTC so that YTW is minimal.

To resolve this equation to YTW, SIX uses standard approximation techniques. For bonds with more than one coupon payment per year, the YTW is annualized with the following method before considered in the index calculation:

$$YTW_{a,i,R} = \left(1+\frac{YTW_{i,R}}{n}\right)^n - 1$$

Based on the Yield to Worst and the Duration to Worst, which is introduced in the section below, the Average Yield is calculated as follows:

$$I_t = \sum_{i=1}^{n} YTW_{i,t}G_{i,t}$$

Where:

$$G_{i,t} = \frac{M_{i,t}D_{i,t}}{\sum_{i=1}^{n} M_{i,t}D_{i,t}}$$

and

$$M_{i,t} = w_{i,t}\,(p_{i,t} + \tau_{i,t}C_i)$$

Legend:

I	Yield Index value
G	Residual Term
M	Market value of the bond
D	Duration of the bond
w	Nominal amount
τ	Fraction of current coupon period in %

4.2.2 Duration Index (Macaulay Duration)

The Macaulay duration is the weighted average of the time until all cash flows are received measured in years. The Duration Index weights the durations of all bonds in the index by their market capitalization.

SIX calculates the Duration to Worst with the following expression:

$$D_{i,t} = \frac{\left(\sum_{T=1}^{R_{i,t}} \frac{(T-\tau_{i,T})\frac{C_{i,T}}{n}}{\left(1+\frac{YTW_{i,t}}{n}\right)^{T-\tau_{i,T}}}\right) + \frac{(R_{i,T}-\tau_{i,T})FV_i}{\left(1+\frac{YTW_{i,t}}{n}\right)^{R_{i,T}-\tau_{i,T}}}}{n\left(p_{i,t} + \tau_{i,t}C_{i,1}\right)}$$

Legend:

D	Duration
R	Time to Maturity or Time to first Call
YTW	Yield to Worst
C	Coupon in %
n	Coupon payments per year
FV	Face value

Based on the duration of the bonds the Average Duration on index level is calculated as follows:

$$I_t = \sum_{i=1}^{N} D_{i,t} G_{i,t}$$

Where:

$$G_{i,t} = \frac{w_{i,t}(p_{i,t} + \tau_{i,T} C_i)}{\sum_{i=1}^{n} w_{i,t}(p_{i,t} + \tau_{i,T} C_i)}$$

Legend:

G	Weight of the Bond Duration in the index
w	Nominal amount
C	Coupon in %
n	Coupon payments per year

5 Maintenance of Components

5.1 Review of Filter Attributes

One of the features of the SIX bond indices is that the broad SBI index can be sliced according to several criteria. For the selection of the bond index baskets derived from the SBI, five attributes are reviewed on a monthly basis.

The outcome of the component review is adjusted to be effective at the first trading day of every month. All necessary information for such a review is communicated to the market by the 20^{th} day of every month, based on the availability to SIX. If that day falls on a weekend or a public holiday, the cut-off date is the last working day before 20^{th}. Such communication concerns:

– Segment Classification: The classification criterion of the Segment Scheme follows the business activity and domicile of the bond issuer. Both of them are determined by using the ICB FI code of the bond. Further details can be found in Appendix 2.
– Guarantee and Collateral Classification Code: The Guarantee and Collateral Code is a five digit code and based on the warranty of the bond. Further information on the scheme can be found in Appendix 3.
– Issue Size: The Issue Size of a bond may vary due to an increase or decrease in the nominal amount listed.
– Residual Term of bonds: The Residual Term used as a filter criterion of a bond is calculated based on the effective date of the component review.
– SBI Composite Rating: If there is a change in the underlying bond rating which impacts the SBI Composite Rating, it is adjusted accordingly.

5.2 Priority of Prices Used in Reference Values

As bond markets tend to be less liquid compared to the markets of other asset classes, the indices either consider the bid or mid-prices of the bonds. Only prices received via the electronic order book of SIX are used.

In the case of a new bond issue, the binding ask price is used for the inclusion of the bond to the index. If there is no ask price of the bond available, the bid price of the bond is used and if there is no bid price of the bond available, the par value of the bond is used. The bid and ask price are both clean prices which do not take into account the accrued interest of the bond. Therefore, the accrued interest is added on top for the calculation of the index values.

Bid Price Indices

For the index calculation binding bid prices are used. If no bid price is available on the day of the calculation, the last available bid price is used.

Mid-Price Indices

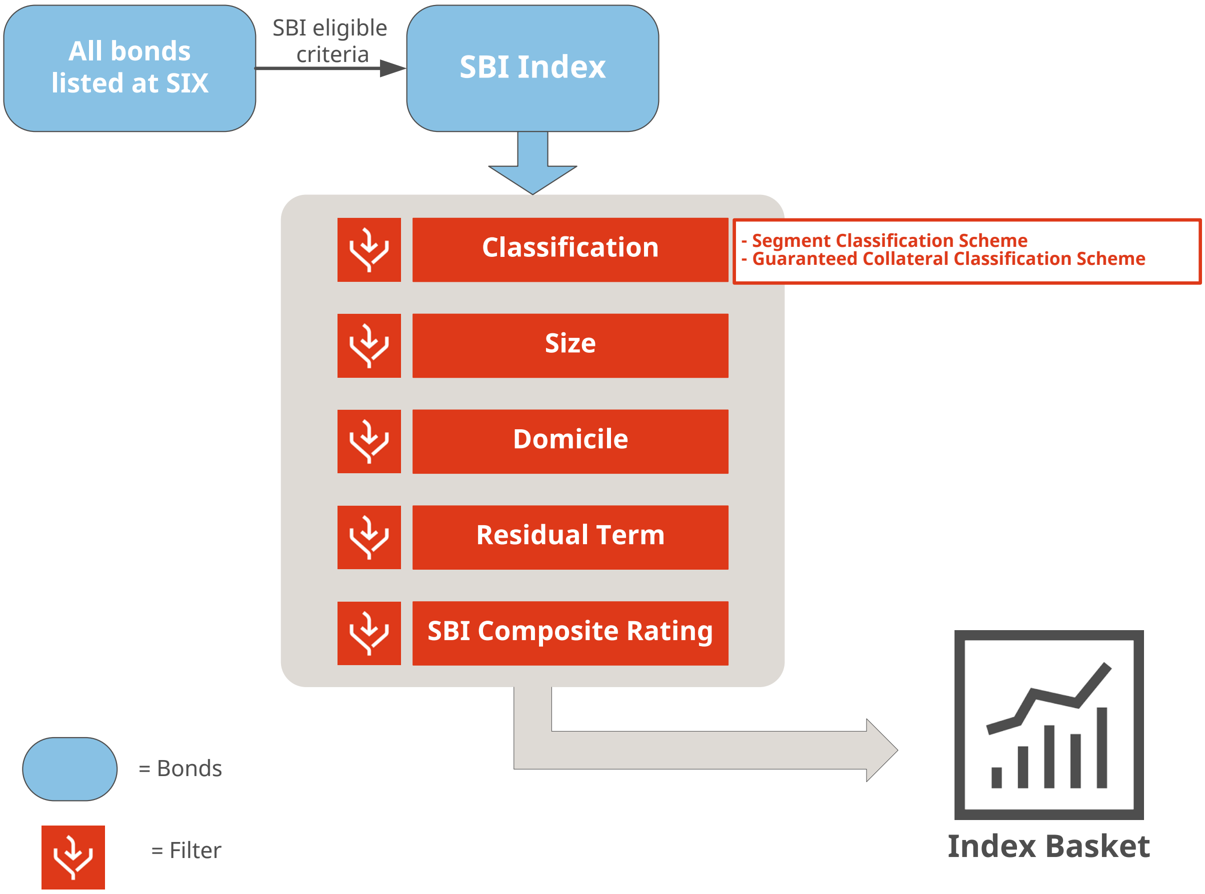
The mid-price is the arithmetic mean of bid and ask price. Only bid and ask prices of the current trading day are used. If there is no mid-price available, the last mid-price of the trading day before is used which is a closing-inside-market price calculated after the close of trading on the previous trading day.

A new mid-price is only calculated if the spread between the bid and ask price is smaller than 600 basis points and if the ask price is bigger than the bid price.

6 Maintenance of Index Composition

6.1 Index Dependencies

The SIX bond index family is derived from the SBI. The SBI is selected from all bonds listed at SIX with the eligibility criteria. Once the SBI is selected, a set of filters on bond attributes is applied to select specific subsets of bonds to gain exposure to defined characteristics. The following graph gives an overview of filters which are available today:



6.2 Ordinary Index Review

Changes due to the component review described in Section 5 have automatic effects on the indices based on the filters described above. As component attribute changes take effect on the first trading day of the month, so do the Index changes for indices based on the filters. This also includes bonds which are newly added to SBI.

7 SBI Index

7.1 Overview

The bond indices offered by SIX reflect the development of the CHF bond market. By providing information on domestic interest rates, they supply valuable information on the Swiss capital market. SBI is the broadest of all SIX bond indices and all other SIX bond indices are currently derived from the SBI.

7.2 Index Composition

The universe from which the SBI index components are selected is represented by all bonds listed at SIX. Based on this universe, a bond needs to fulfill all of the following eligibility criteria to be selected as a component of the SBI:

- Listing: Only a bond which is listed at SIX can be a component of an index.
- Currency: The bond needs to be listed in CHF to be eligible for an index.
- Nominal amount: A bond must have a total nominal amount of at least CHF 100 million to be included into the SBI.
- Coupon Structure: Generally bonds with a fixed coupon structure and without additional clauses can be part of the SBI index universe. Additionally callable bonds, subordinated bonds, step-up bonds and zero coupon bonds can be part as well.
- Residual Term: Each bond in the SBI index universe must have a remaining Residual Term of at least one year. Callable bonds are not eligible for any index composition after their first call date even if they are not called.
- SBI Composite Rating: A bond must have the necessary underlying ratings to allow SIX to assign a Composite Rating. To be eligible for the SBI selection a minimum rating of at least BBB is required. If the underlying bond rating is worse than the minimum SBI Composite Rating of BBB no SBI Composite Rating is assigned to the bond.

Nominal Amount, Residual Term and SBI Composite Rating are reviewed on a monthly basis. Changes are made effective in course of the Maintenance of Index Composition described in section 6. Also additions are included according to the schedule mentioned in that section.

8 Derived Indices from SBI Using Filters

8.1 Overview

SIX provides a range of five filters on bond attributes that can be applied independently from each other on the SBI to select sub-indices. Those sub-indices enable the measurement of markets with a focus on very specific characteristics. An overview of available filter combinations can be found in Appendix 5.

The five filters available are: ‘Classification’, ‘Issue size’, ‘Domicile’, ‘Residual Term’ and ‘SBI Composite Rating’. Accordingly the SBI can be refined for any combination of filters. If a filter is not applied all the filter options are considered for the component selection.

8.2 Classification

SIX uses two schemes with different classification criteria to classify the bonds of the SBI universe. Those schemes are applied exclusively in the sense that only one of the schemes is combined with the other filters at a time.

8.2.1 Segment Scheme

The classification criterion of the Segment Scheme follows the business activity and domicile of the bond issuer. Both of them are determined by using the ICB FI code of the bond. Further details can be found in Appendix 2.

8.2.2 Guarantee and Collateral Scheme

The Guarantee and Collateral Code is a five digit code and based on the warranty of the bond. Further information on the scheme can be found in Appendix 3

8.3 Issue Size

In addition to the minimum nominal amount defined to be eligible for the SBI, more stringent figures may be applied. Currently, there are indices in place where a bond needs to have a size of CHF 400 Million to be included into the respective basket. Should the nominal amount of a bond change and move above/below the respective threshold, it will be reassigned accordingly at the next ordinary index review.

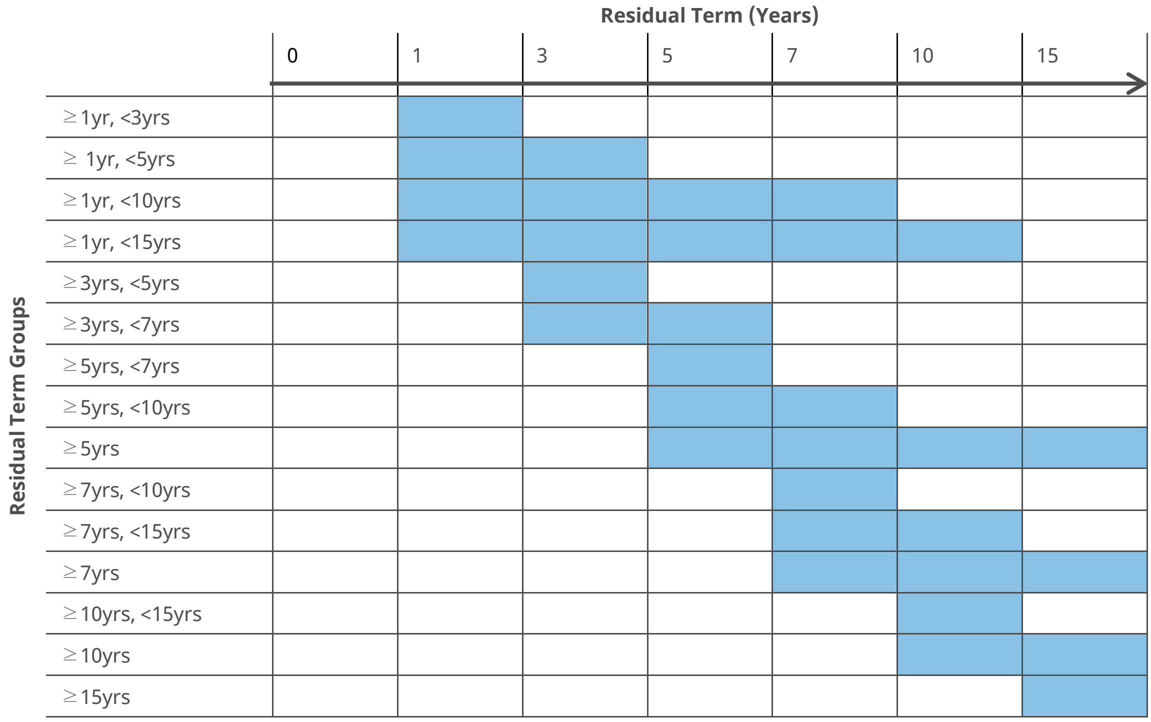
8.4 Domicile

The bond indices are divided by domicile into the following two groups:

- Domestic: All Swiss and Liechtenstein domiciled bonds.
- Foreign: All bonds domiciled outside of Switzerland and Liechtenstein.

8.5 Residual Term

There are indices available for the following groups of Residual Terms:



If an index does not have a defined Residual Term, all Residual Terms are considered.

8.6 SBI Composite Rating

The SBI can be filtered according to the SBI Composite Rating of its components. Those ratings are combined into groups, e.g. AAA-BBB or AAA-A. For a complete list, please consult the Vendor Code Sheet which is published under 'Current list of all indices calculated by SIX' on the SIX Website. Details on the assignment of ratings can be found in Appendix 1.

9 Correction Policy

An index-related correction is made if necessary data is or has not been available or it has been wrong.

9.1 Unavailable Data

If data to determine the price or weight of an index component is not available to SIX due to trade suspensions or market distortions, the latest available data is used. These changes may be related to review schedules, ordinary reviews and component and weighting changes outside of ordinary index reviews and are publicly announced with a notification period of at least 2 trading days.

Information which is not known to SIX at the cut-off date may lead to an update of the bond index forecast. Such information is considered under a notice period of at least 3 trading days before the effective date of the index review.

9.2 Wrong Data

Data errors caused by calculation errors or by incorrect inbound data.

Calculation errors which are detected within a trading day are immediately corrected. Intraday tick data is not corrected retrospectively. Calculation errors that are older than a trading day and incorrect inbound data are only corrected if technically possible and economically viable. If the correction leads to a significant difference in the index levels, those can be corrected retrospectively.

10 Governance

The indices are internally managed by the index team which ensures that the rules of the indices are applied and the indices fulfil the required quality standards. The index team develops new indices and proposes rule changes or the discontinuations of indices.

Elaborated suggestions are presented to the Management Committee of SIX Financial Information for a definite decision. The Management Committee regularly meets in order to decide on pending index-related requests and bears the responsibility for such decisions.

For index-related requests, the Management Committee of SIX Financial Information is supported by the Index Commission (advisory board). The Index Commission convenes at least twice a year to advise on the development of existing and the creation of new products. More information to the Index Commission, its structure and members can be found on the SIX website[1].

Changes to index rules are publicly announced with a notification period of usually 3 months. The launch of new indices and the discontinuation of existing index products are publicly announced with sufficient lead time. If SIX is aware of existing financial products linked to an index to be discontinued, a market consultation is carried out. Depending on the outcome, a transition period may be considered to enable a transfer to another index.

Based on the general principles outlined in section 2, SIX reserves the right to adjust component weightings, component attributes, index compositions or notification periods.

[1] www.six-group.com/exchanges > Participants > Participation > Commissions > Index and Bond Index Commission
www.six-group.com/exchanges > Market Data > Indices > Index Regulation > Index Governance overview

11 External Communication

SIX uses the following tools to inform the market about index changes. Index changes are changes in index compositions, component weightings as well as ordinary and extraordinary index adjustments.

Reports

The index team creates and maintains reports containing index compositions, component weightings, corporate action forecasts and other index-relevant information. SIX publishes the reports on its website. The majority of the reports is only made available to license holders, however. Since the information of some reports is index-specific, the number of reports which are relevant for an index varies from index to index. Depending on the recency of their information, the reports are updated with different frequencies ranging from daily to annual.

Vendor Code Sheet

Information on the actual ticker symbols, index standardizations, launch dates and calculation parameters of the indices can be found in the Vendor Code Sheet which is published under 'Current list of all indices calculated by SIX Swiss Exchange' on the website of SIX.

Newsletter Email Service

SIX provides the Index Service Bond to inform in depth on bond indices including historical index values, corporate actions, and information regarding the index composition. Interested parties may subscribe to the newsletter email service on the website[2]. SIX distributes all notifications regarding indices over this channel. This may include but is not limited to

- Changes in corporate actions
- Updates to the periodic index reviews
- Problems and error in the index calculation
- The launch or discontinuation of indices
- Market consultations
- Issuer surveys

Index Messages

The messages from the newsletter email service with regards to index adjustments are uploaded on the SIX website[3]. Those index messages are publicly available and do neither need a subscription nor a licensing agreement.

Media Release

If an index message is of broad public interest, SIX can decide to publish a media release to inform the public about the index adjustment. Furthermore, media releases can be made for marketing purposes which do not refer to index adjustments.

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[2] www.six-group.com/indices > Market Data > Indices > Request account

[3] www.six-group.com/indices > Market Data > Indices > Newsletter

12 Trademark Protection, Use of Licensing

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[4] www.six-group.com/indices > Market Data > Indices > Licensing

13 Contact

Any requests with respect to the indices may be directed to one of the following addresses:

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Index Operations
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indexsupport@six-group.com

Appendix 1 SBI Composite Rating

A1.1: Sources for the SBI Composite Rating

To assess its creditworthiness, each bond is assigned a SBI Composite Rating. The rating is published by SIX as part of the index data. Bonds can be assigned a SBI Composite Rating of either AAA, AA, A or BBB.

The following table describes the mapping of external rating scales to the SBI Composite Rating scale:

Spectrum of Considered Ratings		Corresponding SBI Composite Rating
High	**Low**	
Aaa / AAA	Aaa / AAA	AAA
Aa1 / AA+	Aa3 / AA-	AA
A1 / A+	A3 / A-	A
Baa1 / BBB+	Baa3 / BBB-	BBB

A1.2: Determination of the SBI Composite Rating

To calculate the SBI Composite Rating, a two-step approach is in place. As a first priority to determine the SBI Composite Rating, the issue and issuer ratings of Moody's, Fitch and Standard & Poor's (S&P) are used. If a bond is not rated by any of the three rating agencies, as a second priority the ratings of the Swiss rating agency Fedafin and the Swiss banks Credit Suisse, UBS, Bank Vontobel and Zürcher Kantonalbank are used. In the second priority case the SBI Composite Rating is only determined if a bond is rated by at least two of the named Swiss institutions.

To determine the SBI Composite Rating the following 'conservative median' approach is applied: With two available ratings, the worst rating is used as SBI Composite Rating. With three or five available ratings, the median is used and with four available ratings the next lower rating below the median is selected.

From the available sources described above, the ratings can be used in the determination process as described according to the following procedures:

- If a bond is not rated on its own, the rating of **its issuer or guarantor** (incl. joint guarantees) is used. If there is a rating for both, the **guarantor** and the **issuer**, the rating of the **guarantor** is used.
- If a bond is **secured or subordinated**, only bond ratings are used, leaving a potential issuer or guarantor rating aside.
- If a bond is classified as government-related, the issuer rating or, in the case of guaranteed bonds, the guarantor rating is used in addition to the bond rating as follows:

  For each rating agency, the lower of the bond rating and the issuer rating (or in the case of guaranteed bonds the guarantor rating) is determined. The resulting ratings are used to calculate the SBI composite rating in accordance with the section above.

The following table provides examples of the selection process of the SBI Composite Rating:

	Rating Providers*	1 Rating		2 Ratings	3 Ratings		4 Ratings	5 Ratings
First Priority	**Moody’s**	Baa1		A3	Aa3	Aa3		
	S&P			BBB+	A+	A+		
	Fitch				BBB	BB+		
Second Priority	**Fedafin**						A-	A-
	UBS		A+				A	A
	CS						BBB+	BBB+
	ZKB						A+	BBB
	Bank Vontobel							BBB-
	SBI composite rating	**BBB**	**-**	**BBB**	**A**	**A**	**A**	**BBB**

* Notches of rating providers are not considered for the determination of the SBI composite rating

Appendix 2 Segment Classification Scheme

The Segment Scheme classifies the bonds into the categories Government, Non-Government, Swiss Pfandbrief and Corporate. Together with information from ICB Fixed Income and the domicile of a bond the specific indices are constructed. There are bond indices for the following classifications:

Index name	Classification	Domicile	ICB FI Classification
SBI	All	All	All
SBI Domestic Swiss Government	Government	Domestic (CH/LI)	Sector 15100 Nation/Treasury
SBI Domestic Non-Government	Non-Government	Domestic (CH/LI)	All exclusive Sector 15100 Nation/Treasury
SBI Domestic Swiss Pfandbrief	Swiss Pfandbrief	Domestic (CH/LI)	Subsector 8779 Mortgage Finance
SBI Foreign Government	Government	Foreign (All excl. CH/LI)	Sector 15000 Government & Sector 16000 Agency/Semi-Government
SBI Foreign Corporate	Corporate	Foreign (All excl. CH/LI)	All Sectors <10000
SBI Foreign Supranational	Supranational	Foreign (All excl. CH/LI)	Sector 17000 Intergovernmental Organization

The allocation of a state-guaranteed bond to the appropriate sector is made according to the borrower's field of activity, regardless of the guarantee.

Appendix 3 Guarantee and Collateral Scheme

The Guarantee and Collateral Scheme is based on the warranty of the bond. A three level, five digit code is assigned to characterize the bonds. The following table provides an overview of the available combinations of Guarantee and Collateral Codes:

Level 1	Level 2	Level 3

– Government related (**5xxxx**)	– Treasury (**51xxx**)
	– Sovereign (**53xxx**)
	– Supranational (**55xxx**)
	– Agency (**57xxx**)
	  – Agency ex guaranteed
	  – Agency guaranteed
	– Local Authority (Regional & Cities) (**59xxx**)
	  – Local Authority (Regional & Cities) ex guaranteed
	  – Local Authority (Regional & Cities) guaranteed
		– Senior (xx100)
		– Subordinated (xx200)

– Securitized / Collateralized (**6xxxx**)	– Covered bonds backed by Public Sector Loans (**61xxx**) – Covered bonds backed by Private Mortgages (**62xxx**) – Covered bonds backed by Mixed Assets (**63xxx**) – Asset backed (**64xxx**) – GICs / Funding Agreement (**65xxx**)	

Level 1	Level 2	Level 3

– Unsecured/Corporate (7xxxx)	All (**71xxx**)
	– Industrials
	– Utilities
	– Financials
	  – Banks
	  – Insurance
	  – Financial Services	

A3.1: Determination of the Level 1 Code

On the first level, a differentiation between government-related bonds, secured/collateralized bonds and unsecured bonds is made and each bond is assigned the first digit of the warranty code.

Government-Related (5xxxx)

Government-related bonds are issued by a governmental, semi-governmental or supranational borrower or are given an explicit state guarantee by a guarantor.

The issuer and guarantor are considered government-related if their ICB FI code is higher than 10000. If the guarantor does not have an ICB FI code, the bond is assigned according to the ICB FI code of the issuer.

Secured/Collateralized (6xxxx)

The interest and nominal amount of secured/collateralized bonds are covered by an asset collateralization pool. A bond is deemed to be guaranteed or the entity is deemed to be a guarantor if the payment of both the interest and principal are guaranteed in full and for the whole period of the bond maturity.

Unsecured (7xxxx)

A bond is categorized as unsecured if it is neither issued by a government-related issuer, nor is it guaranteed by a guarantor or an asset collateralization pool. Therefore, the ICB FI code of the bond issuer is smaller or equal 10000.

A3.2: Determination of the Level 2 Code

On level 2 the selection of level 1 is further refined and the bond is assigned the second digit of the warranty code.

Government-Related (5xxxx)

Bonds which are assigned to the classification 'government-related' on level 1 are categorized based on their guarantor or issuer according to the table below:

Guarantee and Collateral Scheme Allocation	CB FI Code	Description of Guarantor or Issuer
Treasury (**51xxx**)	**15100**	Country's own issues in local currency.
Sovereign (**53xxx**)	**15100**	Country's own issues not in local currency.
Supranational (**55xxx**)	**17000**	Multilateral or supranational government organizations or organizations sanctioned by the UN.
Agency (**57xxx**) ex guaranteed	**16000**	An officially listed government agency (not a state sponsored entity). If there is no public enterprise that performs the same function or if the entity supports the economic or social well-being of the country or region as a whole, the entity is a genuine agency, classification as an agency is considered definitive.
Agency (**57xxx**) guaranteed	**< 10000**	Bonds with explicit state guarantee (state sovereignty).

Local Authority (Regional & Cities) (**59xxx**) ex guaranteed	**15300**	Canton, region, province, federal state
	15500	County/Parish
	15700	City, local government, municipality
Local Authority (Regional & Cities) (**59xxx**) guaranteed	**< 10000**	Bonds with explicit state guarantee (local authority sovereignty).

Secured/Collateralized (6xxxx)

On level 2 within the classification 'Secured/Collateralized' a distinction between Covered Bonds, Asset backed Securities and GICs/Funding Agreements is to be made based on which collateral the bond is covered with:

Covered Bonds (61xxx-63xxx)

Covered bonds backed by Public Sector Loans (**61xxx**)	Covered by public sector collateral.
Covered Bonds backed by Private Sector Mortgages (**62xxx**)	Covered by mortgages for real estate (commercial and/or residential). The distinction between 'Public Sector Loans' and 'Private Sector Mortgages' relates to the cover pool of the relevant bond certificate type and not to the issuer groups 'private mortgage banks' or 'public law banks'.
Covered Bonds backed by Mixed Assets (**63xxx**)	Covered by a combination of loans to the public sector, mortgages and ship or aircraft loans.

Asset Backed (64xxx)

Bonds relating to payment claims against a special purpose vehicle. The special purpose vehicle uses the funds exclusively to acquire claims, mostly of several creditors, and evidences them in the form of a security. The payment claims are covered by the portfolio of claims transferred to a special purpose vehicle. These claims include automobile loans and credit card and leasing claims.

GICs/Funding Agreement (65xxx)

Secured bond issues of US life insurers. In the CHF bond market they are called funding agreements or guaranteed investment contracts. These bonds have a better credit rating compared to ordinary bonds issued by the same company. The reason for this is that in case of bankruptcy, secured bonds have a similar rank as life insurance policies which is normally higher than the ranking of an ordinary bond. The rating assessment also depends on the funding agreement of the federal state where the respective life insurer is based.

Unsecured/Corporate (7xxxx)

Based on the business activity of the issuer which is derived from the sector code, unsecured bonds can be sub-divided into the categories 'Industrials', 'Utilities' and 'Financials'. The bonds of the sub-group 'Financials' can be further split up in 'Banks', 'Insurance' and 'Financial Services'. Independent of their sub-allocation, all unsecured/corporate bonds are given the same warranty code 71xxx since they are not covered by an explicit state guarantee or by an asset collateralization pool.

A3.3: Determination of the Level 3 Code

Being independent from the assignment of level 1 and 2, level 3 indicates the order in which creditors are served in case of bankruptcy of the issuer. On this level, each bond is given the last three digits of the warranty code. On level 3 a bond can either be categorized as a senior bond (xx100) or a subordinated bond (xx200). Senior bonds are considered before subordinated bonds if the issuer goes bankrupt and therefore their holder is more likely to get his or her investment or a part of it back.

Appendix 4 ICB Fixed Income Table

The following table gives an overview of the available sector codes on the ICB Fixed Income industry classification standard. The standard is used in the determination of the Segmentation Classification Scheme explained in Appendix 2.

Industry		Supersector	
0500	Oil & Gas	0500	Oil & Gas
1000	Basic Materials	1300	Chemicals
		1700	Basic Resources
2000	Industrials	2300	Construction & Materials
		2700	Industrial Goods & Services
3000	Consumer Goods	3300	Automobiles & Parts
		3500	Food & Beverages
		3700	Personal & Household Goods
4000	Health Care	4500	Health Care
5000	Consumer Services	5300	Retails
		5500	Media
		5700	Travel & Leisure
6000	Telecommunications	6500	Telecommunications
7000	Utilities	7500	Utilities
8000	Financials	8300	Banks
		8500	Insurance
		8700	Financial Services
9000	Technology	9500	Technology
10000	Special Purpose Vehicles	10100	Special Purpose Vehicles
15000	Government	15100	Nation/Treasury
		15300	Canton/Region/Provinces/State
		15500	County/Parish
		15700	City/Municipality/Town
16000	Agency / Semi-Government	16100	Agency/Semi-Government
17000	Intergovernmental Organization	17100	UN Organization
		17200	Supranational Organization

This table shows the various sectors in the ICB FI classification at 'Industry' and 'Supersector' level. The table does not include the 'Sector' and 'Subsector' levels. Therefore, the table is of broader granularity.

Appendix 5 Overview of the Offering

A5.1: Indices Calculated under the Segment Classification Scheme

		Domicile								
		All	**SBI Domestic**				**SBI Foreign**			
		Overall	Overall	Swiss Govern-ment	Non-Govern-ment	Swiss Pfand-brief	Overall	Govern-ment	Corporate	Supra-national
SBI Composite Rating, Residual Term	**AAA-BBB**	•●	●	●	●	●	●	●	●	●
	1-3;3-5;5-7;5-10;10;1-5; 5-10; 1-10;10-15;1-15;>15	●	●	●	●	●	●			
	3-7;7	●		●						
	AAA	●	●				●			
	1-3;3-5;5-7;7-10;>10;>15	●								
	AA	●	●				●			
	1-3;3-5;5-7;7-10;>10;>15	●								
	A	●	●				●			
	1-3;3-5;5-7;7-10;>10	●								
	BBB	●	●				●			
	AAA-A	●	●		●		●	●	●	●
	1-3;3-5;5-7;5-10;10;1-5;5-10; 1-10;10-15;1-15;>15	●	●		●		●			
	3-7;7	●								
	AAA-AA	●	●		●		●	●	●	●
	1-3;3-5;5-7;7-10;10;1-5;5-10; 10-15;1-10;1-15;>15	●	●		●		●			
	AA-BBB	●	●				●			
	AA-A	●	●				●			
	A-BBB	●	●				●			

A5.2: Indices Calculated under the Guarantee and Collateral Scheme

<table>
<tr><th></th><th></th><th colspan="3">Domicile</th></tr>
<tr><th>Level 1</th><th>Level 2</th><th>All</th><th>Domestic</th><th>Foreign</th></tr>
<tr><td rowspan="5">Government related (5xxxx)</td><td>Treasury (51xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td>Sovereign (53xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td>Supranational (55xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td>Agency (57xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td>Local Authority (59xxx)</td><td>●</td><td>●</td><td>●</td></tr>
<tr><td rowspan="5">Securitized/ Collateralized (6xxxx)</td><td>Covered Bonds backed by Public Sector Loans (61xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td>Covered Bonds backed by Private Sector Mortgages (62xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td>Covered Bonds backed by Mixed Assets (63xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td>Asset Backed Securities (64xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td>GICs/Funding Agreement (65xxx)</td><td>●</td><td></td><td></td></tr>
<tr><td rowspan="6">Unsecured/ Corporate (71xxx)</td><td>Industrials</td><td>●</td><td>●</td><td>●</td></tr>
<tr><td>Utilities</td><td>●</td><td>●</td><td>●</td></tr>
<tr><td>Financials</td><td>●</td><td>●</td><td>●</td></tr>
<tr><td>Banks</td><td>●</td><td>●</td><td>●</td></tr>
<tr><td>Insurance</td><td>●</td><td></td><td></td></tr>
<tr><td>Financial Services</td><td>●</td><td></td><td></td></tr>
<tr><td rowspan="2"></td><td>Senior (711xx)</td><td>●</td><td></td><td></td></tr>
<tr><td>Subordinated (712xx)</td><td>●</td><td></td><td></td></tr>
</table>

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