



iEdge SGX Iron Ore Futures Indices

Index Methodology

Version 1.1 (August 2018)

Singapore Exchange

Version Log

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1.0	1 September 2017	Document creation
1.1	28 August 2018	Renaming to iEdge

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1. Background

- 1.1. Iron ore is the primary raw material used in the production of steel. Steel products can be in various forms including steel rebar, steel plates and hot rolled coils and is the key material used in construction, ship building and other manufacturing activities. China is the main importing nation for global seaborne iron ore and major iron ore producing countries include Australia and Brazil.
- 1.2. SGX, home of the international iron ore derivatives, offers Iron Ore CFR China (62% Fe Fines) Swap, Futures and Option, amongst other iron ore derivative products like the SGX Iron Ore CFR China (58% Fe Fines) Swap and Futures and SGX Iron Ore CFR China (Lump Premium) Swap and Futures.
- 1.3. The iEdge SGX Iron Ore Futures Indices are calculated on a net-roll total return basis that measures the performance from holding a continuous position in the second month of the SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures, while accounting for the gain or loss from rolling from the current to the next contract and the interest earned.
- 1.4. The iEdge SGX Iron Ore Futures Indices comprise:
 - iEdge SGX Iron Ore Futures (1x) Index (Total Return)
 - iEdge SGX Iron Ore Futures Leverage (2x) Index (Total Return)
 - iEdge SGX Iron Ore Futures Inverse (1x) Index (Total Return)
 - iEdge SGX Iron Ore Futures Inverse (2x) Index (Total Return)
- 1.5. This document sets out the rules for construction, calculation and maintenance of the indices.

2. Family

2.1. The core suite of iEdge SGX Iron Ore Futures Indices comprises four indices, based on the 2nd and 3rd month contracts of the underlying SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures.

2.2. Table 1 describes each index, its underlying futures and underlying contracts.

Table 1: Index Descriptions, Underlying Futures and Underlying Contracts

Index	Description	Underlying Futures	Underlying Contracts
iEdge SGX Iron Ore Futures (1x) Index (Total Return)	<ul style="list-style-type: none"> Measures the return from holding a continuous long position in the 2nd month contract, while accounting for the gain or loss from rolling from the current to the next contract and interest earned. The index is incrementally rolled into the 3rd month contract over the last 5 business days of each month. 	SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures	2 nd and 3 rd month contracts
iEdge SGX Iron Ore Futures Leverage (2x) Index (Total Return)	<ul style="list-style-type: none"> Measures the 2x leveraged return from holding a continuous long position in the 2nd month contract, while accounting for the gain or loss from rolling from the current to the next contract and interest earned. The index is incrementally rolled into the 3rd month contract over the last 5 business days of each month. 	SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures	2 nd and 3 rd month contracts
iEdge SGX Iron Ore Futures Inverse (1x) Index (Total Return)	<ul style="list-style-type: none"> Measures the -1x inverse return from holding a continuous short position in the 2nd month contract, while accounting for the gain or loss from rolling from the current to the next contract and interest earned. The index is incrementally rolled into the 3rd month contract over the last 5 business days of each month. 	SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures	2 nd and 3 rd month contracts
iEdge SGX Iron Ore Futures Inverse (2x) Index (Total Return)	<ul style="list-style-type: none"> Measures the -2x inverse leveraged return from holding a continuous short position in the 2nd month contract, while accounting for the gain or loss from rolling from the current to the next contract and interest earned. The index is incrementally rolled into the 3rd month contract over the last 5 business days of each month. 	SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures	2 nd and 3 rd month contracts

3. Construction

3.1. Index Construction Process

3.1.1. The following three-step process (in order) is used to construct the iEdge SGX Iron Ore Indices¹:

- Identify liquid futures and contract months
- Define timing and pace of roll
- Apply index algorithm

3.2. Identify Liquid Futures and Contract Months

3.2.1. A liquid futures contract, in which performance is to be measured, is first selected. A liquid futures contract is defined by standard custom and practice in the industry, where there is adequate depth in the market to facilitate a contract roll. Following this, two underlying contracts of the aforementioned futures are selected – a shorter-term contract ('current contract') and a longer-term contract ('next contract'). Table 1 describes the underlying futures and contracts for the iEdge SGX Iron Ore Indices.

3.2.2. Measurement of performance is done in three recurring cycles, described in Sections 3.2.3, 3.2.4 and 3.2.5.

3.2.3. Non-roll period

3.2.3.1. A 'non-roll' period is defined as business days outside the 'roll period'.

3.2.3.2. During a non-roll period, the index measures the excess return from a 100% long position in the current contract. Price movements of the next contract will not be accounted for index calculations.

3.2.4. Roll period

3.2.4.1. On a specified day, the index begins to roll from the current contract to the next contract for a specified duration. This period is defined as a 'roll period'.

3.2.4.2. During a roll period, the index measures the excess return from long positions in both the current and next contract.

3.2.5. Roll day

3.2.5.1. The last day of the roll period is defined as the 'roll day'.

3.2.5.2. On the roll day, the index measures excess return from a 100% long position in the next contract. Price movements of the current contract will not be accounted for index calculations.

3.2.5.3. At the end of the roll day, the 'next contract' effectively becomes the new 'current contract'. The cycle then enters the subsequent non-roll period and repeats.

¹ Further considerations may be required with regard to the roll, fees and charges (e.g. quanto fees), index currencies and price adjustments. These can be considered an overlay to the core indices and is offered as part of SGX's index customization offering.

3.3. Define Timing and Pace of Roll

3.3.1. Timing and pace of roll is defined by four parameters:

- Timing
- Duration
- Frequency
- Weight

3.3.2. Table 2 describes each parameter in Section 3.3.1.

Table 2: Parameter to Define Timing and Pace of Roll

Parameter	Definition	Example
Timing	The specified day in which the current contract begins to roll to the next contract.	The iEdge SGX Iron Ore Futures Indices begin to roll five business days before the last trading day ² .
Duration	The number of days during the roll period.	The iEdge SGX Iron Ore Futures Indices roll incrementally over five business days.
Frequency	The recurrence of the roll.	The iEdge SGX Iron Ore Futures Indices roll on a monthly basis.
Weight	The contract weights of the underlying contracts during the roll period.	Described in Table 4.

3.3.3. Table 3 describes the timing, duration and frequency of roll for the iEdge SGX Iron Ore Futures Indices.

Table 3: Timing, Duration and Frequency Settings

Timing	Duration	Frequency
Over the last five business days ³ of every month	Five days	Monthly

3.3.4. Table 4 describes the contract weights during the roll period for the iEdge SGX Iron Ore Futures Indices.

Table 4: Contract Weights (Current Contract / Next Contract)

5 th Last Business Day of the month	4 th Last Business Day of the month	3 rd Last Business Day of the month	2 nd Last Business Day of the month	Last Business Day of the month
80% / 20%	60% / 40%	40% / 60%	20% / 80%	0% / 100%

² If the five business days before the last trading day coincide with holiday(s), the roll-over start date would begin earlier such that the roll period ends on the last business day of the month.

³ Business days is defined under Section 9.3.2

3.4. Apply Index Algorithms

3.4.1. On any business day, as defined in Section 5.3.2, the index is calculated as:

$$\text{Index}_t = \text{Index}_{t-1} \times \left(1 + \left(F \times \left(\frac{P_t}{P_{t-1}} - 1 \right) \right) \right) + I_t$$

- t Indicates the current business day
- $t-1$ Indicates the previous business day
- Index_t Index value at time, t
- F Factor (for inverse/leverage)
- P_t Weighted price of the underlying futures contracts at time, t
- I_t Interest return at time, t

3.4.2. The Factor, F , is calculated as:

Table 5: Factor (for calculation of returns)

Index	Factor	Description
iEdge SGX Iron Ore Futures (1x) Index (Total Return)	1	Measures the return from holding a continuous long position in the 2nd month contract, while accounting for the gain or loss from rolling from the current to the next contract and interest earned.
iEdge SGX Iron Ore Futures Leverage (2x) Index (Total Return)	2	Measures the 2x leveraged return from holding a continuous long position in the 2nd month contract, while accounting for the gain or loss from rolling from the current to the next contract and interest earned.
iEdge SGX Iron Ore Futures Inverse (1x) Index (Total Return)	-1	Measures the inverse 1x return from holding a continuous short position in the 2nd month contract, while accounting for the gain or loss from rolling from the current to the next contract and interest earned.
iEdge SGX Iron Ore Futures Inverse (2x) Index (Total Return)	-2	Measures the inverse 2x return from holding a continuous short position in the 2nd month contract, while accounting for the gain or loss from rolling from the current to the next contract and interest earned.

3.4.3. The interest return, I_t , is calculated as:

$$I_t = \frac{I_{ref,t-1} \times \Delta t}{365}$$

- $I_{ref,t-1}$ Reference rate on previous business day
- Δt Number of calendar days between current and previous business day

3.4.4. Appendix A describes the reference rates used to calculate the iEdge SGX Iron Ore Futures Indices. All reference rates are updated daily between 2.00PM – 3.00PM Singapore Time.

3.4.5. The weighted prices of the underlying futures contract, P_t and P_{t-1} , are calculated as:

$$P_t = (CW_{y,t} \times FP_{y,t}) + (CW_{z,t} \times FP_{z,t}) + (w_{roll,t} \times [FP_{y,t} - FP_{z,t}])$$

$$P_{t-1} = (CW_{y,t-1} \times FP_{y,t-1}) + (CW_{z,t-1} \times FP_{z,t-1})$$

- $CW_{y,t}$ Contract weight for the current contract at time, t
- $CW_{z,t}$ Contract weight for the next contract at time, t
- $FP_{y,t}$ Price of the current contract at time, t
- $FP_{z,t}$ Price of the next contract at time, t
- $W_{roll,t}$ Roll-over weight at time, t

3.4.6. Table 6 describes the roll-over weight during and outside the roll period.

Table 6: Roll-over weight

	5 th Last Business Day of the month	4 th Last Business Day of the month	3 rd Last Business Day of the month	2 nd Last Business Day of the month	Last Business Day of the month	All other days
$W_{roll,t}$	20%	20%	20%	20%	20%	0%

3.4.7. In order of descending priority, the index reference price at time, t will be either:

- Daily settlement contract price; or
- Last traded price during the T-session⁴

3.4.8. Daily settlement contract prices are derived in accordance with the SGX-DC Clearing Rules, and in cases where there is sufficient liquidity (as is the case with the iEdge SGX Iron Ore Futures Indices), the settlement price will be derived during the pre-close auction.

3.4.9. If both points above are unavailable, in the case where the contract does not trade at time, t, prices from the previous day (with priority also given to a settlement over a traded price) will be used. This iteration continues ad infinitum until a price is available.

3.5. Base Dates, Values & Currencies

3.5.1. Appendix B describes the base dates, values and currencies of the iEdge SGX Iron Ore Future Indices.

3.6. Dissemination

3.6.1. Appendix C describes the dissemination hours of the iEdge SGX Iron Ore Futures Indices.

3.6.2. Please refer to the 'iEdge SGX Iron Ore Futures Indices – Data Vendors Codes' for a list of tickers for the total return indices.

⁴ The T-session trading hours for the SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures are described in the contract specifications published by SGX.

4. Dissemination

4.1. Calculation and Dissemination Frequency

- 4.1.1. On any business day, as defined in the Section 5 – Policy, indices are calculated on a real-time basis with index values disseminated every 10 seconds.
- 4.1.2. Please refer to Appendix C for a list of dissemination hours for the iEdge SGX Iron Ore Futures Indices.

4.2. Dissemination Mediums

- 4.2.1. All index values and analytics are available, through subscription, via SFTP. Index values are also available via Bloomberg and Thomson Reuters.
- 4.2.2. Please refer to the 'iEdge SGX Iron Ore Futures Indices – Data Vendors Codes' for a list of tickers for the iEdge SGX Iron Ore Futures Indices.

5. Policy

5.1. Calculation of Index Values

- 5.1.1. All index values are calculated solely based upon transacted prices. All transacted prices are observable and are formed by the competitive forces of supply and demand in an active market, ensuring reliability in price discovery.

5.2. Publication of Index Close Values

- 5.2.1. Subscribers to index data for iEdge SGX Iron Ore Futures Indices will receive the index closing values after the market close for each relevant contract.

5.3. Holiday Schedule

- 5.3.1. The iEdge SGX Iron Ore Futures Indices are calculated on business days, during the hours described in Appendix C.
- 5.3.2. Business days, in this context, refer to days in which the underlying SGX TSI Iron Ore CFR China (62% Fe Fines) Futures contract's T-session is open for trading on SGX.
- 5.3.3. The iEdge SGX Iron Ore Futures Indices are not calculated on weekends or holidays. Holidays, in this context, refer to weekdays in which the underlying SGX TSI Iron Ore CFR China (62% Fe Fines) Futures contract's T-session is not open for trading on SGX.
- 5.3.4. SGX will continue to disseminate and publish the latest index value on trading days of any market on which an Index-linked investable product is listed, even if the underlying SGX TSI Iron Ore CFR China (62% Fe Fines) Futures contract's T-session is not open for trading on SGX. In this case, the published index value will be calculated using the latest reference rate available and may differ slightly to the close value of the last business day, per the definition in Para 5.3.2.

5.4. Unscheduled Events

- 5.4.1. An unscheduled event potentially causes unavailability of underlying data for index calculation. This includes, but is not limited to, unscheduled closures of the respective cash markets or service interruptions.
- 5.4.2. SGX will continue to calculate the iEdge SGX Iron Ore Futures Indices during the occurrence of an unscheduled event.
- 5.4.3. If the unscheduled event persists indefinitely, SGX will review on a case-by-case basis whether index calculation will continue. If SGX decides to cease index calculation, the cessation will be in accordance with Section 9.5: Index Cessation.
- 5.4.4. Pertaining to index calculation, unscheduled events may affect either or both the reference prices and pace of roll. This is described further in Sections 5.4.5 and 5.4.6.

5.4.5. Reference Prices

- 5.4.5.1. Index calculation will be based on the last available price published by SGX, prior to the unscheduled event.

5.4.5.2. When an unscheduled event disrupts the publication of a settlement price, the last traded price may be used to close the index on that business day.

5.4.6. Pace of Roll

5.4.6.1. Index calculation will be based on the expected contract weights, as defined in Table 4. The unscheduled event will not affect the pace of roll.

5.4.6.2. If the unscheduled event persists across an entire business day, SGX will review on a case-by-case basis and may choose to disregard roll on that specific day. If this occurs, contract weights will be the same prior to the decision.

5.4.7. Recalculation of Index Values

5.4.7.1. Index values will be recalculated if incorrect or significantly distorted.

5.4.7.2. Upon recalculation, subscribers of the relevant index will be notified appropriately.

5.5. Index Cessation

5.5.1. External factors, some beyond the control of SGX, may impact tradability of an index. This includes, but is not limited to, a significant reduction in observed liquidity. In these circumstances, SGX may consult with the market to either change the index methodology or cease production in accordance with the SGX Index Services Methodology Change and Cessation Policy.

5.5.2. Users of the Index should ensure that financial instruments linked to the Index are able to address the possibility of index cessation. The possibility of index cessation will necessitate a transition for users of the index which will be performed in collaboration between SGX and any product issuers for which the index is an underlying component.

5.6. Notifications

5.6.1. All index notifications will be made at the earliest opportunity to subscribers through the appropriate media.

5.6.2. Notifications will contain the necessary explanation to sufficiently facilitate any changes, if applicable.

5.7. Reverse Split

5.7.1. If the Index Level on a Business Day is below 10, a reverse split will be implemented on the 7th Business Day of the following month. As at the Closing Time on the 7th Business Day of the following month, the Index Level will be multiplied by 100 and information about the reverse split will be shared via an index bulletin to all market participants and data subscribers.

6. Governance

6.1. SGX is the Benchmark Administrator as defined by the IOSCO Principles for Financial Benchmarks published in July 2013.

6.2. Collectively, the iEdge SGX Iron Ore Futures Indices are the Benchmark as defined by the IOSCO Principles for Financial Benchmarks published in July 2013.

6.3. SGX Index Governance Committee

6.3.1. A period review of the methodology is conducted by the SGX Index Governance Committee on an annual basis. The review of each methodology is scheduled from the recorded date of the creation of the methodology document, and as part of the review the committee will consider internal index management feedback, logged feedback from key external stakeholders and any new regulatory developments. If the committee deems it necessary, the methodology may be updated per the terms of the SGX Index Services Policy on Methodology Changes and Index Cessation and this may invoke a market consultation that will be conducted in alignment with the policy's terms.

6.3.2. The SGX Index Governance Committee will monitor the operational adherence set forth in this document. SGX will aim to comply with the terms of this document. However, deviations from this policy may be required to more adequately reflect the true experience of portfolio managers during events that may not be entirely captured in this document.

6.3.3. Any deviations, errors or exceptions in executing the terms of this methodology will be recorded in an "Exceptions Log" which is reviewed by the SGX Index Governance Committee. The committee may then recommend changes or enhancements to the methodology, or refer certain portions of this methodology to a closed-market consultation before recommending any actions.

6.3.4. In instances whereby a deviation from the methodology occurs, SGX will provide adequate notice and full justification ahead of the planned implementation of the action or event.

6.3.5. This methodology will be reviewed by the SGX Index Governance Committee on an annual basis on the anniversary date of the creation of the document in order to ensure that it is representative of the underlying segments and stated objectives.

6.4. Complaints Procedure

6.4.1. Procedures to make a formal complaint are described in the SGX Complaints Procedures Policy.

7. Contact Information

7.1. Please email index@sgx.com for more details.

8. Glossary

Business day	Days in which the respective underlying futures' T-Session is open on SGX
Committee	SGX Index Committee
Current contract	The shorter-term contract considered for index calculation
SFTP	Secure File transfer protocol
Month contract	Futures contracts which expire monthly
Next contract	The longer-term contract considered for index calculation
Non-roll period	Business days outside the roll period
Roll period	The duration in which the current contract rolls to the next contract
Roll day	The last day of the roll period
SGT	Singapore time
SGX	Singapore Exchange
T-Session	A trading session defined by the respective futures' contract specifications

9. Appendix A: Index Types

Index	Underlying Futures	Reference Rate	Total Return	Leverage	Inverse	Net Roll
iEdge SGX Iron Ore Futures (1x) Index (Total Return)	SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures	Korea Overnight Call Rate (Bank of Korea)	•			•
iEdge SGX Iron Ore Futures Leverage (2x) Index (Total Return)	SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures	Korea Overnight Call Rate (Bank of Korea)	•	• (L = 2)		•
iEdge SGX Iron Ore Futures Inverse (1x) Index (Total Return)	SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures	Korea Overnight Call Rate (Bank of Korea)	•		• (I = -1)	•
iEdge SGX Iron Ore Futures Inverse (2x) Index (Total Return)	SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures	Korea Overnight Call Rate (Bank of Korea)	•		• (I = -2)	•

10. Appendix B: Index Base Dates, Values & Currencies

Index	Base Date	Base Value	Currency
iEdge SGX Iron Ore Futures (1x) Index (Total Return)	8-Apr-13	1,000.00	US Dollar
iEdge SGX Iron Ore Futures Leverage (2x) Index (Total Return)	8-Apr-13	1,000.00	US Dollar
iEdge SGX Iron Ore Futures Inverse (1x) Index (Total Return)	8-Apr-13	1,000.00	US Dollar
iEdge SGX Iron Ore Futures Inverse (2x) Index (Total Return)	8-Apr-13	1,000.00	US Dollar

11. Appendix C: Dissemination Hours

Index	Dissemination Hours (SGT)*
iEdge SGX Iron Ore Futures (1x) Index (Total Return)	08:00 – 20:05
iEdge SGX Iron Ore Futures Leverage (2x) Index (Total Return)	08:00 – 20:05
iEdge SGX Iron Ore Futures Inverse (1x) Index (Total Return)	08:00 – 20:05
iEdge SGX Iron Ore Futures Inverse (2x) Index (Total Return)	08:00 – 20:05

* Final index tick value will be disseminated at 23:40 SGT, following the publication of the DSP for the underlying futures contract.

* From 9th Oct 2017 onwards, all indices will be disseminated from 07:25 – 20:05 due to a change in the trading hours of the SGX TSI Iron Ore CFR China (62% Fe Fines) Index Futures Contract.

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