SGX Iron Ore Derivatives

Narendra Hegde
November 2016
Singapore Exchange – The Asian Gateway

SGX – A primary price discovery centre for Asian Currencies

The Asian Gateway

- Asia’s premier access point for managing Asian capital and investment exposure
- Offers the world’s biggest offshore market for Asian equity futures, centred on Asia’s three largest economies – China, India and Japan

Pioneering CCP

- A fully integrated value chain from trading, clearing to settlement
- Leading Asian counterparty for clearing of financial and commodity products
- Rated AAA for strength and stability

First-mover Product Offering

- 1st to offer Japan (Nikkei), China (A50), Indonesia and Philippines Stock Index (MSCI)
- 1st to offer clearing of OTC swaps on Iron Ore and Asian NDFs
- 1st Asian Exchange to receive DCO and EMIR Q CCP recognition

Source: sgx.com
# Trading Asia in One Place

## Equity
- Asia’s most international listing venue
- 775 listed companies with total market capitalisation of US$755 billion

## Derivatives
- Single point access to Asian markets
- Covering 80% of Asia’s equity markets

## China, India & Indonesia
- Only exchange outside China to offer futures for exposure to China’s 50 largest companies.
- Futures contracts on India’s largest companies
- ETFs
- Bonds

## Asian companies listed in US
- Large Asian companies traded on news flow in Asian time zone as ADRs

## Commodities
- Iron ore
- Coal (coking & thermal)
- Hot rolled coil steel
- Freight
- Rubber
- Fuel oil
- Electricity
- Gold
- Petrochemicals

## Bonds
- Asia’s bond centre
- >1,700 bonds
- > 34 countries
- > 19 currencies, including RMB
Overview of SGX Commodities Products

### Iron Ore & Steel
- Iron Ore (CFR China)
- Coking Coal (FOB Australia, CFR China)
- HRC Steel (CFR ASEAN)

### Thermal Coal
- Sub-bit (FOB Indonesia)
- API 4 (FOB Richards Bay)
- API 5 (FOB Newcastle)

### Energy
- Fuel Oil
- Gasoil
- Naphtha
- Aromatics: BZ and PX
- Polyolefin: LLDPE and PP
- LNG

### Dry Bulk Freight
- Time Charter FFA (CV, PV, SV, HV)
- Single Routes (C5, 2A, 3A)

### Electricity
- Electricity Futures

### Rubber
- SICOM Rubber Futures

### Gold
- Singapore Kilobar Gold Contract
Milestones

- **Sep 2012**: Launched the world’s first cleared iron ore swaps
- **May 2013**: Launched iron ore futures
- **Feb 2014**: Launched Asia’s first seaborne steel derivative
- **Aug 2014**: Launch of iron ore 58% Fe fines derivatives
- **Aug 2015**: Annual 2015 iron ore volumes exceed one billion tonnes for the first time
- **Apr 2009**: Launched iron ore options-on-swaps
- **Apr 2013**: Organised inaugural Singapore Iron Ore Week
- **Feb 2014**: Launched coking coal derivatives and iron ore options-on-futures
- **Mar 2015**: Launch of iron ore lump premium derivatives

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SGX
Leading International Iron Ore Exchange

Global Market Share for Cleared Swaps & Options > 90%

<table>
<thead>
<tr>
<th>Iron Ore Swap, Futures &amp; Options Records</th>
<th>Contracts</th>
<th>Tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 Volume</td>
<td>12,664</td>
<td>6 mil</td>
</tr>
<tr>
<td>2010 Volume</td>
<td>35,357</td>
<td>18 mil</td>
</tr>
<tr>
<td>2011 Volume</td>
<td>86,611</td>
<td>43 mil</td>
</tr>
<tr>
<td>2012 Volume</td>
<td>219,319</td>
<td>109 mil</td>
</tr>
<tr>
<td>2013 Volume</td>
<td>590,744</td>
<td>269 mil</td>
</tr>
<tr>
<td>2014 Volume</td>
<td>2,846,522</td>
<td>581 mil</td>
</tr>
<tr>
<td>2015 Volume</td>
<td>7,971,513</td>
<td>1.05 bil</td>
</tr>
<tr>
<td>2016 YTD</td>
<td>11,143,532</td>
<td>1.25 bil</td>
</tr>
</tbody>
</table>

SGX Monthly Iron Ore Futures/Swap Volume and Open Interest

- US$ Denomination
- Cash settled against monthly daily average of index prices — pricing mechanism aligned that used in physical market
- Diverse market participants
- Liquidity is spread across the contract months
- Trading can be monthly, quarter or calendar
- Margin offset against FFA, coking coal and steel products on SGX

SGX Iron Ore Derivatives Customer Segments – 2016 YTD

- Fund 16%
- Bank / Brokerage 37%
- International Trading Houses and Producers 16%
- Asian Steel Mills and Traders 27%
- Others 4%
# SGX Screen and OTC Comparison

<table>
<thead>
<tr>
<th></th>
<th>SGX Screen</th>
<th>SGX OTC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>Futures</td>
<td>Futures (NLT) / Swap</td>
</tr>
<tr>
<td><strong>Volumes</strong></td>
<td>▪ Trading in small quantities</td>
<td>▪ Trading in large quantities</td>
</tr>
<tr>
<td><strong>Liquidity</strong></td>
<td>▪ Most active contract traded are the 2(^{nd}) and 3(^{rd}) contract months</td>
<td>▪ 1-12 months contract months are largely liquid. The contract length can be up till 48 months. OTC allows trading of monthly, quarterly and yearly calendar strips.</td>
</tr>
<tr>
<td><strong>Settlement</strong></td>
<td>▪ Traded contracts are cleared immediately</td>
<td>▪ Traded contracts need to be registered in the system, confirmed then cleared.</td>
</tr>
<tr>
<td><strong>Deposit requirements</strong></td>
<td></td>
<td>Identical</td>
</tr>
<tr>
<td><strong>Open interest limit</strong></td>
<td></td>
<td>Identical</td>
</tr>
<tr>
<td><strong>Daily settlement price and final settlement price</strong></td>
<td></td>
<td>Identical</td>
</tr>
</tbody>
</table>
SGX Iron Ore Screen
SGX Iron Ore Futures (Screen)

- Daily iron ore screen futures volume increased due to reduction in slippage cost (Improvement of bid offer spread and market depth).
- Total monthly iron ore screen futures volume was 5.5 million metric tons.
- Slippage cost for second contract month (active month) dropped from US$0.50 (5kt) in July 15 to US$0.02 recently.
- T+1 screen futures volume share of total screen volume is 12%.
SGX Iron Ore Futures (Screen) – Market Depth

Oct 16 contracts

Bid Offer Spread: US$0.05

Bid: 248 lots

Ask: 240 lots

SGX Iron Ore 62%  Oct16

VWAP: 55.9163

Avg Vol 30 Day: 1078.33

Beta: .000

Theo Auct Price: N.A.

% Change: +.89%

Australia 61 2 9777 8600 Brazil 5511 1295 9000 Europe 44 20 7330 7500 Germany 49 58 9204 1210 Hong Kong 852 2877 6000 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000

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SN 216695 G477-1566-0 02-Sep-16 9:10:24 HKT GMT+6:00
The bid-offer spread of Sep 16 – Oct 16 spread contract (9.00 am to 11.30, 1.30pm to 3.00pm) has an average low of US$0.03 in Aug 2016.

Compared with the OTC market with a bid-offer spread average of US$0.10.

Compared to outright screen market, the Sep 16 – Oct 16 spread costs about US$0.16 lower.

Our screen spread contract is the most effective platform.

Current DAV in Aug 3,400 contracts: 61,417 contracts or 6.4 million tons.

*As of 2.05pm 25 Aug 2016*
# SGX Iron Ore 62% FE Fines

<table>
<thead>
<tr>
<th></th>
<th>Iron Ore Swaps</th>
<th>Iron Ore Futures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contract</strong></td>
<td>SGX Iron Ore CFR China (62% Fe Fines) Swap</td>
<td>SGX Iron Ore CFR China (62% Fe Fines) Futures</td>
</tr>
<tr>
<td><strong>Contract Size</strong></td>
<td>500 metric tonnes</td>
<td>100 metric tonnes</td>
</tr>
<tr>
<td><strong>Ticker Symbol</strong></td>
<td>FE</td>
<td>FEF</td>
</tr>
<tr>
<td><strong>Minimum Price Fluctuation</strong></td>
<td>US$0.01 per metric tonne</td>
<td>US$0.01 per metric tonne</td>
</tr>
<tr>
<td></td>
<td>Value per tick = US$5.00</td>
<td>Value per tick = US$5.00</td>
</tr>
<tr>
<td><strong>Contract Months</strong></td>
<td>Up to 48 consecutive months staring with current month</td>
<td>12 consecutive months will be added upon expiry in December</td>
</tr>
<tr>
<td><strong>NLT Threshold</strong></td>
<td>N/A</td>
<td>5 lots</td>
</tr>
<tr>
<td><strong>Trading Hours</strong></td>
<td><strong>T-session:</strong> 8:00 am to 8:00 pm</td>
<td><strong>T-session:</strong> 8:00 am to 8:00 pm</td>
</tr>
<tr>
<td></td>
<td><strong>T+1 session:</strong> 8:00:01 pm to 4:00 am</td>
<td><strong>T+1 session:</strong> 9:00 pm to 2:00 am</td>
</tr>
<tr>
<td><strong>Last Trading Day</strong></td>
<td>Last publication day of The Steel Index (TSI) Iron Ore 62% reference prices in the contract month</td>
<td></td>
</tr>
<tr>
<td><strong>Final Settlement Price</strong></td>
<td>Cash settlement using the arithmetic average of all The Steel Index (TSI) Iron Ore 62% reference prices in the expiring month, rounded to 2 decimal places</td>
<td></td>
</tr>
</tbody>
</table>

**Price Information (Vendor: Ticker)**

- **Bloomberg:** SCOA Comdty CT
- **Reuters:** SZZF
- **Wenhua Financial (mobile):** TSI
- **Algostar:** FEF
- **Others:** PATS, CQG, TT
SGX Coking Coal

- Optionality to trade both the FOB Australia and CFR China contracts
- Effective and relevant hedging and speculative tools for the seaborne coking coal market
- Capital efficiencies – margin offsets with other SGX commodities contracts
## Contract Specifications

<table>
<thead>
<tr>
<th></th>
<th>Coking Coal Swaps</th>
<th>Coking Coal Futures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contract</strong></td>
<td>1. SGX Australia Premium Coking Coal Swaps</td>
<td>1. SGX Australia Premium Coking Coal Futures</td>
</tr>
<tr>
<td></td>
<td>2. SGX China Premium Coking Coal Swaps</td>
<td>2. SGX China Premium Coking Coal Futures</td>
</tr>
<tr>
<td><strong>Contract Size</strong></td>
<td>500 metric tons</td>
<td>100 metric tons</td>
</tr>
<tr>
<td><strong>Ticker Symbol</strong></td>
<td>1. CC</td>
<td>1. CCF</td>
</tr>
<tr>
<td></td>
<td>2. AC</td>
<td>2. ACF</td>
</tr>
</tbody>
</table>
| **Minimum Price Fluctuation** | US$0.01 per metric ton  
Value per tick = US$5.00 |                                                                                     |
| **Contract Months** | Up to 48 consecutive months staring with current month                           |                                                                                     |
| **Trade Registration** (Singapore Time) | **Swaps & NLT Futures**  
T-session: 7:00 am to 8:00 pm  
T+1 session: 8:00:01 pm to 3:00 am | **Screen Futures**  
T-session: 8:00 am to 8:00 pm  
T+1 session: 9:00 pm to 2:00 am |
| **Last Trading Day** | 1. Last publication day of Premium coking coal (Australian Exports, FOB East Coast Australian port) index prices in the contract month  
2. Last publication day of Premium JM25 coking coal (Chinese Imports, CFR Jingtang port) index prices in the contract month |                                                                                     |
| **Final Settlement Price** | 1. Cash settlement using the arithmetic average of all Premium coking coal (Australian Exports, FOB East Coast Australian port) index prices in the expiring month, rounded to 2 decimal places  
2. Cash settlement using the arithmetic average of all Premium JM25 coking coal (Chinese Imports, CFR Jingtang port) index prices in the expiring month, rounded to 2 decimal places |                                                                                     |
SGX’s RMB FX Product Features
An overview of SGX’s RMB denominated products

• Comprehensive suite of RMB FX products
  • Onshore and Offshore RMB Futures
  • RMB Crosses (EUR, SGD)

• Only cash-settled RMB FX Futures in the market
  • Initial margin can be in USD, RMB, EUR, SGD, JPY
  • P/L settled in RMB (CNH) and USD (CNY)

• Contract has 3 year maturity curve
  • Covers most popular RMB Bond issuance tenors

• Committed Market Makers with longer trading hours
Hedging, Trading, Clearing
Hedged vs Unhedged

• **Hedging brings predictability in an uncertain environment**

• **Hedging instruments allow participants to reduce the adverse impact of volatility**

• **Derivatives enable participants to convert floating exposure into fixed, and vice-versa**
Key Benefits Of Clearing

- Effective hedging against price risk
- Easy to build positions, no need to handle physical delivery
- Clearing house meeting highest regulatory standards
- Single clearing account, multiple counterparties
- Up to 20 hours of clearing
- Lowers counterparty risk
- Better risk management with daily mark-to-market
- Neutral end-of-day forward curves for forward pricing

One-stop Clearing Venue
**Producer Example**

An iron ore producer wishes to hedge his price risk in the sale of iron ore, to be delivered in November 2016

- Hedge is achieved by shorting SGX TSI Iron Ore 62% Nov 16 futures

<table>
<thead>
<tr>
<th>Price Risk</th>
<th>Iron Ore 62%</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>01 Sep 2016</strong></td>
<td><strong>30 Nov 2016</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Physical**

- Decrease in Iron Ore Prices
  - Sell physical iron ore for delivery in Nov 2016 and settled based on monthly daily average of TSI Iron Ore 62% Nov 16 spot prices
  - On 30 Nov 16, Nov monthly daily average of TSI Iron Ore 62% spot price was US$40.00/dmt

**Derivatives**

- Hedge with SGX TSI Iron Ore 62% Futures
  - Short Nov 16 SGX TSI Iron Ore 62% futures at US$54.00/dmt
  - SGX TSI Iron Ore 62% futures settled on 30 Nov 16 at US$40.00/dmt. The realised gain was US$14.00/dmt
  - Sales price locked in at US$54.00/dmt

NB. The above example may similarly be applied for coking coal
Steel Mill Example

In September 2016, a steel mill wants to hedge against the risk of price increase of iron ore for November’s production. This hedge can be done by buying iron ore futures.

<table>
<thead>
<tr>
<th>Price risk</th>
<th>Iron Ore 62%</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Sep 2016</td>
<td>30 Nov 2016</td>
<td></td>
</tr>
</tbody>
</table>

**Physical**

- Increase in the cost price of iron ore.
- Buy 100k physical iron ore with a delivery contract in Nov 2016 and settled based on monthly daily average of TSI Iron Ore 62% Nov 16 spot price.
- On 30 November 2016, average TSI Iron Ore 62% spot price was US$65.00/dmt

**Derivatives**

- Hedge with SGX TSI Iron Ore 62% Futures
- Buy Nov 16 SGX TSI Iron Ore 62% futures at US$54.00/dmt
- SGX TSI Iron Ore 62% Oct 16 settled at US$65.00/dmt. The realized gain was US$11.00/dmt.
- Purchase price locked in at US$54.00/dmt (US$65.00-US$11.00)

NB. The above example may similarly be applied for coking coal
Option Strategies
Call Options for Steel Mills

- Suppose currently, the iron ore physical commodity prices is at US$55/mt.
- In Nov 2016, a steel mill requires 100,000 mt of iron ore for steel production.
- There is a general consensus across steel mills that the price of iron ore will increase. Hence, the steel mill is interested to explore SGX iron ore option to hedge against cost increases.
- Taking into consideration the iron ore’s price volatility and delivery date, the steel mill decides to pay US$2/mt to buy Nov 16 SGX iron ore call option contract.

Nov 2016: Scenario A
- The average price for iron ore is US$70/mt.
- The call option will be exercised at the strike price of US$60 as it is in the money. The call premium should be calculated using the monthly average price of US$70 – US$60 = US$10. The steel mill realize a profit of US$8.00/mt (US$10 - US$2.00). This will mitigate the increase in cost of production for steel mill.

Nov 2016: Scenario B
- The average price for iron ore is US$50/mt.
- Steel mill’s call option is out of the money.
- Steel mill has a loss of US$ 2.00 call premium

<table>
<thead>
<tr>
<th>Product</th>
<th>SGX’s CFR China 62% FE call option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>100,000mt (equivalent to 200 lots)</td>
</tr>
<tr>
<td>Strike price</td>
<td>US$60</td>
</tr>
<tr>
<td>Contract</td>
<td>Nov 2016</td>
</tr>
<tr>
<td>Duration</td>
<td>90 days</td>
</tr>
<tr>
<td>Implied volatility</td>
<td>30%</td>
</tr>
<tr>
<td>Premium</td>
<td>US$2.00/mt</td>
</tr>
</tbody>
</table>

Call option

**Call strategy**

- **Buy call option**
  - Limited loss, unlimited gain

**Call option**

- **Profit**
- **Loss**
Put Options for Miners

- On 01 Sep 2016, iron ore miners who are concerned about prices falling below US$45 per metric ton in Nov 16 can hedge their downside risk by buying a put option on SGX Iron Ore futures with a US$45 strike. The premium for this option is at US$2.00.
- **Buy put option at US$45 strike at US$2.00 premium for Nov-16**

If the average prices for Nov 16 iron ore futures fall to US$40, the put option is In-The-Money and will be automatically exercised into short Nov 16 iron ore futures at US$40 and cash settled against US$45. The miner will make a profit of US$3.00 per metric ton (US$45 – US$40 – US$2.00) on their options position to compensate for the loss in revenue from the lower physical iron ore sale price.

Conversely, if average prices rise to US$50, the put option will not be exercised. The miner continues to enjoy unlimited upside of being able to sell their iron ore at higher price and their eventual price per metric ton for the physical iron ore will be US$50 – US$2.00 premium paid.
### Margin Offset

<table>
<thead>
<tr>
<th></th>
<th>Iron Ore</th>
<th>Coking Coal</th>
<th>HRC Steel</th>
<th>Freight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron Ore</td>
<td>Up to 60%</td>
<td>Up to 50%</td>
<td>Up to 50%</td>
<td>Up to 45%</td>
</tr>
<tr>
<td>Coking Coal</td>
<td>-</td>
<td>Up to 70%</td>
<td>-</td>
<td>Up to 40%</td>
</tr>
<tr>
<td>HRC Steel</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Up to 45%</td>
</tr>
<tr>
<td>Freight</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Up to 65%</td>
</tr>
</tbody>
</table>

### Sample Portfolio

<table>
<thead>
<tr>
<th></th>
<th>Buy</th>
<th>Sell</th>
</tr>
</thead>
<tbody>
<tr>
<td>62% Iron Ore</td>
<td>5,000 MT</td>
<td>-</td>
</tr>
<tr>
<td>Australia Coking Coal</td>
<td>2,500 MT</td>
<td>-</td>
</tr>
<tr>
<td>HRC Steel</td>
<td>-</td>
<td>3,120 MT</td>
</tr>
<tr>
<td>Capesize 5TC</td>
<td>5 days</td>
<td>-</td>
</tr>
</tbody>
</table>
# 5th Singapore Iron Ore Week
23-28 April 2017 | Sands Expo & Convention Centre

## Embracing Today's Market Dynamics
Redefining Tomorrow's Steel Value Chain

<table>
<thead>
<tr>
<th></th>
<th>Sunday 23 April</th>
<th>Monday 24 April</th>
<th>Tuesday 25 April</th>
<th>Wednesday 26 April</th>
<th>Thursday 27 April</th>
<th>Friday 28 April</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Morning</strong></td>
<td>SGX Iron Ore Week Triathlon</td>
<td>Physical Trading Workshop</td>
<td>Derivatives Workshop</td>
<td>Derivatives Workshop</td>
<td>Singapore Iron Ore Forum (SIOF)</td>
<td></td>
</tr>
<tr>
<td><strong>Afternoon</strong></td>
<td></td>
<td>Futsal Tournament</td>
<td>Derivatives Workshop</td>
<td>Basketball Tournament</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Evening</strong></td>
<td></td>
<td>Voice of Iron Ore</td>
<td>SGX AsiaClear Awards Night and SIOF Welcome Reception</td>
<td>SIOF Gala Dinner</td>
<td>Closing Cocktail Reception</td>
<td></td>
</tr>
</tbody>
</table>

*The above schedule is subject to change*
Thank you

Narendra.Hegde@sgx.com

+65 97123566