Parameters for Performance Review of Commodity for the Financial year 2019-20

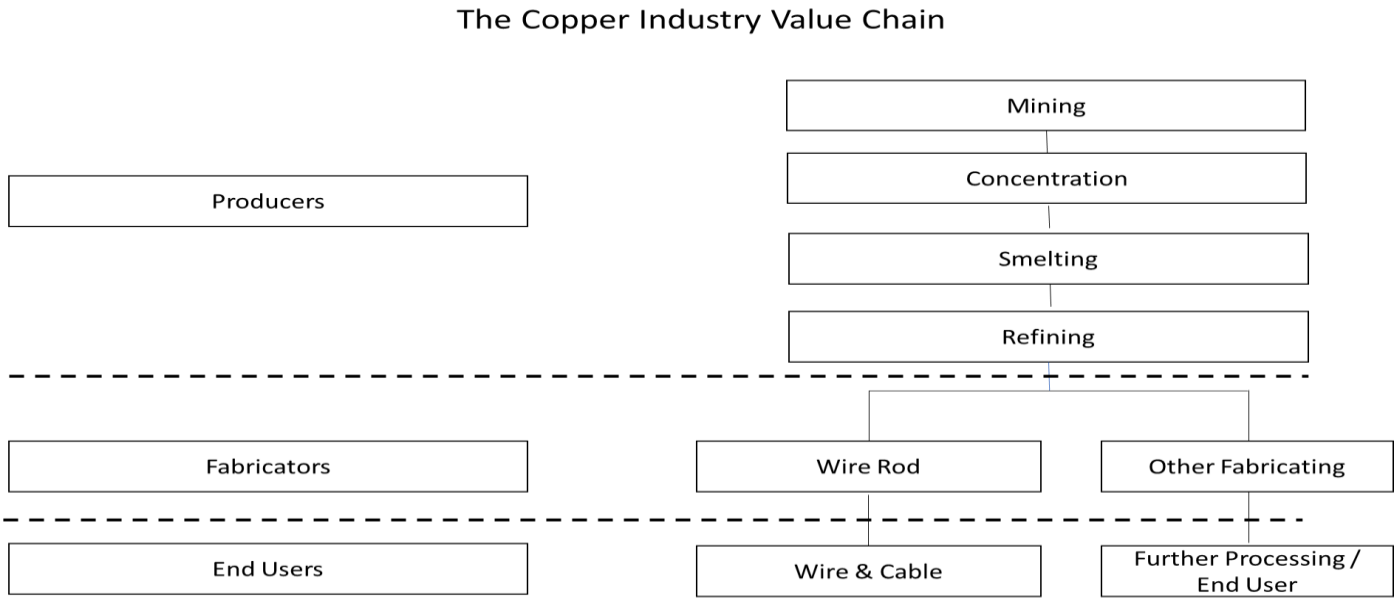
Copper

1. **Background**

a) **Brief about the commodity such as sample picture, lifecycle and various varieties/grade of the commodity found in India**

Copper is a soft, malleable, and ductile metal with very high thermal and electrical conductivity. Copper is one of the few metals that occurs in nature in directly usable metallic form (native metals) and is an important non-ferrous base metal having wide industrial applications, ranging from defence, space programme, railways, power cables, mint, telecommunication cables, etc. India is not self-sufficient in the production of copper ore. In addition to domestic production of ore and concentrates, India imports copper concentrates for its smelters. The domestic demand for copper and its alloys is met through domestic production, recycling of scrap and by imports.

Value Chain for Copper



BSE - INTERNAL

Various grades of Copper Produced in India

The total reserves/resources of copper ore as on 1.4.2015 as per NMI database based on UNFC system are estimated at 1.51 billion tonnes. Of these, 207.77 million tonnes (13.75%) fall under 'Reserve's category' while the balance 1.30 billion tonnes (86.25%) are placed under 'Remaining resources' category. Gradewide there are no reserves with 1.85% or more copper grade. However, 203.83 million tonnes reserves fall under 1% to below 1.85% Cu grade. Of the total ore resources 8.28 million tonnes (0.55%) comprise ore containing 1.85% Cu or more and 657.92 million tonnes (43.53%) resources fall under 1% to below 1.85% Cu grade.

Source: India Mineral Yearbook

b) Commodity fundamentals and balance sheet as per the following format (to be prepared based on publicly available information on best effort basis

Global Copper Scenario		
000' MT	2018	2019(p)
World Mine production	20,565	20,528
World Refined Copper Production	24,058	24,045
World refined Copper Usage	24,484	24,427
Source: International Copper Study Group		

India Copper Scenario (Refined Copper)		
000' MT	2018-19	2019-20
Production	244.9	229.1
Import (Tonnes)	56	95.4
Total Supply	300.9	324.5
Exports	18.4	17.1
Domestic Consumption**	670	710
Source: CMIE ***April-October Data*** **** Source: HCL Investor presentation March 2021***		

Top 10 Major producing countries

Top 10 Major producing countries (In tonnes)		
Country	2018	2019
China	91,20,398	96,40,423
Chile	24,61,200	22,74,700
Japan	15,94,517	15,04,156
United States	11,11,080	10,44,690
Russia	9,87,152	10,22,299
D.R. Congo	8,55,094	8,77,693
South Korea	6,24,243	6,62,522
Germany	6,71,194	6,17,616
Poland	5,01,862	5,67,842
Mexico	4,15,126	4,50,251
Source: Bloomberg ***Note: Refined copper production numbers are considered***		

BSE - INTERNAL

Top 10 Major consuming countries

Top 10 Major consuming countries (In tonnes)		
Country	2018	2019
China	1,25,15,228	1,28,37,181
United States	18,12,550	18,52,320
Japan	10,24,683	9,89,069
Germany	12,04,476	9,75,904
South Korea	6,63,209	6,35,600
Italy	5,48,547	5,44,539
India	5,04,859	5,28,601
Turkey	4,68,867	4,47,291
Mexico	3,88,569	4,19,029
Thailand	3,59,181	3,63,418

Source: Bloomberg
Note: Refined copper consumption numbers are considered

Top 10 Major Exporting countries

Top 10 Major Exporting countries (In $ Millions)			
Country	2018-19	Country	2019-20
Chile	14,783	Chile	11,409
Germany	8,123	EU-28	6,691
EU-28	8,074	Japan	6,107
Japan	6,613	Germany	5,101
Russian Federation	5,066	Rep. of Korea	2,986
Rep. of Korea	4,195	Poland	2,548
USA	3,325	USA	2,523
Poland	2,756	Canada	2,225
Belgium	2,657	Belgium	2,108
Australia		Kazakhstan	1,712

Source: UN Comtrade

Top 10 Major Importing countries

Top 10 Major Importing countries (In $ Millions)			
Country	2018-19	Country	2019-20
EU-28	8,079	USA	6,788
USA	7,711	EU-28	6,014
Germany	6,150	Italy	4,633
Italy	5,495	Germany	3,735
Thailand	3,481	India	2,637
India	3,242	Turkey	2,596
Turkey	2,900	Rep. of Korea	1,840
Rep. of Korea	2,861	United Kingdom	1,241
Malaysia	2,556	Mexico	1,121
United Arab Emirates	2,195	Spain	1,057

Source: UN Comtrade

BSE - INTERNAL

Top 10 Major producing States in India

Top 10 Major producing States in India (In tonne) (Copper Ore)		
States	2017-18	2018-19
Madhya Pradesh	23,39,035	25,42,159
Rajasthan	11,60,267	13,49,566
Jharkhand	1,78,700	2,43,020
Source: India Mineral Yearbook		

Top 10 Major producing States in India (In tonne) (Copper Cathode)			
States	2017-18	States	2018-19
Gujarat	4,13,808	Gujarat	3,51,041
Tamil Nadu	2,17,020	Dadra Nagar haveli	86,644
Dadra Nagar haveli	1,86,416	Jharkhand	13,782
Jharkhand	13,280	Tamil Nadu	2,870
Source: India Mineral Yearbook			

c) Major changes in the polices governing trade in the spot markets of the commodity

India has several trade agreements with the world countries

d) Geopolitical issues in the commodity and its impact on Indian scenario.

- Copper began the year at $6,075/tonne, dipped to as low as $5,757/tonne in October and ended the year at $6,077/tonne – effectively flat year on year growth.
- Indonesia's nickel ore export ban had a cascading effect in all base metals
- Fear of global economic slowdown linked to US-China trade war
- US tariffs hike on Chinese exports.
- China's trade policy quotas which aimed at a significant reduction in the import of any waste into the country, including metal scrap.

BSE - INTERNAL

2. **Trading related parameter**

a. **Monthly and Annual traded volume**

Month	Volume (In MT)
Apr-19	7
May-19	593
Jun-19	268
Jul-19	6
Aug-19	-
Sep-19	-
Oct-19	-
Nov-19	-
Dec-19	-
Jan-20	-
Feb-20	-
Mar-20	-
Total FY 2019-20	**874**

b. **Annual traded volume as proportion of total deliverable supply:** 0.11%
- Annual Traded Volume: 874 MT
- Deliverable Supply (Production + Imports): 8,26,029 MT

c. **Annual traded volume as proportion of total annual production:** 0.21%
- Annual Traded Volume = 874 MT
- Total Annual Production = 4,08,398 MT

d. **Annual average Open interest as proportion of total production:** 0.001%
- Annual Average OI = 4
- Total Annual Production = 4,08,398 MT

e. **Annual average Open interest as proportion of total deliverable supply:** 0.0005%
- Annual Average OI = 4
- Deliverable Supply (Production + Imports) = 8,26,029 MT

Note: numbers of leading exchanges are considered for calculating deliverable supply

f. Monthly and Annual quantity of delivery (in appropriate units)

Month	Annual value of trade (In crores)
Apr-19	0.33
May-19	26.90
Jun-19	11.78
Jul-19	0.27
Aug-19	-
Sep-19	-
Oct-19	-
Nov-19	-
Dec-19	-
Jan-20	-
Feb-20	-
Mar-20	-
Total	**39.27**

BSE - INTERNAL

f. Monthly and Annual quantity of delivery

- Nil

g. Monthly and Annual value of delivery (in Rs.)

- Nil

h. Average Monthly and Annual Average Open Interest (OI)

Months	Average OI (In MT)
Apr-19	-
May-19	20
Jun-19	28
Jul-19	-
Aug-19	-
Sep-19	-
Oct-19	-
Nov-19	-
Dec-19	-
Jan-20	-
Feb-20	-
Mar-20	-

Annual Average Open Interest = 4 MT

Note: Note: Average OI is taken since launch date till the end of the year

i. Annual average volume to open interest ratio: 75%

- Annual Average Volume: 3 MT
- Annual Average OI: 4 MT

j. Total number of unique members and clients who have traded during the financial year

- Unique Members: 10
- Unique Clients: 11

k. Ratio of open interest by FPOs/farmers/Hedge/VCP positions to total open interest (Annual average as well as maximum daily value)

Not Available

l. Number of unique FPOs / farmers and VCPs/hedgers who traded in the financial year

Not Applicable

m. Algorithmic trading as percentage of total trading

- 48.24%

BSE - INTERNAL

n. **Delivery defaults**

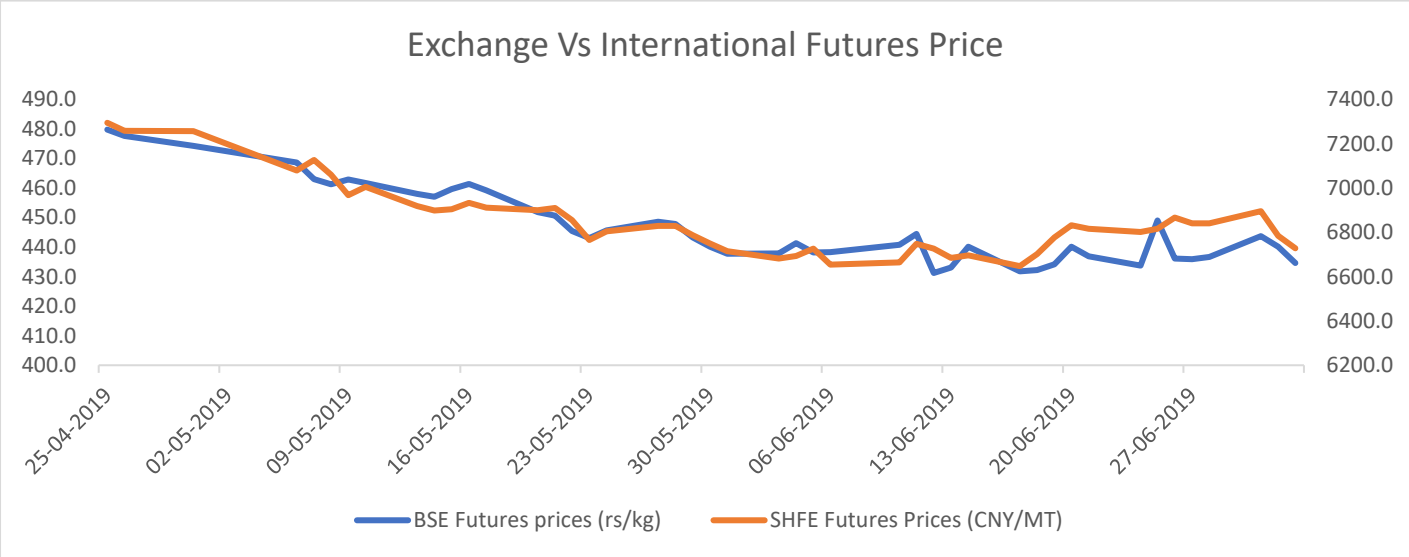
Number of instances = Nil

Quantity involved = Nil

Value involved = Nil

3. **Price movements**

a. **Comparison, correlation, and ratio of standard deviation of Exchange futures price vis-à-vis international futures price (wherever relevant comparable are available)**



The correlation between exchange and International Futures Prices is 0.9055 for period April 25,2019 to July 3, 2019

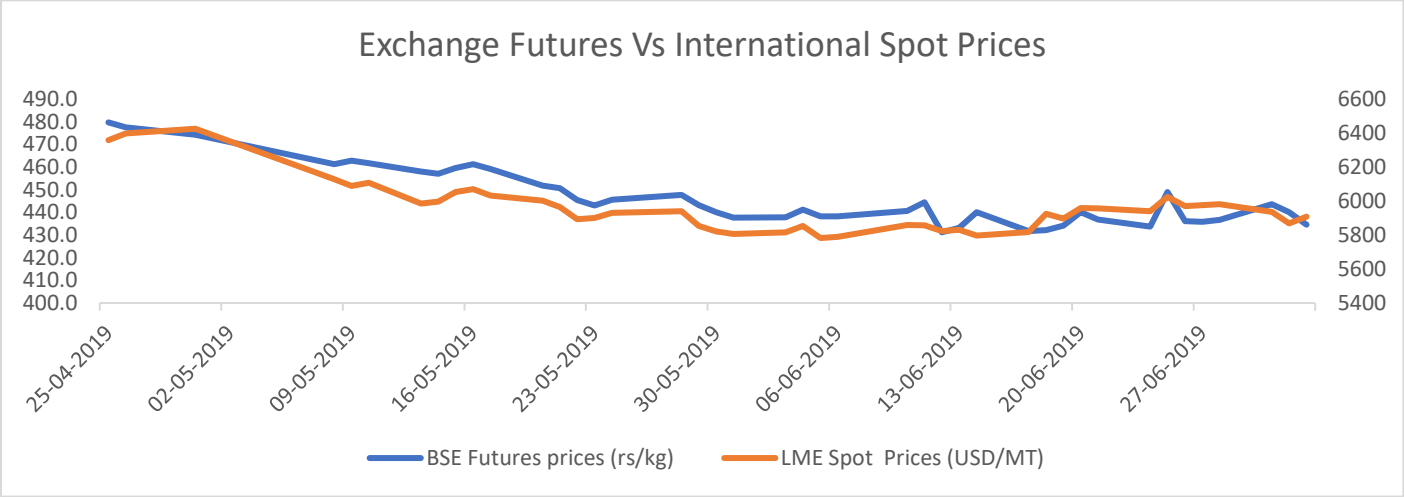
The standard deviation of Exchange Futures prices was 1.21% for period April 25,2019 to July 3, 2019

The standard deviation of International Futures prices was 0.77% for period April 25,2019 to July 3, 2019

The ratio of Standard Deviation for the same period was 1.48

BSE - INTERNAL

b. Comparison, correlation, and ratio of standard deviation of Exchange futures price vis-à-vis international spot price (wherever relevant comparable are available) and domestic spot price (exchange polled price).



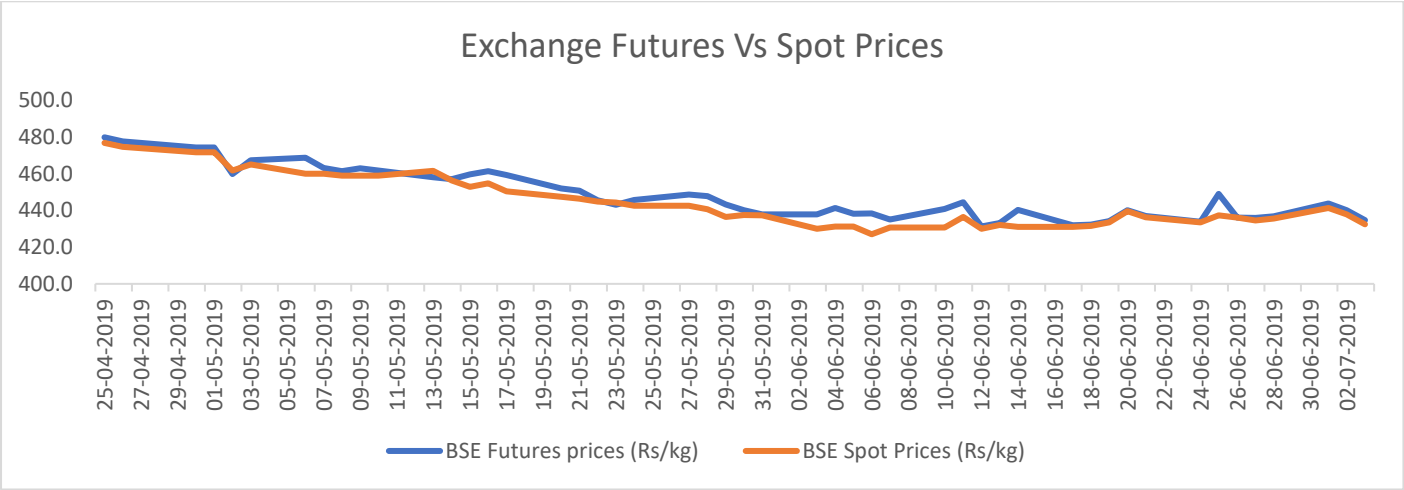
The correlation between exchange futures and International Spot Prices is 0.8713 April 25,2019 to July 3, 2019

The standard deviation of Exchange Futures prices was 1.21% for period April 25,2019 to July 3, 2019

The standard deviation of International Spot prices was 1.07% for period April 25,2019 to July 3, 2019

The ratio of Standard Deviation for the same period was 1.14

c. Correlation between exchange futures & domestic spot prices along with ratio of standard deviation.



The correlation between exchange futures and Exchange Spot Prices is 0.9655.

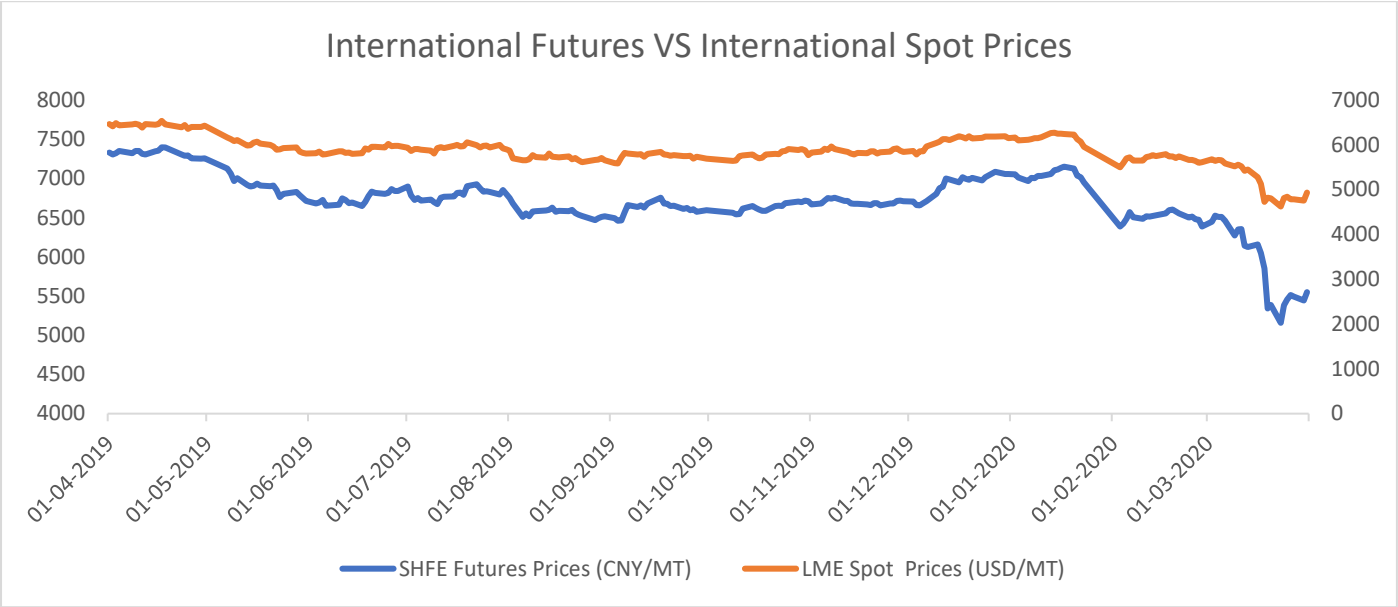
The standard deviation of Exchange Futures prices was 1.21%% for period April 25,2019 to July 3, 2019

The standard deviation of Exchange Spot prices was 0.76 % for period April 25,2019 to July 3, 2019

The ratio of Standard Deviation for the same period was 1.59

BSE - INTERNAL

d. Correlation between international futures & international spot prices along with ratio of standard deviation (wherever relevant comparable are available).



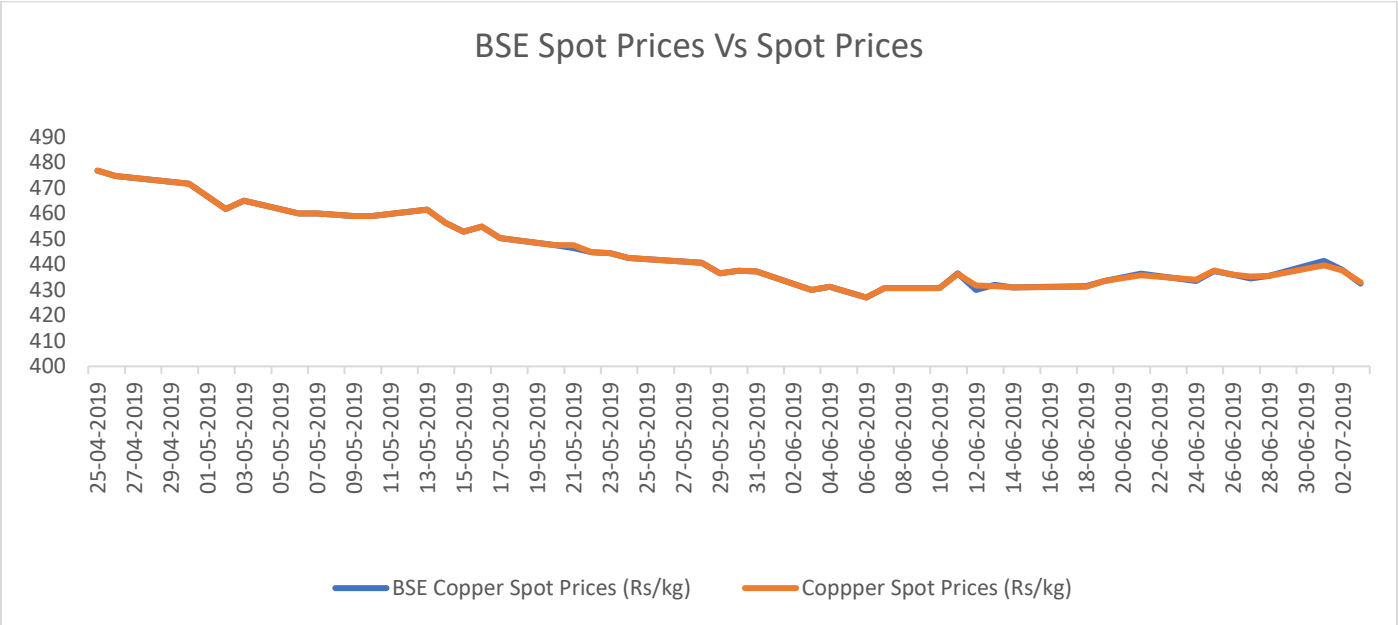
The correlation between International futures and International Spot Prices is 0.9846 for FY 2019-20

The standard deviation of International Futures prices was 1.14% for period FY 2019-20

The standard deviation of International Spot prices was 1.24% for period FY 2019-20

The ratio of Standard Deviation for the same period was 0.92

e. Comparison of Exchange polled price and mandi price (in case of agricultural commodities) / other relevant price (in case non-agricultural commodities) at basis centre



BSE - INTERNAL

f. Maximum & Minimum value of daily futures price volatility and spot price volatility along with disclosure of methodology adopted for computing the volatility.

Commodity	Max of Daily Futures Price Volatility %	Min Daily Futures Price Volatility %	Max of Daily Spot Price Volatility %	Min Daily Spot Price Volatility %
Copper	3.50%	-3.03%	1.38%	-2.12%

g. Number of times the futures contract was in backwardation/contango by more than 4% for the near month contract in the period under review

BSE Copper futures contract was never in Backwardation or Contango by more than 4% in the period under review

4. Other's parameters

a. Qualitative and quantitative measure for Hedge effectiveness ratio and basis Risk (Volatility of Basis) along with disclosure of methodology adopted for such calculations

Hedge Effectiveness for FY 2019-20

Commodity	Hedge Efficiency
Copper	99.92%

Note: Hedging efficiency is the 'R Square' value of the regression equation between BSE futures prices and BSE polled spot prices during the financial year.

Basis Risk for FY 2019-20

Commodity	Unit	Average Return of Basis (Unit)	Standard deviation
Copper	Rs/Kg	1.28	6.22
Note: Period 25/04/2019 to 03/07/2019			

Note: Basis Risk is computed as the Standard deviation of daily normal return in Basis, which is excess of Spot over Futures price.

b. Details about major physical markets of the commodity vis-à-vis market reach in terms of availability of delivery centers (information to be provided state-wise and UT-wise)

City	State
Coimbatore	Tamil Nadu
Bhilai	Chattisgarh
Rudrapur	Uttarkhand
Noida	Uttar Pradesh
Kochi	Kerala
Angul	Odisha
Gandhinagar	Gujarat

BSE - INTERNAL

Vadodara	Gujarat
Mumbai	Maharashtra
Bangalore	Karnataka
Sri City	Andhra Pradesh
Margao	Goa
Aurangabad	Maharashtra
Hyderabad	Andhra Pradesh
Coimbatore	Tamil Nadu
Bhilai	Chattisgarh
Rudrapur	Uttarakhand
Source: Wikipidea	

Note: BSE has a delivery centre at Bhiwandi

c. Details about major physical markets of the commodity and average Open Interest for each month generated from those regions

Same as point (4b)

Information on region wise Open Interest is Not available

d. Details, such as number and target audience, of stakeholders' awareness programs carried out by the exchange

Sr. No.	Program Type	Location	Participants
1	Client Awareness Program	MUMBAI	100
2	Commodity Awareness Program	MUMBAI	75
3	Awareness Program in association with FIEO	MUMBAI	45

e. Steps taken / to be undertaken to improve hedging effectiveness of the contracts as well as to improve the performance of illiquid contracts

Exchange had arranged client awareness session with Brokers.

Exchange also held One to one meeting with Corporate clients.

BSE - INTERNAL