

TUMBLING TRADE ON THE MCX: RESTORING THE GLORY OF MENTHA OIL FUTURES

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It was a bright, sunny day in November 2020. Mumbai, the state capital of Maharashtra in India, was under lockdown because of the COVID-19 outbreak. Offices were closed, roads were deserted, and pollution was at an all-time low. Rishi Nathany, senior vice-president and head of business development and marketing at the Multi Commodity Exchange of India Limited (MCX), was speaking with Sunil Kumar, product manager at the MCX. Nathany observed, “Mentha oil futures contracts were among the frequently traded derivative contracts, and the oil is widely consumed in the medicinal, cosmetics, and confectionary sectors.”

Kumar remarked, “India is the world’s top grower of mentha. After 2017, there was a deep decline in mentha oil futures trading, wiping out liquidity, and several market participants have withdrawn from the MCX.” Nathany asked, “What is causing this downturn?” Poring over the findings of a recent stakeholder study in the mentha oil trade conducted by the Indian Institute of Management Lucknow in 2020–21,¹ he observed that, since 2005, the futures market had strengthened the mentha oil trade and its ecosystem, and benefited numerous entities engaged in activities such as production, processing, trading, and distribution. The sagging futures market might reverse the mentha oil trade, bringing it back to its unorganized and fragmented state. Nathany realized that a plan of action would need to be determined to restore the glory of mentha oil futures.

COMMODITY DERIVATIVES MARKETS IN INDIA

A derivative was a financial instrument whose value was derived from an underlying asset or commodity. The objective of derivatives trading was to make a profit by speculating on the direction of commodity prices or hedging the exposure or price risk associated with the commodities underpinning the derivatives market.

Commodity derivatives markets promoted commodity trading via futures and options, enabling the trade to settle at a predetermined future date.² Commodity derivatives markets provided direct and indirect benefits

¹ Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 1–39, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

² Securities and Exchange Board of India, *FAQS on Commodity Derivatives*, November 2021, https://www.sebi.gov.in/sebi_data/faqfiles/nov-2021/1636459721896.pdf.

to the value chain actors in terms of price discovery, hedging price risk, investment opportunity, and portfolio diversification.³ The commodities traded in India's market included agricultural, metals, precious metals or bullion, and energy products.

Commodity derivatives trading was the oldest economic pursuit known to India, predating the advent of financial derivatives. Kautilya's *Arthashastra*, written around 350–275 BCE, documented forward and options trading in commodities practised in ancient India.⁴

In 1875, the Bombay Cotton Trade Association established a regional exchange, the Bombay Cotton Exchange, which was followed by the trading of various commodities, including oilseeds in Bombay (1900), raw jute and hessian in Calcutta (1912), wheat in Hapur (1913), and bullion in Bombay (1920).⁵ In 1952, the Forward Contracts (Regulation) Act was passed by the Parliament of India to regulate the commodity derivatives market, but it was repealed in 2015 when the commodity derivatives market regulator, the Forward Markets Commission, merged with the Securities and Exchange Board of India (SEBI).

In 2002–03, the commodities derivatives market landscape witnessed a wave of nationalization. Based on the recommendations of a committee set up by economics professor Kamal Nayan Kabra in 1993–94 and on the National Agriculture Policy in 2000, three national-level commodity exchanges were established: the MCX, the National Commodity and Derivatives Exchange, and the National Multi Commodity Exchange.⁶ These three national-level electronic exchanges dominated the commodity derivatives markets, with the seventeen regional commodity exchanges claiming a relatively smaller share.

In 2008–09, to expand and deepen the exchange-traded commodity derivatives trade, the Forward Markets Commission authorized three additional national-level commodity exchanges—namely, the Indian Commodity Exchange, the Universal Commodity Exchange, and the Ahmedabad Commodity Exchange-Kotak Derivatives Exchange. However, some of these exchanges were unable to survive, and as of 2018, the commodity derivatives landscape had come to be dominated by two principal exchanges: the MCX for energy and metals, and the National Commodity and Derivatives Exchange for agricultural commodities.⁷

These demutualized commodity exchanges supplanted open outcry or pit trading with the advent of the derivatives trading and settlement system, which was state-of-the-art technology. The order-driven market had surpassed the quote-driven market, resulting in enhanced liquidity, leverage, and transparency.⁸ The exchanges allowed members (dealers) to access the electronic limit order book, which maintained real-time buy (bid) and sell (ask) prices while helping market participants make informed decisions in trading—closing out or carrying out open positions for delivery. Maintaining price-time in derivatives trading was critical to transactional transparency and liquidity.

³ Tushar Ranjan Barik, "Commodity Derivative Market - An Overview," TaxGuru, May 16, 2021, <https://taxguru.in/sebi/commodity-derivative-market-overview.html>.

⁴ Rose Mary K. Abraham, "Evolution of Regulatory Policy in Commodity Derivatives Markets in India," *Social Scientist* 48, no. 3/6 (March–June 2020): 103–116.

⁵ Jyoti Sharma, "Agri Commodity: History Journal (Part 1)," *AgriBazaar* (blog), January 16, 2021, <https://blog.agribazaar.com/agri-commodity-history-journal-part-1/>.

⁶ Dilip Kumar Jha, "NCLT Approves Merger of Ahmedabad based NMCE with Reliance-Anchored ICEX," *Business Standard*, September 3, 2018, https://www.business-standard.com/article/markets/nclt-approves-merger-of-ahmedabad-based-nmce-with-reliance-anchored-icex-118090300778_1.html.

⁷ Gauri Dhir and Khushdeep Dharni, "Commodity Exchanges in India: Status and Issues," *International Journal of Pure & Applied Bioscience* 6, no. 3 (2018): 475–482, www.ijpab.com/form/2018%20Volume%206,%20issue%203/IJPAB-2018-6-3-475-482.pdf.

⁸ Sudhakar Reddy Syamala, V. Nagi Reddy, and Abhinav Goyal, "Commonality in Liquidity: An Empirical Examination of Emerging Order-Driven Equity and Derivative Market," *Journal of International Financial Markets, Institutions and Money* 33 (November 2014): 317–334.

After 2003, the market was structured and integrated due to the implementation of improvised surveillance for trading, settlement, and delivery operations. Derivative contracts floated on these exchanges were broad-based and standardized to protect the interests of diverse stakeholders, including producers, processors, traders, exporters, and importers. Market players in the derivatives market were notably hedgers, speculators, and arbitrageurs. They contributed to liquidity by influencing trade volume and aided in price discovery and risk transfer.⁹

A derivative contract specification included a standard variety of the commodity, trading lot or order size, maximum allowable position for clients and exchange members, price bands, tick size (difference between two price points of the same futures contract), delivery orders, margining system, quality parameters, delivery logics, due date rates, delivery locations, and pay-in and pay-out mechanisms. Daily and final settlement through the exchange's owned or adjunct clearing house offered a robust performance guarantee mechanism for buyers and sellers, which helped avert potential credit defaults.

MULTI COMMODITY EXCHANGE

The MCX facilitated online commodity derivatives trading, clearing, and settlement operations. It started operations in November 2003 under the auspices of the Forward Markets Commission, the regulator at that time. The SEBI began regulating the MCX in September 2015. The exchange provided a derivatives trading and settlement system for metals, energy products, and agricultural commodities. In 2008–09, the exchange pioneered algorithmic trading for metals and energy items.

Until 2012, a portfolio of futures derivative products had dominated the exchange business. The year 2013 posed several challenges for the MCX, including the National Spot Exchange Limited crisis and the imposition of the Commodity Transaction Tax on non-agricultural derivatives products such as metals and energy.¹⁰ However, despite a brief period of decline, the MCX continued to be India's leading commodity exchange, with a market share of 94 per cent in 2019–20 (see Exhibit 1), and it grew to become the seventh-largest exchange in the world in terms of the volume of futures contracts traded.

The MCX was a leader in the energy and metal derivatives segments. For every million trade transactions, the MCX charged transaction fees of ₹7.5¹¹ for agricultural and ₹21 for non-agricultural commodities. In 2018–19, the exchange earned revenues of ₹387.52 million, up from ₹56.63 million in 2017–18. Its operating expenses, on the other hand, rose to ₹253.45 million from ₹24.94 million. In 2018–19, the exchange disclosed a net income of ₹94.34 million, almost fivefold the ₹20.27 million reported in 2017–18. In terms of the MCX's shareholding pattern, the public, non-institutional players, and non-promoters held 75.96 per cent, 23.86 per cent, and 0.19 per cent, respectively. The MCX had 620 registered members and 48,427 authorized persons spanning 981 cities and towns across India.

The Multi Commodity Exchange Clearing Corporation Limited (MCXCCL), a wholly owned subsidiary of the MCX, was India's first commodity clearing corporation. The European Securities and Markets Authority recognized the MCXCCL as a third-country central counterparty under European market

⁹ Nidhi Aggarwal, Sargam Jain, and Susan Thomas, "Do Futures Markets Help in Price Discovery and Risk Management for Commodities in India?" (Indira Gandhi Institute of Development Research, Mumbai, June 2014), 7–14, www.igidr.ac.in/pdf/publication/WP-2014-020.pdf.

¹⁰ Nilanjan Ghosh and Renita D'Souza, "Investigating the Impact of Commodity Transaction Tax on India's Commodity Derivatives Markets," *Occasional Paper* no. 313 (May 2021): 2; D. Satish and M. V. Nagendra Kumar, "NSE's Payment Crisis: Jolt to Indian Commodity Markets," *Asian Journal of Management Cases* 12, no. 2 (2015), <https://doi.org/10.1177/0972820115592211>.

¹¹ ₹ = INR = Indian rupee; US\$1 = ₹74.0029 on November 30, 2020.

infrastructure rules. The MCXCCL offered collateral management and risk management services, as well as clearing and settlement of deals, and operated as an electronic commodity accounting and receipts tracking system through a web-based portal dubbed the Commodity Receipts Information System. Through the settlement guarantee fund, the clearing corporation provided settlement guarantees for transactions performed on the MCX platform.

The MCX, in association with Thomson Reuters, launched the Thomson Reuters-MCX India Commodity Indices (iCOMDEX) in 2017. In December 2019, the MCX introduced the MCX iCOMDEX series of indices. In 2020 and 2021, the exchange launched futures on various indices. The MCX initiated options on gold futures in October 2017 and introduced options for crude oil, copper, silver, and zinc in May 2018.

The MCX forged strategic alliances with leading international exchanges, including the CME Group, Inc., London Metal Exchange, Dalian Commodity Exchange, and Taiwan Futures Exchange. It also collaborated with various trade bodies, corporations, educational institutions, and research and development centres. It entered memoranda of understanding with other exchanges and educational institutions to establish an inclusive environment for the commodities derivatives market, knowledge sharing, and awareness creation.¹²

MENTHA OIL SPOT AND FUTURES MARKETS

The confectionery and pharmaceuticals industries both leveraged several varieties of mentha oil, including Japanese mint (*Mentha arvensis*), peppermint (*Mentha piperita*), and spearmint (*Mentha spicata*). The MCX floating futures contract included trading and delivery of Japanese mint. Between 2017–18 and 2019–20, India produced between 35,000 and 37,000 metric tons of Japanese mint. It was responsible for more than 80 per cent of the global output.

Uttar Pradesh, a state in northern Indian, was a hub of mentha production. Mentha was cultivated in the eastern and Terai regions of Uttar Pradesh—namely, Barabanki, Moradabad, Rampur, Budaun, Sitapur, Bareilly, Faizabad, Pilibhit, Raebareli, Lucknow, and Sultanpur. The state produced more than 80 per cent of India's mentha. The congenial agro-climatic conditions and value-added services provided by processing and exports had buoyed up mentha cultivation in about 70 per cent of the gross cropped area during the last decade in Uttar Pradesh. Mentha, a crop with a short growing season of 100–120 days, was a profitable cash crop for Uttar Pradesh farmers, who followed a cropping pattern—paddy, mustard, or potato with mentha. According to the Indian Institute of Management report, farmers in Barabanki and Masauli outperformed other mentha production hubs in the state in terms of the cost-benefit ratio of mentha cultivation (see Exhibit 2).

Price Information Access and Trading

Farmers in Uttar Pradesh often sold their produce to local traders. Farmers accessed information on mentha oil spot and futures prices from market yards and local traders. Mobile phone penetration in rural areas had enabled producers to access real-time futures and spot prices; the ease of this access lowered their transaction and search costs. While most farmers had not traded in mentha oil futures, a few farmer producer companies (FPCs) in the state had established trading accounts with MCX members or brokers.¹³ For

¹² "Multi Commodity Exchange of India Ltd.," *Business Standard*, accessed September 23, 2021, <https://www.business-standard.com/company/multi-comm-exc-25746/information/company-history>.

¹³ Saswat Kumar Pani, Damodar Jena, and Nishith Ranjan Parida, "Farmer Producers Company in India: Status and Policy Implications on Marginal and Small Farmers," *International Journal of Modern Agriculture* 9, no. 4 (2020): 801–810, www.modern-journals.com/index.php/ijma/article/view/441.

example, producer companies Navjyoti Kisan Producer Company Limited and Ujjwal Kisan Producer Company Limited, founded in 2014, had more than one thousand member producers with a paid-up capital of ₹900,000 and ₹300,000, respectively. These FPCs were involved in the input supply, aggregation, processing, and trading of mentha oil. They occasionally hedged their exposure in the MCX platform, and delivered mentha oil drums in several units to warehouses in Uttar Pradesh's Barabanki and Chandausi regions. The Warehousing Development and Regulatory Authority had accredited and notified these warehouses for mentha oil storage and delivery.

Processing

Harvested mentha leaves were distilled into oil. The distillation procedure included the following steps: gradual chilling through refrigeration, crystallization, centrifugation, and drying.¹⁴ Liquid menthol was manufactured from de-mentholated oil, a by-product of the crystallization process. Menthol was used worldwide as a flavouring and cooling agent in the tobacco, cosmetics, confectionery, pharmaceuticals, and oral care sectors. Mint products contributed to about 18–19 per cent of India's spices exports.¹⁵ China and the United States were India's primary export destinations, accounting for about 40 per cent and 19 per cent, respectively, of India's mint product exports. Other export destinations for India's mint products included the Netherlands, Singapore, Germany, France, Japan, and the United Kingdom (see Exhibit 3). The natural mentha market had risen until 2010, with the introduction of synthetic menthol as an alternative reshaping the market landscape.

Futures Trading

In 2005, the MCX launched its mentha oil futures contract, which gained traction in 2009–10. Buoyancy in the trade volumes persisted until 2017, as hedgers and speculators continued to drive the mentha oil futures. After 2017, however, the market lost momentum. Many intraday traders exited the market intermittently. Large exporters and processors withdrew their participation. In 2018, the decline in transaction volume, turnover, and open interest halted the breadth and depth of the mentha oil futures market (see Exhibits 4 and 5).¹⁶ The mentha oil futures and spot price series were split into two regimes: the first covered the period between January 1, 2014, and December 31, 2016, and the second between January 1, 2017, and November 4, 2020 (see Exhibit 6). The degree of financialization in mentha oil futures determined the categorization of the two distinct regimes.¹⁷ Upward movement of mentha oil futures prices, trading volume (market breadth), liquidity, and open interest (market depth) characterized the financialization. After 2017–18, the reduced market depth and breadth indicated de-financialization for mentha oil futures. The exchange's liquidity and minimal participation remained a source of worry.

STAKEHOLDER SURVEY

The MCX commissioned a stakeholder study in collaboration with the Indian Institute of Management in October 2020. The study administered a survey questionnaire to forty-four respondents. The survey

¹⁴ Indian Institute of Management Lucknow, *Survey-Based Study*, 7.

¹⁵ Indian Institute of Management Lucknow, *Survey-Based Study*, 8.

¹⁶ Open interest referred to the number of futures contracts outstanding in a trading day; cumulative open interest indicated the number of contracts or open positions available for making (sell) or taking (buy) delivery after the expiry of the futures contract. See John C. Hull, *Options Futures and Other Derivatives*, 9th ed. (New Delhi: Pearson, 2014), 14–16.

¹⁷ Surobhi Mukherjee, "Futures Market: Old Style Speculation or Financialisation?," *Economic & Political Weekly* 52, no. 35 (September 2, 2017), <https://www.epw.in/journal/2017/35/special-articles/futures-markets.html>.

respondents included twenty-three spot (physical) and futures market traders, nine exchange members, six processors-cum-exporters, four FPCs, and two warehousing companies facilitating mentha oil delivery.

The survey reported the value chain activities of stakeholders in parts of Uttar Pradesh, the National Capital Territory of Delhi, and Mumbai. Of the forty-four sample respondents, thirty-three participated in futures trading, ten were involved in processing or distillation of mentha leaves into mentha oil, and seven were engaged in exporting menthol and by-products of mentha oil. Thirty-two respondents traded in the physical markets of Barabanki and Chandausi in Uttar Pradesh, and thirty-four stored mentha oil drums in either their houses or the exchange-accredited warehouses to fetch a remunerative price in the lean period.

Concerning the mentha oil futures trading on the MCX, a questionnaire was designed and administered to thirty-three respondents, including traders, processors-cum-exporters or hedgers, and exchange members. Twenty-two respondents reported that they delivered mentha oil drums on the exchange platform, and twenty-four respondents shared their problems in trading and delivery resulting from the alignment of trading and delivery lots (i.e., six drums). Twenty-five respondents opined that the increased initial margin amount could be attributed to the steep decline of futures trading in mentha oil. Furthermore, twelve respondents were concerned about the delivery lot of six drums, while twenty-one respondents did not show any concern about delivering six drums of mentha oil. However, twenty-six respondents agreed that the assaying agencies approved by the commodity exchange should rationalize per-unit assaying costs.

REASONS FOR TUMBLING TRADE

The survey report highlighted that, between 2017 and 2020, amendments in mentha oil futures contract specifications acted as an impediment and affected the financialization of the mentha oil futures trade (see Exhibit 7). The survey attributed the drop in trade volume to various sources, including an increase in the trading lot size from two drums to six drums. While major processors and exporters remained unaffected, the loss in liquidity and trade volume after the change in trading lot size raised margin requirements and trading costs for market participants (see Exhibit 8). Between April 1, 2020, and April 21, 2020, the initial margin increased from 4 per cent of the contract value to 8 per cent and then 12 per cent. An extreme loss margin of 1 per cent also added fuel to the fire. Scalping activities were interrupted after many intraday traders exited mentha oil futures due to the significant increase in the (initial) margin requirement.

Furthermore, market participants were unable to use mentha oil futures for arbitrage or hedging purposes. Unscrupulous dabba trading¹⁸ had, at times, trumped a regulated futures market.¹⁹ Another factor contributing to the decline included a sharp reduction in the maximum allowable position limit and near-month position limit for clients and members. This amendment in the contract affected delivery. Since the limit did not apply to the near-month futures contract, the hedgers could not take or make delivery of positions exceeding their near-month position limits.

¹⁸ Dabba trading (or, off-market trading) was an unauthorized pseudo stock or commodity market following its own set of rules. It was illegal and not regulated by the SEBI. Dabba trading was carried out by persons who acted as members or brokers and put the order of the trade in their book as the stock or commodity exchange and collected money. They were not registered with the SEBI, and transactions were made in cash. See ET Contributors, "What Is Dabba Trading? Here Are 5 Things to Know," *Economic Times*, last updated March 21, 2022, <https://economictimes.indiatimes.com/wealth/invest/what-is-dabba-trading-here-are-5-things-to-know/articleshow/90333585.cms>.

¹⁹ Indian Institute of Management Lucknow, *Survey-Based Study*, 19.

The doubling of assaying costs, too, aggravated matters; the average assaying costs soared from ₹5,900 to ₹9,735, inclusive of the goods and services tax (see Exhibit 9). With the reduction in delivery lot size from twelve to six drums, the Delhi Test House, one of the exchange's authorized assayers, reduced the assaying costs from ₹5,900 per sample to ₹3,835 per sample for six drums. The other assayer, Fragrance and Flavour Development Centre, did not decrease assaying charges.

Farmers or depositors often failed to meet the quality standards for physical delivery specified in the gas-liquid chromatography (GLC) test.²⁰ The exchange-approved assaying agency set a premium to the mentha oil futures price if the oil contained 68 per cent or more of the l-menthol compound, offered a discount if the l-menthol concentration ranged between 68 per cent and 63 per cent, and rejected the lot if it contained less than 63 per cent. Inadequate GLC testing facilities, a dearth of assaying agencies, and doubled assaying charges limited farmers' or FPCs' participation in the exchange.

In sum, the mentha value chain players suffered a setback because of the increased trading lot size and initial margin, the reduced maximum allowable and near-month position limits for hedgers and investors, and the doubling of assaying costs. Other concerns included a lack of knowledge about futures trading, an unorganized spot market, and warehouse receipt financing offered to farmer collectives or FPCs.

OPTIONS FOR NATHANY

Nathany's first option for strengthening the mentha oil futures market concerned decreasing the trading and delivery lots, along with the initial margin money. Because the new margin amount was about nine times the earlier amount, the participation of FPCs and small intraday traders was affected (see Exhibit 8). Their decreased participation resulted in a declining traded volume, increased impact costs of trading, and a less liquid market. Although the MCX could decrease the trading and delivery lot size, the exchange would have to acquire a clearance from the market regulator, SEBI, in consultation with the product advisory committee of the MCX.

The second option was to rationalize the assaying costs on a per-unit basis. The twofold increase in the assaying costs had affected the participation of hedgers and depositors (see Exhibit 9).

The third was to concentrate on the capacity building of FPCs. The exchange offered various benefits to the FPCs: it enhanced their awareness and strengthened their financial and technical capacities to understand the futures trading and participation (see Exhibit 10). FPCs, as an exchange participant group, would help boost hedging activity. As per the stakeholder survey report, mentha has a cost-benefit ratio of 2.65 for Barabanki and Masauli farmers and 1.65 for Sambhal, Chandausi, and Rampur farmers (see Exhibit 2).

DILEMMA

Nathany wondered whether reducing the trading lot size and initial margin, in consultation with the SEBI, would encourage the involvement of processors and exporters, and of intraday traders who contributed to liquidity through scalping or intraday trading activities.

²⁰ "Impacts of Potato & Mentha Oil Futures on the Commodity Ecosystem," Indian Institute of Management Calcutta (IIMC) Kolkata and National Institute of Science, Technology, and Development Studies (NISTADS), New Delhi, April 2013, accessed October 26, 2021, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iimc-final-report_.pdf?sfvrsn=2, 51.

Nathany also wondered whether the MCX should convince the assayers to reduce the assaying costs in order to enhance the delivery of mentha oil drums. Should the MCX promote participation by FPCs and facilitate warehouse receipt financing?²¹ As GLC-certified mentha oil fetched a premium price in the futures market, should the MCX encourage FPCs to get their oil tested for quality at laboratories connected to National Accreditation Board for Testing and Calibration Laboratories?²² He also had to consider whether it would be necessary to amend mentha oil futures contract specifications to offer benefits to FPCs and commercial users of mentha oil (see Exhibit 11).

P. S. Reddy, managing director and chief executive officer at the MCX, was also keen to restore glory to mentha oil futures. On the advice of Reddy, Nathany sat down to compose an email in preparation for a virtual meeting with Debojyoti Dey, assistant vice-president in the department of research at the MCX. The agenda was to discuss the findings of the stakeholder survey report and chart an action plan. Nathany was eager to know whether mentha oil futures was efficient in price discovery and an effective instrument for hedging price risks.

A meeting with the MCX product advisory committee was scheduled for the following week. Nathany believed that the conclusion of that meeting would determine the destiny of the mentha oil futures on the MCX.

²¹ K. G. Sahadevan, "Mentha Oil Futures and Farmers," *Economic & Political Weekly* 43, no. 4 (January 26, 2008), <https://www.epw.in/journal/2008/04/notes/mentha-oil-futures-and-farmers.html>.

²² "About NABL," National Accreditation Board for Testing and Calibration Laboratories, accessed May 14, 2022, <https://nabl-india.org/about-nabl/about-nabl-2/>.

EXHIBIT 1: PERFORMANCE OF MCX AND OTHER EXCHANGES

Exchange	Year	Market Share (%)	Traded Value (₹ billion)	Turnover (₹ billion)
MCX	2017–18	90	107,866.99	53,933.5
	2018–19	92	135,447.45	67,723.73
	2019–20	94.2	173,472.87	86,895.18
NCDEX	2017–18	10	117,866.99	5,894.97
	2018–19	7	10,628.26	5,315.88
	2019–20	NA	8,840.18	4,420.09
ICEX	2017–18	1	43.17	21.58
	2018–19	1	481.22	240.61
	2019–20	NA	481.22	405.11

Note: MCX = Multi Commodity Exchange of India Limited; ₹ = INR = Indian rupee; US\$1 = ₹74.0029 on November 30, 2020; NCDEX = National Commodity and Derivatives Exchange; ICEX = Indian Commodity Exchange.

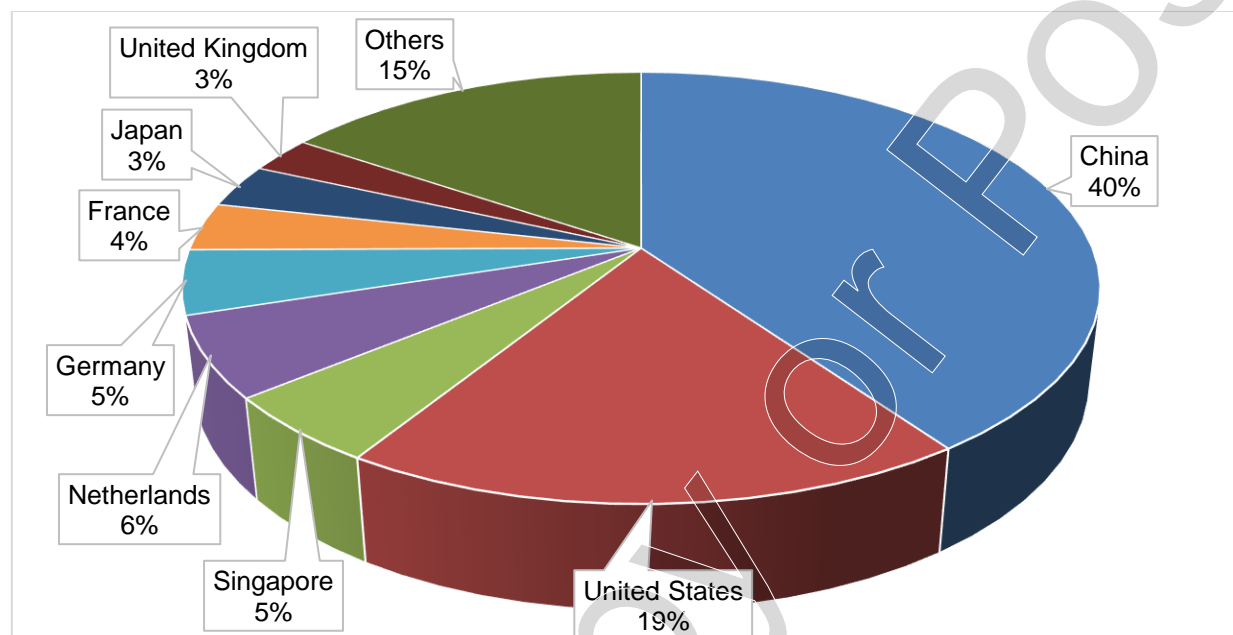
Source: Securities and Exchange Board of India, Annual Reports 2017–18, August 8, 2018 https://www.sebi.gov.in/reports-and-statistics/publications/aug-2018/annual-report-2017-18_39868.html; Securities and Exchange Board of India, Annual Reports 2018–19, July 24, 2019, https://www.sebi.gov.in/reports-and-statistics/publications/jul-2019/annual-report-2018-19_43670.html; Securities and Exchange Board of India, Annual Reports 2019–20, February 10, 2021, https://www.sebi.gov.in/reports-and-statistics/publications/feb-2021/annual-report-2019-20_49071.html.

EXHIBIT 2: MENTHA PRODUCTION COSTS AND REVENUES IN UTTAR PRADESH

Particulars	Barabanki/ Masauli	Sambhal	Chandausi	Rampur	Aggregate
Mentha's share in total cultivated area (%)	75.25	69.20	73.11	65.95	70.72
Oil per acre (litres)	64.80	48.00	48.00	48.00	51.90
Mentha oil selling price (₹ per litre)	990.00	980.00	978.70	980.00	982.00
Costs of cultivation per acre (₹)	26,403.00	28,483.20	28,483.20	28,483.20	27,995.70
Revenues per acre from sales of mentha oil (₹)	64,159.00	47,045.00	46,981.00	47,045.00	51,041.10

Note: ₹ = INR = Indian rupee; US\$1 = ₹74.0029 on November 30, 2020.

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 12, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

EXHIBIT 3: MAJOR EXPORT DESTINATIONS FOR INDIAN MINT PRODUCTS

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 9, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

**EXHIBIT 4: QUARTERLY MENTHA OIL FUTURES AVERAGE TRADING VOLUME, TURNOVER,
AND OPEN INTEREST, 2017–2020**

Year	Average quarterly volume (metric tons)	Average quarterly turnover (₹ million)	Average quarterly open interest (metric tons)
2017			
Q1	667	680	1,654
Q2	621	580	1,084
Q3	1,280	1,430	1,809
Q4	1,072	1,670	1,447
2018			
Q1	702	990	874
Q2	519	650	688
Q3	741	1,200	766
Q4	476	790	544
2019			
Q1	380	610	400
Q2	336	460	337
Q3	488	620	525
Q4	285	360	411
2020			
Q1	167	200	266
Q2	37	40	70
Q3	82	80	150
Q4 (to Nov. 30)	51	50	154

Note: ₹ = INR = Indian rupee; US\$1 = ₹74.0029 on November 30, 2020; Q = quarter.

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 29–31, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

EXHIBIT 5: MENTHA OIL FUTURES TRADE FACT SHEET

Particulars	Jan. 1, 2014–Nov. 4, 2020	Period of steep decline: Jan. 2018–Nov. 4, 2020
Average daily traded volume (metric tons)	815	364
Futures trade multiplier (traded volume/annual production)	6.32	...
Average daily open interest (number of contracts)	4,408	1,175
Average trading lot size (drums), as per contract specifications*	2.36	2.7
Average delivery lot (drums), as per contract specifications*	6.45	10.97
Average trade—proprietary and client-based (%)	43 and 57	43 and 57
Average near-month position limit for individual client (metric tons), as per contract specifications	95.1	42.57
Number of contracts floated in a year	12	12
Annualized volatility (%)	29	32

Note: * Trading lot and delivery lot size were six drums from June 2020.

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 29–31, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

EXHIBIT 6: REGIME-WISE MENTHA OIL DAILY FUTURES AND SPOT PRICES (₹)

Regime I: Mentha oil futures and spot prices

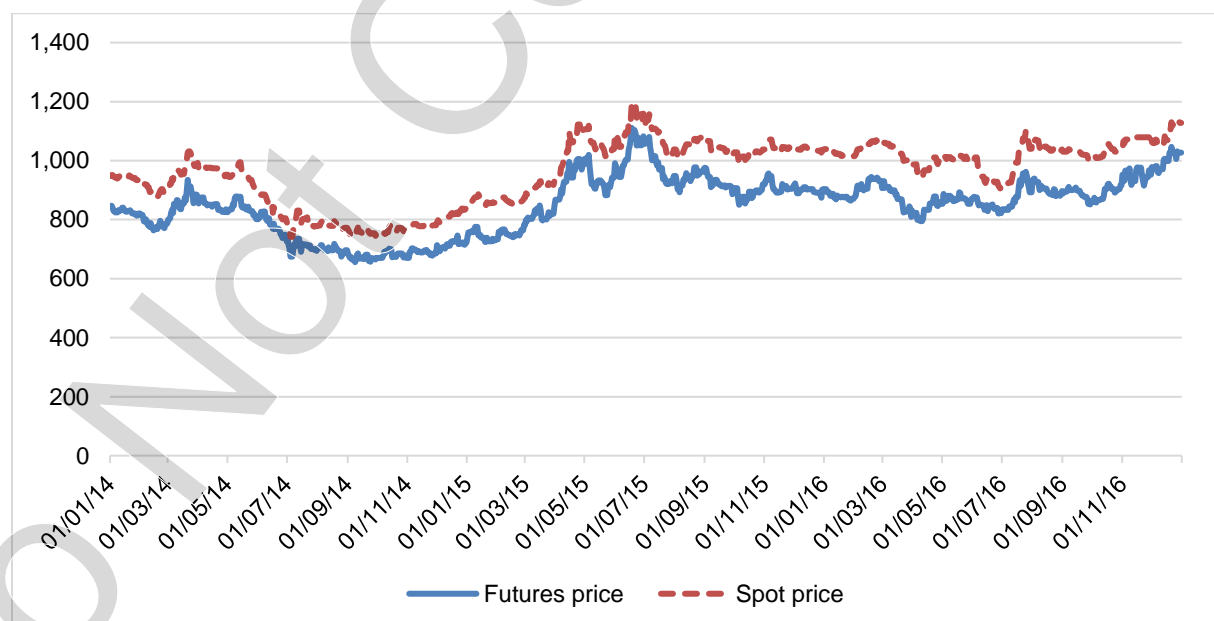
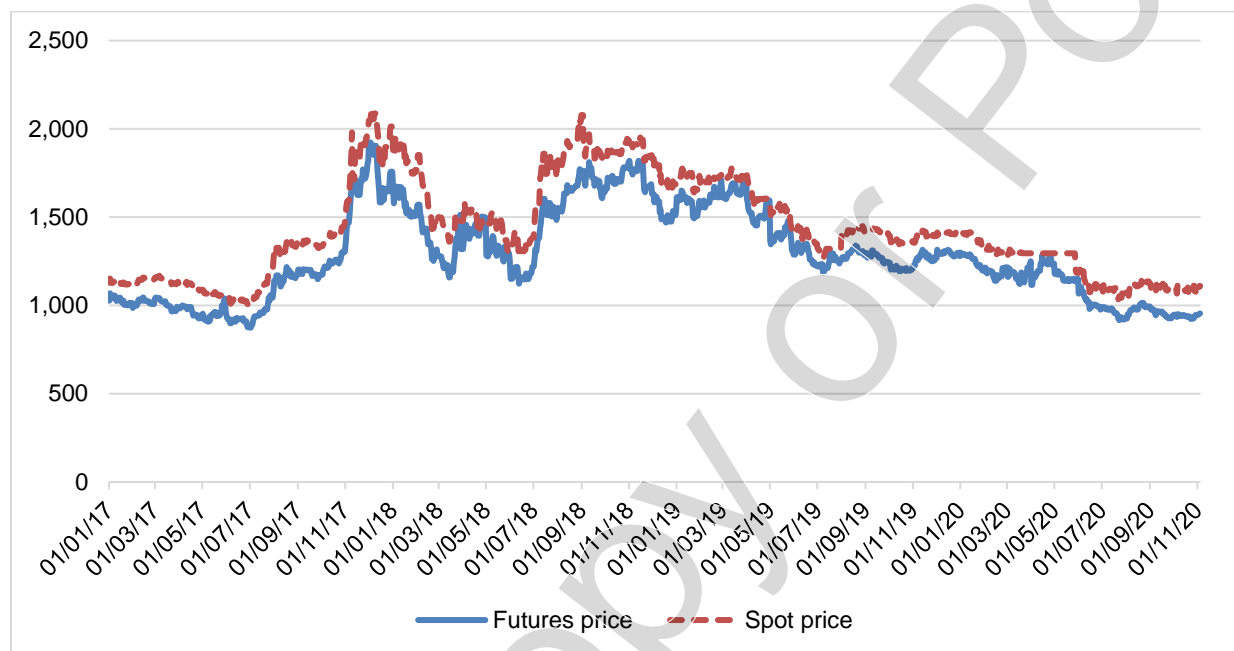


EXHIBIT 6 (CONTINUED)

Regime II: Mentha oil futures and spot prices



Note: ₹ = INR = Indian rupee; US\$1 = ₹74.0029 on November 30, 2020.

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 29–31, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

EXHIBIT 7: CHANGES IN MENTHA OIL FUTURES CONTRACT—IMPORTANT DATES

Date	Change in mentha oil futures contract specifications
July 2017	Maximum allowable open position for clients reduced from 500 t to 125 t
October 2017	Delivery lot size changed from 2 drums (180 kg = 1 drum) to 12 drums
September 2018	Quality analysis method changed from “packed column” to “capillary column”
April 1, 2020	Initial margin revised from 4% to 8%
April 21, 2020	Initial margin revised from 8% to 12%
June 2020	Trading lot (order) size increased from 2 to 6 drums
	Delivery lot size reduced from 12 drums to 6 drums

Note: t = metric tons; kg = kilograms.

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 18–19, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

EXHIBIT 8: MARGIN REQUIREMENT—COMPARING OLD AND NEW TRADING LOT

Margin value comparison		(₹)
Old contract value (lot size of two drums)		360,000
New contract value (lot size of six drums)		1,080,000
Old margin requirement (4% initial margin)		14,400
New margin requirement (12% initial margin)		129,600
Multiple of new margin requirement over old margin requirement		9

Note: ₹ = INR = Indian rupee; US\$1 = ₹74.0029 on November 30, 2020. Price taken as ₹1,000/kilogram for both old and new contracts. Margin requirement refers to the minimum initial margin required to initiate the trade. Participants also need to maintain a minimum 1% of extreme loss margin when initiating trade. Besides this, they may need to bear additional or special margins, as imposed by the Multi Commodity Exchange of India Limited in the case of high price volatility.

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 33, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

EXHIBIT 9: ASSAYING CHARGES OF TWO ASSAYING AGENCIES

Effective assaying costs (including GST) per 12 drums	FFDC	DTH	Average
October 2017 onwards (₹)	5,900	5,900	5,900
June 2020 onwards (₹)	11,800	7,670	9,735
Effective increase (%)	100	30	65

Note: GST = goods and services tax; FFDC = Fragrance and Flavour Development Centre; DTH = Delhi Test House; ₹ = INR = Indian rupee; US\$1 = ₹74.0029 on November 30, 2020.

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 22, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

EXHIBIT 10: BENEFITS TO FPCs FOR PARTICIPATION IN DERIVATIVES

As per information available on the Multi Commodity Exchange of India Limited website, the exchange has been providing the following benefits to FPCs for participation in derivatives trading and delivery in agriculture commodities, including mentha oil futures:

The following fees or costs are reimbursable to FPC:

- 1) Assaying charges and warehousing rent/storage charges
The assaying expenses and the warehousing rent/storage expenses incurred by the FPCs for depositing goods on the exchange platform are fully reimbursable.
- 2) Costs of packaging
The expenses incurred by FPCs for purchasing bags, drums, etc. for packaging and storage of the respective commodities for the purpose of depositing on the exchange platform are fully reimbursable.
- 3) Transportation costs
The expenses incurred by FPCs for transporting the respective commodities for the purpose of depositing on the exchange platform are reimbursable to the extent of 50% of the transportation cost.

Activities for utilization of fund	Subsidy/reimbursement (%)	Percentage of overall funds utilization (%)
Assaying charges	100	30
Warehouse rent/storage charges	100	30
Cost of bags, drums, etc.	100	40
Transportation cost	50	
Total		100

- 4) To encourage FPCs' participation, the exchange also exempts mark-to-market or daily settlement for such short positions against which there is an early pay-in facility.

Note: FPC = farmer producer companies.

Source: Indian Institute of Management Lucknow, *Survey-Based Study of Mentha Oil Futures*, December 2020, 29–31, https://www.mcxindia.com/docs/default-source/education-training/research-studies/iim-lucknow---survey-based-study-of-mentha-oil-futures.pdf?sfvrsn=d4e37a91_2.

EXHIBIT 11: MENTHA OIL FUTURES CONTRACT DESIGN AT THE MCX

Symbol	MENTHAOIL
Description	MENTHAOILMMYY
Contract listing	Contracts are available as per the contract launch calendar
Contract start day	First day of contract launch month; if first day is a holiday, then the next working day
Last trading day	Last calendar day of the contract expiry month; if last calendar day is a holiday, then the preceding working day is counted
Trading period	Mondays through Fridays
Trading session	Monday to Friday: 9:00 a.m. to 5:00 p.m.
Trading unit	1,080 kilograms (6 drums)
Quotation/base value	1 kilogram
Price quote	The price quoted for payment in Chandausi, Moradabad, and Uttar Pradesh includes the spot price of mentha oil drum, storage charges, and fees on the purchase and sales of agricultural produce, which are commonly referred to as mandi taxes.
Maximum order size	18,000 kilograms (100 drums)
Tick size (minimum price)	₹0.10
DPLs	DPLs will have two slabs—an initial and an enhanced slab. Once the initial slab limit of 3% is reached in any contract, after a period of 15 minutes, this limit will be increased by an enhanced slab of 1%, only in that contract. Trading will be permitted during the 15-minute period within the initial slab limit. After the DPLs are enhanced, trade will be permitted throughout the day within the enhanced total DPLs of 4%.
Initial margin	Minimum 12% or based on the standard portfolio analysis of risk,* whichever is higher
Extreme loss margin	Minimum 1%
Additional or special margin	In case of additional volatility, an additional margin (on both the buy and sell sides) or special margin (on either the buy or the sell side) at such a percentage, as deemed fit, will be imposed with respect to all outstanding positions
Maximum allowable open position	For individual clients: 184 t For a member collectively for all clients: 1,840 t or 15% of the market wide open position, whichever is higher Near-month limits—for individual clients: 46 t Near-month member-level position limit equivalent to one-fourth of the overall member-level position limit
Delivery unit	1,080 kilograms/six drums (with a tolerance limit of 1% per drum) and direct multiples thereof, though the delivery driver would receive the value only for the actual quantity delivered
Delivery period margin	Delivery period margins shall be the higher of 3% + 5-day 99% value-at-risk of spot price volatility, or 25%

EXHIBIT 11 (CONTINUED)

Delivery centre(s)	At exchange-designated warehouse in Chandausi	
Additional delivery centre(s)	At exchange-designated warehouse in Barabanki at a discount of ₹2 per kilogram	
Quality specifications	Natural crude <i>Mentha arvensis</i> oil conforming to the following quality specification:	
	Appearance	Clear liquid, pale yellow
	Odour	Characteristics of <i>Mentha arvensis</i>
	Optical rotation (°)	-32 to -36
	Specific gravity at 25°C	0.80 to 0.91
	Refractive index at 25°C	1.42 to 1.48
	Solubility in 70% ethanol at 25°C	Soluble (1:3.5 volumes of ethanol)
	L-menthol	73% as per gas-liquid chromatography test—capillary column acceptable up to 67% with 1:1 discount above 73% with 1:1 premium
	Terpene	Maximum 8%
	Menthyl acetate	1.8% to 3.5%
	Total menthol content	Minimum 78%
	Neo-menthol	1.8%– 3.0%
	Total menthones	9%–13%
	Pulegone	Maximum 1.6%
	High boilers	Maximum 2.0%
	Water and Solid Sediments	0.65%
	D-menthol	...
	It should be free from adulteration or any admixture such as edible oil, petroleum, and mineral oil. To check adulteration, water test, pH paper test, alkali test, or any other necessary test will be conducted; the test result should be negative.	
Funds pay-in	Tender/expiry day + 2 basis: 12:00 p.m.	
Funds pay-out	Tender/expiry day + 2 basis: 2:00 p.m.	
	<p>The seller will have to do the delivery pay-in through their repository account with CDSL Commodity Repository Limited by earmarking their existing valid commodity balance in the account toward the pay-in obligation.</p> <p><u>On tender days</u> On tender days by 3:00 p.m. except Saturdays, Sundays, and public holidays. Marking of the delivery will be done on the tender days based on the intentions received from the sellers after trading hours.</p> <p><u>On expiry days</u> On expiry days, all the open positions shall be marked for delivery. Delivery pay-in will be on expiry day + 2 basis by 12:00 p.m., except on Saturdays, Sundays, and public holidays.</p>	
Delivery pay-out	Tender/expiry day + 2 basis: 02:00 p.m.	

* Developed by the Chicago Mercantile Exchange in 1988, the standard portfolio of risk was a system for calculating margin requirements for futures and options on futures. It was a portfolio margining method that used grid simulation.

Note: MCX = Multi Commodity Exchange of India Limited; DPL = daily price limit; t = metric ton.

Source: MCX Research, Mentha Oil: Hedging Price Risk, 2021, 6–7, https://www.mcxindia.com/docs/default-source/education-training/hedging-brochures/english/mentha-oil-hedging-brochuree3322e4757fb64e3bdfdf00007acb35.pdf?sfvrsn=73c94a91_2.