
NOVEMBER 2023

FTSE iEDGE SINGAPORE FIXED INCOME INDICES

METHODOLOGY



**FTSE
RUSSELL**
An LSEG Business



CONTENTS

About this document	3
Intended readership.....	3
Purpose and basic principles	3
Index types.....	3
Overview of SFI Bond Index family.....	3
Available Data Types.....	4
General selection criteria.....	4
Selection times	4
Calculation times	4
Calculation price basis.....	4
Clean Price Index (CI):	6
Gross Price Index (PI):	6
Total Return Index (RI):	7
Interest Paid this Year (XD):.....	7
Average Coupon (CO):.....	7
Average Life (L):	7
Average Duration (DU):	8
Average Convexity (CX):	8
Average Redemption Yield (RY):.....	8
Average Redemption Yield – Annualised (RA).....	8
Average Current Yield (IY):.....	8
Market Value (MV).....	8

About this document

Intended readership

This document supports data use by FTSE Russell an LSEG business Indices client. Clients receive the data as part of their desktop license or may be licensed to use Indices from LSEG in a separate licensing agreement.

Background

The FTSE iEDGE Singapore Bond Indices (SFI) are calculated by LSEG Datastream. Datastream has been calculating domestic government bond indices since 1985, based on the formulation recommended by EFFAS (European Federation of Financial Analysts Societies).

FTSE Russell an LSEG business aims to offer as transparent and flexible a set of bond indices as possible. To this end, each index contains only those bonds that follow the rules agreed by the subcommittee and all indices have been rigorously back tested. All indices in the SFI series are calculated from January 2009.

Purpose and basic principles

The main purposes of bond indices are to act as a benchmark for portfolio management, an indicator of market performance and development, and a basis of comparison for different markets.

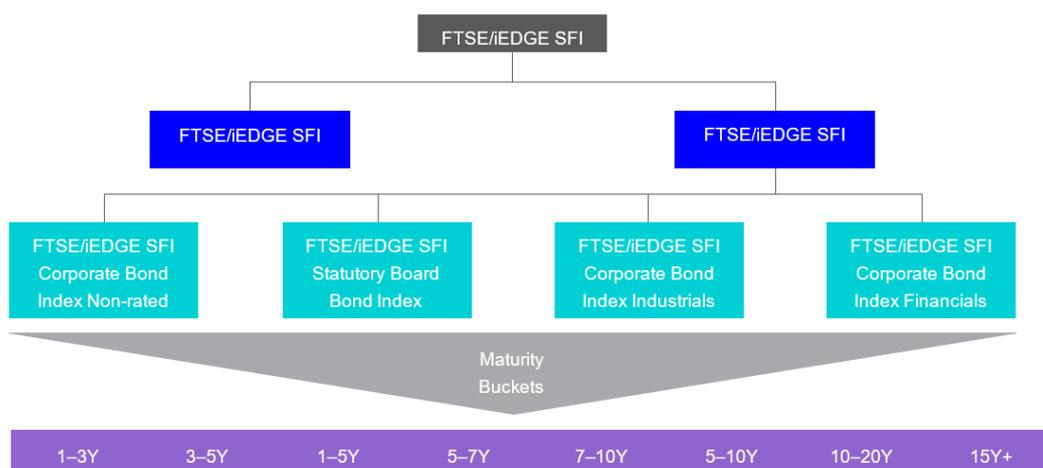
Bond index calculations should abide by several basic principles. They must reflect the experience of the average holder in the sector; have objective criteria for underlying selection and finally publish all calculations and selection criteria.

The SFI bond index suite is derived on the basis of an all traded index methodology. The indices include all traded issues and are primarily aimed at long term investors whose portfolios tend to encompass both liquid and illiquid bonds.

Index types

Overview of SFI Bond Index family

The FTSE iEDGE Singapore Fixed Income Index family covers over 80% of the Singapore Dollar denominated plain vanilla bullet bond market. The flagship FTSE/iEDGE SFI composite index is divided into sub-indices as indicated in the below diagram. Please note that the non-rated sub-indices only have indices for 1–5Y, 5–10Y and 10Y+ maturities.



Available Data Types

DATA TYPE DESCRIPTION	DATA TYPE
Total Return Index	RI
Gross Price Index	PI
Clean Price Index	CI
Average Redemption Yield	RY
Redemption Yield Annualized	RA
Average Coupon	CO
Average Life	L
Average Duration	DU
Average Convexity	CX
Interest Paid This Year	XD
Market Value	MV
Average Current Yield	IY

General selection criteria

	REQUIREMENT
Currency of Denomination	Singapore Dollar
Market of Issue	Singapore
Remaining Term-to-Maturity	Greater or equal to 1 year and less than 50 years
Coupon Type	Bullet Bonds including callable bonds
Minimum Amount Outstanding	None
Excluded	Floating Rate Notes
	Convertibles
	CMBS/MBS/ABS
	Hybrid Bonds
	Variable Rate Bonds
Band	Criteria
1–3 Years	Bonds between 1 – 2.999 years
1–5 Years	Bonds between 1 – 4.999 years
3–5 Years	Bonds between 3 – 4.999 years
5–7 Years	Bonds between 5 – 6.999 years
5–10 Years	Bonds between 5 – 9.999 years
7–10 Years	Bonds between 7 – 9.999 years
10+ Years	Bonds equal and greater than 10 years
10–20 Years	Bonds between 10 – 19.999 years
15+ Years	Bonds equal and greater than 15 years

Selection times

Index lists are selected on the 1st working day of each month using values and details as of the last working day of the previous month.

Calculation times

Index data is calculated at approx. 10am Singapore time (2am GMT) for the previous days bond prices.

Calculation price basis

Current, historical and ongoing prices of the FTSE/iEDGE Singapore Fixed Income Indices rely on LSEG Pricing Service which is described in detail below.

Bond Pricing Overview

Each issue is individually priced by incorporating the following information, techniques, and resources:

- Terms and conditions in LSEG corporate bond database
- LSEG Evaluation staff
- Market color gathered from broker / dealer sources and contributed pricing
- LSEG Proprietary Bond Model
- Market news from LSEG
- Quality control checks

Terms and Conditions

Security terms and conditions are collected and maintained by LSEG full time data staff. Coverage includes:

- Credit ratings of issuers
 - Amount issued/outstanding
 - Deal underwriters
 - Call/put schedules
 - Coupon, maturity, and all significant reference data
- New issue information is gathered from official prospectuses and offering documents obtained from public document libraries and underwriter solicitation. All data must pass multiple quality checks to ensure consistency and accuracy.

Evaluation Staff

The dedicated evaluators are reviewing Singapore government/ corporate bonds on daily basis. Each evaluator is responsible for gathering quotes, as well as maintaining current terms and conditions. LSEG Pricing Service has seven offices world- wide: Singapore, Sydney, Tokyo, Bangalore, Gdynia, London and New York.

Market Color and Pricing Model

LSEG has a wide network of real time contributors of SG Treasury prices. These contributors include over 10 secondary dealers and inter-dealer brokers. LSEG Evaluation staff updates SG Treasury prices throughout the day. The model incorporates real time on-the-run updates and dealer contributions. Evaluators compare the output with multiple price sources.

Most Singapore corporate issues are priced by dealer quote. LSEG receives market quotes from a number of dealers. Evaluators call street contacts for up-to-date quotes as needed. Evaluators examine all available quotes and choose the most accurate based upon parameters, such as underwriter status and historical reliability. Issues not quoted by the broker/dealer community are evaluated using theoretical assumptions based upon observable market data.

Market News

Thomson Reuters Editorial staff covers all financial markets globally. They have significant relationships with all dealer desks in major market locations. Evaluators are notified of all new issuances, news stories, and credit events through LSEG products and via internal e-mail and messaging systems.

Quality Control

LSEG employs vigorous quality control checks to ensure pricing accuracy. All issues that are flagged must be viewed by the assigned evaluator, as well as the desk team leader before prices are released to customers. Below are three tolerance check reports used in the quality control process:

- **Stale Report** - A daily report that alerts the evaluation team to any price that has not changed in the last 5 business days. Evaluators are responsible for checking each of these issues and providing a detailed report as to why the price is stale.

- **Tolerance Report** - A daily report that shows all bonds moving by more than 2% from the prior day. Evaluators and team manager must approve the change and give a detailed report on the movement before prices can be released to customers.
- **Stale Contributor Report** - A monthly report that tracks prices from LSEG Pricing Service contributors. This report compares prices on a monthly basis to ensure that all contributors are keeping their prices up to date. Prices that are stale are investigated further for news about mergers, or any other information that might have led to a stale price.

Formulas

NOTATION			
Z_t	Value of criterion Z at time t	Y	Redemption yield to assumed maturity
Z_{t-1}	Value of criterion Z at time (t-1)	L	Life to assumed maturity
Z_0	Initial value of criterion Z	D	Duration
$Z_{i,t}$	Value of criterion Z for the ith security at time t	X	Convexity
P	Clean price of the bond (without accrued interest) Based on a middle price	C	Coupon rate%
$P_{i,t}$	Clean price of the ith bond at time t	$G_{i,t}$	Value of any coupon payment received from the ith bond at time t or since time (t-1). If none, the value = 0
$P_{i,t}^*$	Clean price of the ith bond at time t, adjusted for any partial serial redemptions. At all other times it is the same as the unadjusted price P	R	Redemption price of the bond
A	Accrued interest to the "normal" settlement date	N	Nominal value of amount outstanding is known, otherwise the issued amount
P^*	<p>For serial bonds: When a serial bond is partly redeemed the price of the bond may jump as a result of the rump of the issue being quoted ex the partial redemption. Market convention assumes that the part of the bond being called for redemption is now worth the redemption price, and on the premise that the investor should not gain or lose money on this partial redemption, the current price is adjusted according to the following formula:</p> <p>Where: NC_t is the amount called for redemption at time t</p> <p>N_t is the amount remaining in issue (ex the amount called) at time t</p> <p>R_t is the redemption price of the bonds being called at time t</p> <p><i>Note: This assumes any moneys from the partial redemption are available for reinvestment on the ex date as opposed to the actual early redemption date.</i></p> <p>At other times P^* is the same as P.</p>		

Clean Price Index (CI):

$$CI_0 = 100$$

$$CI_t = CI_{t-1} * \frac{\sum_i P_{i,t} * N_{i,t}}{\sum_i P_{i,t-1} * N_{i,t-1}}$$

Gross Price Index (PI):

The accrued interest (AI) in the gross price is given by:

$$AI_t = \frac{\sum_i A_{i,t} * N_{i,t}}{\sum_i P_{i,1} * N_{i,t-1}}$$

where the summations are over the bonds currently in the index.

The Gross Price Index (PI) is then:

$$PI_t = CI_t * (1 + AI_t)$$

Total Return Index (RI):

$$RI_0 = 100$$

$$RI_t = RI_{t-1} * \frac{\sum_i (P_{i,t} + A_{i,t} + CP_{i,t} + G_{i,t}) * N_{i,t-1}}{\sum_i (P_{i,t-1} + A_{i,t-1} + CP_{i,t-1}) * N_{i,t-1}}$$

where the summations are over the bonds currently in the index. CP is an adjustment made for bonds which have ex-dividend periods – when a bond goes ex-dividend, CP has a value equal to the next coupon payment; outside the ex-dividend period CP=0.

This compensates for the sharp drop in accrued interest when a bond goes ex-dividend. For any bonds currently in the index that have serial redemption features, an adjustment is made when t falls within the period between the drawing date and the next serial redemption date. For such bonds the calculation is:

$$RI_t = RI_{t-1} * \frac{\sum_i N_{i,t-1} * (P_{i,t} + A_{i,t}) + G_{i,t} * (N_t + NC_{i,t}) + CP_{i,t} * (N_t + NC_{i,t}) + NC_{i,t} * (R_{i,t} + A_{i,t})}{\sum_i N_{i,t} * (P_{i,t-1} + A_{i,t-1}) + NC_t * (R_t + A_{i,t-1}) + CP_{i,t} * (N_t + NC_{i,t})}$$

Note: when t = drawing date,

$$N_{i,t-1} = N_{i,t-1} + NC_{i,t}$$

Interest Paid this Year (XD):

The interest paid this year calculation gives the accumulated income expressed as a percentage of the gross price index. It is reset at the start of each year. The interest paid calculation enables the total return index to be adjusted for portfolios subject to tax on income received.

$$XD_{ts} = 0$$

where ts = the time at the end of each calendar year

$$XD_t = xd_{t-1} + Pl_{i,t} * \frac{\sum_i G_{i,t} * N_{i,t-1}}{\sum_i (P_{i,t-1} + A_{i,t-1}) * N_{i,t-1}}$$

where the summations are over the bonds currently in the index.

Average Coupon (CO):

$$CO_t = \frac{\sum_i C_{i,t} * N_{i,t}}{\sum_i N_{i,t}}$$

where the summations are over the bonds currently in the index.

Average Life (L):

$$L_t = \frac{\sum_i L_{i,t} * N_{i,t}}{\sum_i N_{i,t}}$$

where the summations are over the bonds currently in the index.

Average Duration (DU):

$$DU_t = \frac{\sum_i D_{i,t} * (P_{i,t} + A_{i,t}) * N_{i,t}}{\sum_i (P_{i,t} + A_{i,t}) * N_{i,t}}$$

where the summations are over the bonds currently in the index.

Average Convexity (CX):

$$CX_t = \frac{\sum_i X_{i,t} * (P_{i,t} + A_{i,t}) * N_{i,t}}{\sum_i (P_{i,t} + A_{i,t}) * N_{i,t}}$$

where the summations are over the bonds currently in the index.

Average Redemption Yield (RY):

$$RY_t = \frac{\sum_i Y_{i,t} * D_{i,t} * (P_{i,t} + A_{i,t}) * N_{i,t}}{\sum_i D_{i,t} * (P_{i,t} + A_{i,t}) * N_{i,t}}$$

where the summations are over the bonds currently in the index. Yields are compounded according to the conventions of the market (for example, semi-annually in the UK and USA and annually in France).

Average Redemption Yield – Annualised (RA)

This is calculated according to the previous formula, except that all yields are compounded annually. This facilitates cross-country comparisons.

Average Current Yield (IY):

$$IY_t = \frac{100 * \sum_i C_{i,t} * N_{i,t}}{\sum_i P_{i,t} * N_{i,t}}$$

The current yield of a bond is also known as a flat, running or interest yield. It is given by:

where the summations are over the bonds currently in the index.

Market Value (MV)

$$MV_t = \sum_i (P_{i,t} + A_{i,t}) * N_{i,t}$$

where the summations are over the bonds currently in the index. The value is expressed in local currency, in thousands.

ABOUT FTSE RUSSELL

FTSE Russell is a leading global provider of index and benchmark solutions, spanning diverse asset classes and investment objectives. As a trusted investment partner we help investors make better-informed investment decisions, manage risk, and seize opportunities.

Market participants look to us for our expertise in developing and managing global index solutions across asset classes. Asset owners, asset managers, ETF providers and investment banks choose FTSE Russell solutions to benchmark their investment performance and create investment funds, ETFs, structured products, and index-based derivatives. Our clients use our solutions for asset allocation, investment strategy analysis and risk management, and value us for our robust governance process and operational integrity.

For over 35 years we have been at the forefront of driving change for the investor, always innovating to shape the next generation of benchmarks and investment solutions that open up new opportunities for the global investment community.

CONTACT US

To Learn more, visit ftse-russell/indices; email data@sgx.com or Index_Queries@lseg.com

Disclaimer

© 2023 London Stock Exchange Group plc and its applicable group undertakings (the "LSE Group"). The LSE Group includes (1) FTSE International Limited ("FTSE"), (2) Frank Russell Company ("Russell"), (3) FTSE Global Debt Capital Markets Inc. and FTSE Global Debt Capital Markets Limited (together, "FTSE Canada"), (4) FTSE Fixed Income Europe Limited ("FTSE FI Europe"), (5) FTSE Fixed Income LLC ("FTSE FI"), (6) The Yield Book Inc ("YB") and (7) Beyond Ratings S.A.S. ("BR"). All rights reserved.

FTSE Russell® is a trading name of FTSE, Russell, FTSE Canada, FTSE FI, FTSE FI Europe, YB and BR. "FTSE®", "Russell®", "FTSE Russell®", "FTSE4Good®", "ICB®", "The Yield Book®", "Beyond Ratings®" and all other trademarks and service marks used herein (whether registered or unregistered) are trademarks and/or service marks owned or licensed by the applicable member of the LSE Group or their respective licensors and are owned, or used under licence, by FTSE, Russell, FTSE Canada, FTSE FI, FTSE FI Europe, YB or BR. FTSE International Limited is authorised and regulated by the Financial Conduct Authority as a benchmark administrator.

All information is provided for information purposes only. All information and data contained in this publication is obtained by the LSE Group, from sources believed by it to be accurate and reliable. Because of the possibility of human and mechanical error as well as other factors, however, such information and data is provided "as is" without warranty of any kind. No member of the LSE Group nor their respective directors, officers, employees, partners or licensors make any claim, prediction, warranty or representation whatsoever, expressly, or impliedly, either as to the accuracy, timeliness, completeness, merchantability of any information or of results to be obtained from the use of FTSE Russell products, including but not limited to indexes, data and analytics, or the fitness or suitability of the FTSE Russell products for any particular purpose to which they might be put. Any representation of historical data accessible through FTSE Russell products is provided for information purposes only and is not a reliable indicator of future performance.

No responsibility or liability can be accepted by any member of the LSE Group nor their respective directors, officers, employees, partners or licensors for (a) any loss or damage in whole or in part caused by, resulting from, or relating to any error (negligent or otherwise) or other circumstance involved in procuring, collecting, compiling, interpreting, analysing, editing, transcribing, transmitting, communicating, or delivering any such information or data or from use of this document or links to this document or (b) any direct, indirect, special, consequential or incidental damages whatsoever, even if any member of the LSE Group is advised in advance of the possibility of such damages, resulting from the use of, or inability to use, such information.

No member of the LSE Group nor their respective directors, officers, employees, partners or licensors provide investment advice and nothing in this document should be taken as constituting financial or investment advice. No member of the LSE Group nor their respective directors, officers, employees, partners or licensors make any representation regarding the advisability of investing in any asset or whether such investment creates any legal or compliance risks for the investor. A decision to invest in any such asset should not be made in reliance on any information herein. Indexes cannot be invested in directly. Inclusion of an asset in an index is not a recommendation to buy, sell or hold that asset nor confirmation that any particular investor may lawfully buy, sell or hold the asset or an index containing the asset. The general information contained in this publication should not be acted upon without obtaining specific legal, tax, and investment advice from a licensed professional.

The information contained in this report should not be considered "research" as defined in recital 28 of the Commission Delegated Directive (EU) 2017/593 of 7 April 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council ("MiFID II") and is provided for no fee.

Past performance is no guarantee of future results. Charts and graphs are provided for illustrative purposes only. Index returns shown may not represent the results of the actual trading of investable assets. Certain returns shown may reflect back-tested performance. All performance presented prior to the index inception date is back-tested performance.

Back-tested performance is not actual performance, but is hypothetical. The back-test calculations are based on the same methodology that was in effect when the index was officially launched. However, back-tested data may reflect the application of the index methodology with the benefit of hindsight, and the historic calculations of an index may change from month to month based on revisions to the underlying economic data used in the calculation of the index.

This document may contain forward-looking assessments. These are based upon a number of assumptions concerning future conditions that ultimately may prove to be inaccurate. Such forward-looking assessments are subject to risks and uncertainties and may be affected by various factors that may cause actual results to differ materially. No member of the LSE Group nor their licensors assume any duty to and do not undertake to update forward-looking assessments.

No part of this information may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission of the applicable member of the LSE Group. Use and distribution of the LSE Group data requires a licence from FTSE, Russell, FTSE Canada, FTSE FI, FTSE FI Europe, YB, BR and/or their respective licensors.



**FTSE
RUSSELL**
An LSEG Business

