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COMMODITY DERIVATIVES ON MULTI COMMODITY EXCHANGE: A PERFORMANCE EVALUATION

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Abstract
The Multi Commodity Exchange of India (MCX) plays a vital role in trading commodity derivatives, offering futures and options contracts across diverse segments such as bullion, base metals, energy, and agricultural commodities. This research paper presents a comprehensive performance evaluation of commodity derivatives traded on the Multi Commodity Exchange (MCX) over nine years from 2015 to 2023, especially after the 2015 SEBI as the regulatory body for the Commodity market, emphasizing comprehensive segment & commodity-wise such as Cotton, Nickel, Gold, Natural Gas and so on, performance evaluation on the derivatives markets. By analyzing yearly data of various commodity groups - base metals, bullion, energy, and agriculture - this study aims to identify trends, assess market fluctuations, and understand the dynamics of the commodity derivatives market in Multi Commodity Exchange. Using statistical techniques like linear regression, descriptive analysis, and basic trend analysis, we examine the trading volumes and values of all commodities traded in MCX like cotton, gold, crude oil, silver, etc. Through its comprehensive examination of these segments, this research paper offers valuable insights into the complex interconnections inherent in commodity derivatives trading. Additionally, the study examines how market trends and other factors affect commodity performance and identifies the reasons for market fluctuations. These results highlight major trends and the overall performance of commodities that can help market participants make vital decisions. This study tries to contribute to the body of knowledge by providing an adequate and detailed analysis of the growth and performance of commodity derivatives on the Multi Commodity Exchange of India (MCX).

Keywords: Derivatives, Commodity market, Multi Commodity Exchange, Futures Market

1. Introduction

The markets for commodity derivatives have been essential to the growth of the agricultural and non-agricultural sectors. The price fluctuations of various commodities might affect this part of the company's value chain. Commodity derivatives have been crucial in giving producers, farmers, and other value chain participants a platform for hedging. Commodity exchanges worldwide have been offering a range of goods and platforms that serve two essential functions Price Discovery and Hedging.

Commodity futures offered by the MCX are varied and include base metals, bullion, energy, and agricultural products. Because of various market-specific, geopolitical, and economic considerations, each of these commodity groupings has a substantial impact on the market. To identify patterns, evaluate volatility, and comprehend the fundamental dynamics of the MCX market, this study looks at the performance of particular commodities, such as cotton, silver, and gold.

Multi Commodity Exchange (MCX) is an independent and de-mutualized exchange in India and has permanent acknowledgment from the government for enabling transactions in the commodities futures market nationwide, including online trading, clearing, and settlement. MCX is currently one of the top four energy exchanges and three bullion exchanges. The MCX currently holds the top rank in India and holds 86.2% of the overall commodity market share. In terms of the quantity of futures contracts traded, it is ranked first among all global exchanges for gold and silver and third for crude oil.

The Exchange features an in-house clearing house that handles all aspects of delivery, fund settlement, margining, and settlement guarantee fund management. To make sure there are no alterations or postponements from this cycle, it runs a well-defined settlement cycle. To offer financial services to trading members, MCX has appointed sixteen clearing banks.

Commodities which are Currently traded in MCX are

Agri-Commodities	Base Metal	Bullion	Energy
Cotton	Aluminium	Gold	Crude Oil
Cpo	Copper	Silver	Natural Gas
Mentha Oil	Lead		
Kapas	Nickel		
	Zinc		

SEBI banned futures trading in important agricultural commodities such as wheat, paddy, chana, and soybean to prevent excessive speculation and stabilize prices in December 2021. According to critics, prohibitions compromise the market's effectiveness in determining prices and reducing risk. The Securities and Exchange Board of India (SEBI) has extended the suspension of futures trading in seven key agricultural commodities until January 31, 2025.

2. Need for the study

This study emphasizes the importance of trading commodities traded in MCX while assessing the performance of commodities derivatives on the MCX. Analysis of market dynamics is of critical importance given the rising market volatility and changing regulatory actions, especially SEBI's limitations on agricultural futures.

3. Review of literature

Gopal and Sudhir (2001), In terms of managing price risk, certain commodity markets are more efficient than others. The low trading volume during the maturity period and the absence of hedger participation were identified as the causes of the inefficiency of the other commodity markets.

K.G. (2002), The commodity futures market is inefficient in managing price risk due to factors such as low market depth and volume, government intervention, and lack of trading participation.

Lin and Tamvakis (2003), investigated how information is transmitted and how prices are determined for crude and refined oil products traded on the London-based International Petroleum Exchange (IPE) and the New York Mercantile Exchange (NYMEX). They discovered significant spillover effects between two markets where the NYMEX closing price the day before appears to have a significant impact on IPE morning prices.

Jairatt and Kamboj (2005), revealed that during 2002–03, about 95% of all commodities traded were agricultural goods, and in 2004–05, the same percentage was approximately 92%. He stated that during the time after the restriction was lifted, the proportion of regional exchanges fell from 94 to 27 percent, while the proportion of national commodities exchanges rose from about 6 percent.

K. Lakshmi, (2007), examined the effects of granting authorization to banks, mutual funds, and foreign institutional investors in commodity derivative markets. She discovered that these institutions' involvement may increase the volume and liquidity of trade in the commodities market and provide them with additional chances to diversify their portfolios.

Himdari (2007), noted that commodities have become a popular asset class due to their significant risk-return features and potential for diversification; Indian futures markets have gotten better recently and will cause significant changes to the current isolated local markets, especially when it comes to agricultural commodities.

Anson & Mark (2009), assesses the usefulness of commodity futures investing by comparing it to a commodity futures index. Adding commodity futures to a stock and bond portfolio helps lower portfolio volatility, as shown by the correlation coefficients that show a constant negative association between commodity futures returns and stock and bond returns.

Dummu, T. R. (2009), analysis identifies issues that impede efficient trading in India's commodities futures markets, such as market fragmentation and poor infrastructure. To improve market sustainability and risk management, it highlights the necessity of business involvement and regulations that encourage it.

Bhat, Z. H. (2010), outlines the historical evolution and significance of commodity exchanges like MCX and NCDEX in India, emphasizing their roles in price discovery and risk management. It also addresses the regulatory framework and challenges of technological advancements and global economic factors.

Ali, J., & Gupta, K. B. (2013), finds a research gap in the MCX Comdex and draws attention to the expected correlation between spot and futures pricing disturbed by incomplete information. The current study of these dynamics was prompted by earlier research that used techniques such as Granger causality to evaluate pricing correlations.

Kaur, H. P., & Anjum, B. (2013), describe how the Indian commodity derivatives market has changed over time, highlighting the Forward Market Commission's regulatory involvement since 1953 and the notable deregulation after 2003. It draws attention to continuous initiatives to promote market efficiency and integrity through global cooperation and better procedures.

Brajesh and Pandy (2013), examined the Indian commodity futures market's short- and long-term market efficiency. Four agricultural and even non-agricultural goods were assessed for impartiality and market efficiency. The outcome validated the short-term inefficiency of commodities futures prices and their long-term efficiency.

Easwaran, R. S., & Ramasundaram, P. (2016), the Indian commodity market, emphasizing research on market efficiency, regulatory frameworks, and the connection between futures and spot prices. To increase involvement in commodities trading, it highlights the necessity of better investor education and comprehension of market dynamics.

Karamala, P. (2023), the paper emphasizes the need for a well-regulated commodity derivative market in India to stabilize prices and enhance farmers' income. It highlights key studies on market dynamics and the challenges of agricultural futures, advocating for regulatory reforms to improve efficiency and position India as a significant player in global commodity trading.

Arcot, P. P., & Naidu, B. D. (2024), emphasizes the function of futures markets in pricing efficiency and discovery. It analyzes the links between metal derivatives in the MCX using techniques like Granger causality and cointegration tests, considering investor sentiment and macroeconomic variables.

4. Objectives

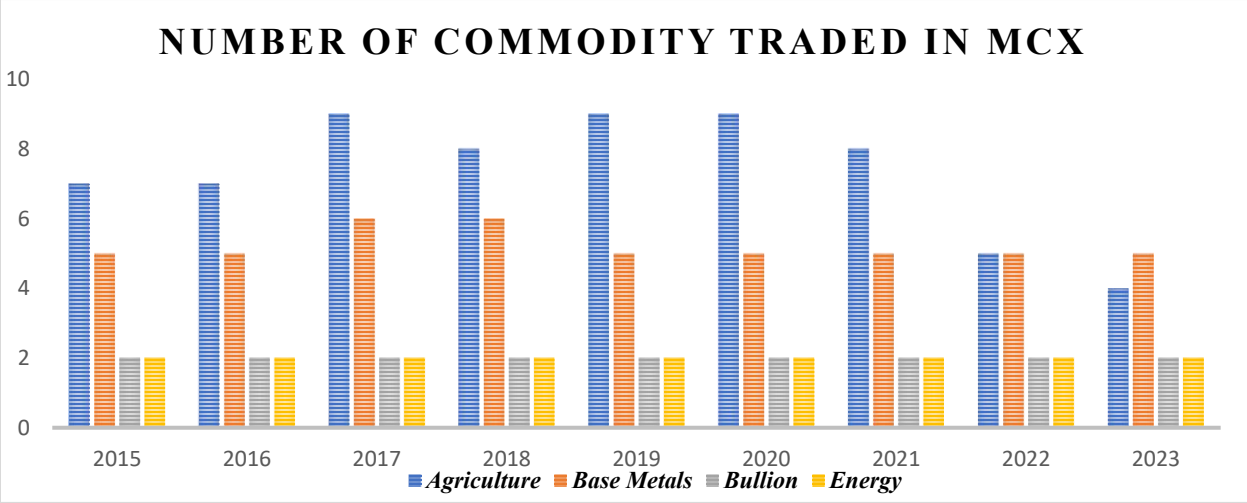
- To analyze the trading performance of commodity derivatives on MCX
- To analyze trading trends across different commodities on the MCX
- To examine the relationship between the number of contracts traded and total values

5. Methodology

The study evaluates the performance of commodity derivatives on the Multi Commodity Exchange (MCX) for 9 years from 2015 to 2023. Secondary Yearly data of trading volumes and values of all commodities such as bullion, base metals, energy, and agriculture were collected from MCX and SEBI. The descriptive analysis highlights trading patterns and key statistics, while trend analysis examines year-on-year trading volume and value changes by considering 2015 as a base year. Regression analysis evaluates relationships between variables like total contracts and trading values.

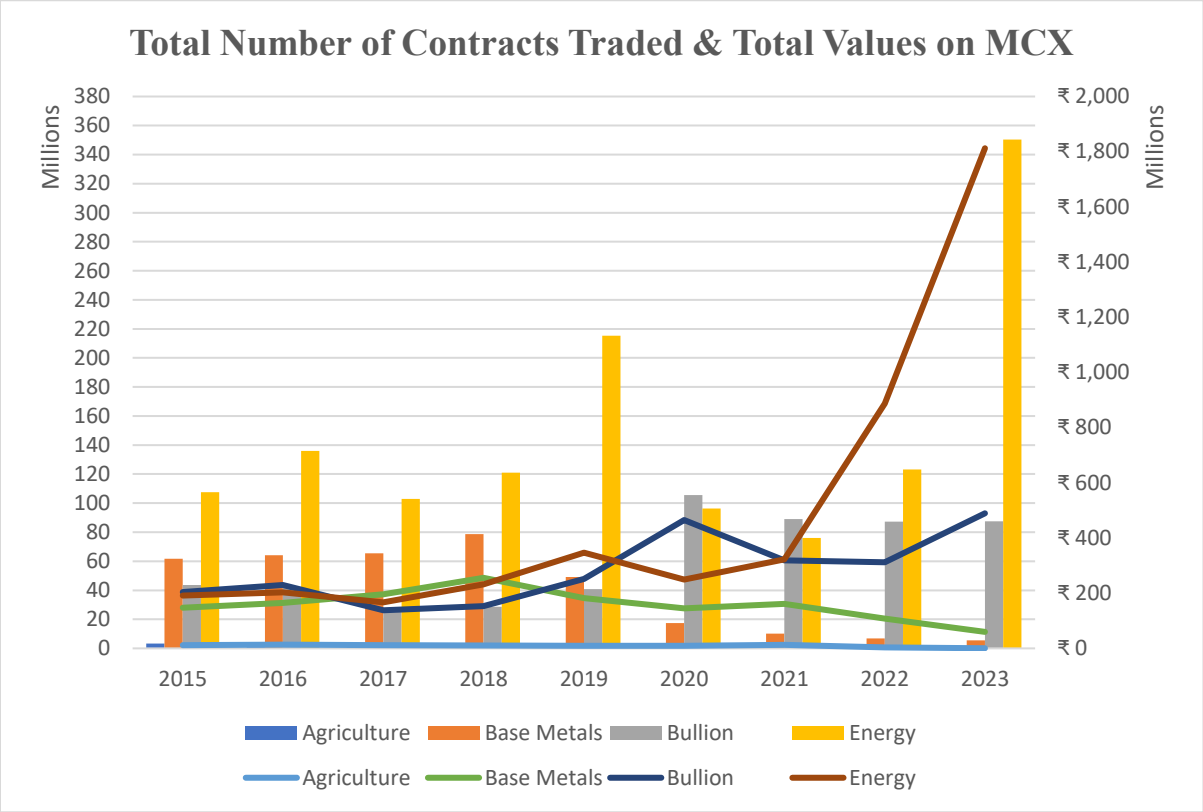
6. Analysis

Chart 1



Source – Multi Commodity Exchange & SEBI

Chart 2



Source – Multi Commodity Exchange & SEBI

Table 1 Segment-wise - Descriptive Analysis (Traded Commodities)

		Agriculture - Contracts	BaseMetals - Contracts	Bullion - Contracts	Energy - Contracts
N	Valid	9	9	9	9
	Missing	0	0	0	0
Mean		1797314.89	39931234.67	61330667.00	147631587.11
Std. Error of Mean		374314.064	9836652.643	10132855.804	28515782.857
Median		1747298.00	49223300.00	43621037.00	120996599.00
Mode		84793[a]	5452750[a]	27756148[a]	76043137[a]
Std. Deviation		1122942.192	29509957.928	30398567.413	85547348.570
Skewness		-.023	-.089	.278	2.044
Std. Error of Skewness		.717	.717	.717	.717
Kurtosis		-.684	-2.137	-2.018	4.203
Std. Error of Kurtosis		1.400	1.400	1.400	1.400
Range		3333234	73226434	77699575	274423337

Minimum	84793	5452750	27756148	76043137
Maximum	3418027	78679184	105455723	350466474

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Table 2 Segment-wise - Descriptive Analysis (Total values of Commodities)

		Agriculture - Values	BaseMetals - Values	Bullion - Values	Energy - Values
N	Valid	9	9	9	9
	Missing	0	0	0	0
Mean		9361917.95	157951009.41	284783120.08	490250121.96
Std. Error of Mean		1467376.478	18303237.456	41795287.987	180866583.746
Median		10713550.02	161810995.13	252236918.34	249882631.57
Mode		512842[a]	59795472[a]	138091169[a]	166921461[a]
Std. Deviation		4402129.435	54909712.369	125385863.961	542599751.238
Skewness		-1.313	-.066	.684	2.265
Std. Error of Skewness		.717	.717	.717	.717
Kurtosis		.915	1.116	-.631	5.058
Std. Error of Kurtosis		1.400	1.400	1.400	1.400
Range		13109397	195910048	351382136	1645585877
Minimum		512842	59795472	138091169	166921461
Maximum		13622239	255705520	489473305	1812507338

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Table 3 - Segment–wise Trend Analysis (Traded Contracts)

Year		Agriculture	Base Metals	Bullion	Energy
2015	No. of Contracts	3418027	61721565	43621037	107586332
	% of Growth	100%	100%	100%	100%
2016	No. of Contracts	3216150	64140891	41706752	136013722
	% of Growth	-5.91	3.92	-4.39	26.42
2017	No. of Contracts	2437131	65506594	27756148	102914689
	% of Growth	-28.70	6.13	-36.37	-4.34
2018	No. of Contracts	1947383	78679184	28716464	120996599
	% of Growth	-43.03	27.47	-34.17	12.46

	No. of Contracts	1747298	49223300	40768505	215356526
2019	% of Growth	-48.88	-20.25	-6.54	100.17
	No. of Contracts	1412628	17525895	105455723	96219861
2020	% of Growth	-58.67	-71.60	141.75	-10.56
	No. of Contracts	1465222	10230090	89106474	76043137
2021	% of Growth	-57.13	-83.43	104.27	-29.32
	No. of Contracts	447202	6900843	87283166	123086944
2022	% of Growth	-86.92	-88.82	100.09	14.41
	No. of Contracts	84793	5452750	87561734	350466474
2023	% of Growth	-97.52	-91.17	100.73	225.75

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

The trading volumes for agricultural commodities on the MCX have experienced a consistent decline from 2015, with a notable 97.52% drop by 2023. Base metals initially showed growth but saw a sharp decline in recent years, with an 88.82% reduction in 2022 and a further 91.17% in 2023. Bullion trading displayed significant volatility, experiencing both large increases and decreases, with the most considerable rise of 141.75% in 2020 and notable fluctuations throughout the period. Energy commodities exhibited substantial growth, particularly in 2019 and 2023, with increases of 100.17% and 225.75%, respectively, in spite of some periods of decline. These trends highlight distinct patterns in each segment, reflecting varying market dynamics and investor behavior across different commodity groups on the MCX. Based on the trend analysis data, the Energy segment has performed the best on the MCX. In contrast, the Agriculture and Base Metals segments saw a consistent decline in trading volumes over the years, with notable reductions of 97.52% and 91.17% by 2023, respectively.

Table 4 - Segment–wise Trend Analysis (Total Values)

Year		Agriculture	Base Metals	Bullion	Energy
	Values	₹ 1,16,52,928.96	₹ 14,77,89,650.63	₹ 20,39,81,403.28	₹ 19,17,40,448.98
2015	% of Growth	100	100	100	100
	Values	₹ 1,36,22,238.65	₹ 16,49,16,332.42	₹ 22,99,06,109.71	₹ 20,27,09,364.69
2016	% of Growth	16.90	11.59	12.71	5.72
	Values	₹ 1,17,30,932.92	₹ 19,66,05,208.60	₹ 13,80,91,168.91	₹ 16,69,21,461.04
2017	% of Growth	0.67	33.03	-32.30	-12.94
	Values	₹ 1,07,13,550.02	₹ 25,57,05,519.99	₹ 15,35,18,590.18	₹ 23,17,62,141.75
2018	% of Growth	-8.06	73.02	-24.74	20.87
	Values	₹ 94,25,945.99	₹ 18,22,56,901.34	₹ 25,22,36,918.34	₹ 34,70,95,957.08
2019	% of Growth	-19.11	23.32	23.66	81.02
	Values	₹ 94,91,899.40	₹ 14,47,78,476.69	₹ 46,54,96,467.84	₹ 24,98,82,631.57

	% of Growth	-18.54	-2.04	128.21	30.32
	Values	₹ 1,32,73,493.65	₹ 16,18,10,995.13	₹ 31,84,88,213.00	₹ 32,26,04,666.83
2021	% of Growth	13.91	9.49	56.14	68.25
	Values	₹ 38,33,429.87	₹ 10,79,00,527.78	₹ 31,18,55,904.60	₹ 88,70,27,087.88
2022	% of Growth	-67.10	-26.99	52.88	362.62
	Values	₹ 5,12,842.08	₹ 5,97,95,472.09	₹ 48,94,73,304.85	₹ 1,81,25,07,337.80
2023	% of Growth	-95.60	-59.54	139.96	845.29

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX

The trend analysis of total values on the MCX for Agriculture, Base Metals, Bullion, and Energy reveals diverse patterns. Agriculture and Base Metals show fluctuating values with significant declines by 2023, indicating potential market challenges. In contrast, Bullion displays high volatility with substantial growth periods, particularly in 2020 and 2023. Energy is the top-performing segment, demonstrating exceptional growth, especially in recent years, with an 845.29% increase in 2023 alone.

Segment-wise Linear Regression Analysis

Table 5 - Model Summary

Model		Agriculture	Base Metals	Bullion	Energy
R		.828[a]	0.784	0.897	0.834
R Square		.685	0.615	0.805	0.696
Adjusted R Square		.641	0.56	0.778	0.652
Std. Error of the Estimate		2639218.646	36414481	59129467	319911734
Change Statistics	R Square Change	.685	0.615	0.805	0.696
	F Change	15.257	11.19	28.973	16.014
	df1	1	1	1	1
	df2	7	7	7	7
	Sig. F Change	.006	0.012	0.001	0.005
Durbin-Watson		1.326	0.964	1.844	0.949

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Table 6 - Coefficients

Model		Agriculture - Contracts	Base Metals - Contracts	Bullion - Contracts	Energy - Contracts
Unstandardized Coefficients	B	3.246	1.459	3.702	5.291
	Std. Error	.831	0.436	0.688	1.322

Standardized Coefficients	Beta	.828	0.784	0.897	0.834
t		3.906	3.345	5.383	4.002
Sig.		.006	0.012	0.001	0.005
95.0% Confidence Interval for B	Lower Bound	1.281	0.428	2.076	2.164
	Upper Bound	5.211	2.491	5.328	8.417
Collinearity Statistics	Tolerance	1.000	1	1	1
	VIF	1.000	1	1	1

Table 7 - Collinearity Diagnostics

Model	Dimensions	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	Contracts
Agriculture	1	1.862	1	.07	.07
	2	.138	3.668	.93	.93
Base Metals	1	1.82	1	0.09	0.09
	2	0.18	3.184	0.91	0.91
Bullion	1	1.906	1	0.05	0.05
	2	0.094	4.502	0.95	0.95
Energy	1	1.878	1	0.06	0.06
	2	0.122	3.916	0.94	0.94

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

The linear regression analysis indicates significant positive relationships between the number of contracts and total values across all segments. Agriculture shows a strong relationship (R = 0.828) with each contract increasing the total value by 3.246 units. Base Metals have a moderate relationship (R = 0.784), with each contract adding 1.459 units. Bullion demonstrates the strongest relationship (R = 0.897), with each contract increasing the total value by 3.702 units. Energy also shows a strong relationship (R = 0.834), with a 5.291 unit increase per contract. All models are statistically significant, highlighting reliable connections between traded contracts and total values.

Commodity-wise – Trend Analysis

Table 8 -Trend Analysis for Base Metals (Traded Contracts)

Year		ALUMINIUM	COPPER	LEAD	NICKEL	ZINC
2015	Values	2229672	11051908	3577653	10012617	4614275
	% of Growth	100	100	100	100	100
2016	Values	1861151	10963338	3965074	8750039	6349497

	% of Growth	-17	-1	11	-13	38
	Values	1840691	9074084	3805164	9881186	6065211
2017	% of Growth	-17.45	-17.90	6.36	-1.31	31.44
	Values	2973523	11388536	3980880	11093792	11093792
2018	% of Growth	33.36	3.05	11.27	10.80	140.42
	Values	1097131	6926216	2455481	10270404	4829409
2019	% of Growth	-50.79	-37.33	-31.37	2.57	4.66
	Values	482861	4204615	888506	3726369	2676450
2020	% of Growth	-78.34	-61.96	-75.17	-62.78	-42.00
	Values	1161693	4090296	791262	2349805	1835113
2021	% of Growth	-47.90	-62.99	-77.88	-76.53	-60.23
	Values	1721323	3020458	345065	395307	1415336
2022	% of Growth	-22.80	-72.67	-90.35	-96.05	-69.33
	Values	696731	1795215	180106	128	1159792
2023	% of Growth	-68.75	-83.76	-94.97	-100.00	-74.87

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Aluminium, Copper, Lead, Nickel, and Zinc experienced significant volatility with brief growth periods, but overall substantial declines, especially by 2023, where Aluminium dropped by 68.75% and Copper by 83.76%. Zinc had significant growth in 2018 (140.42%)

Table 9 - Trend Analysis for Bullion & Energy (Traded Contracts)

Year		Gold	Silver	Crude Oil	Natural Gas
	Values	3947175	5957382	47788400	13501292
2015	% of Growth	100	100	100	100
	Values	4093572	5572254	53256420	15355328
2016	% of Growth	3.71	-6.46	11.44	13.73
	Values	2296957	3918104	35357630	13281057
2017	% of Growth	-41.81	-34.23	-26.01	-1.63

	Values	2256202	4145954	36629307	13846265
2018	% of Growth	-42.84	-30.41	-23.35	2.56
	Values	3626278	5489992	61637503	16659623
2019	% of Growth	-8.13	-7.85	28.98	23.39
	Values	3668580	7839040	47905028	46106898
2020	% of Growth	-7.06	31.59	0.24	241.50
	Values	2204212	4311203	19083426	40032148
2021	% of Growth	-44.16	-27.63	-60.07	196.51
	Values	1827266	4506933	15386842	21440049
2022	% of Growth	-53.71	-24.35	-67.80	58.80
	Values	1692404	5078893	8895528	29140566
2023	% of Growth	-57.12	-14.75	-81.39	115.84

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Gold and Silver had fluctuating trends, with Gold dropping by 57.12% and Silver decreasing by 14.75% by 2023. Energy commodities like Crude Oil and Natural Gas showed mixed trends; Natural Gas had notable growth in 2020 (241.50%) and 2021 (196.51%), while Crude Oil declined by 81.39% in 2023.

Table 10 - Trend Analysis for Agri-Commodities (Traded Contracts)

Year		COTTON	CPO	MENTHA OIL	KAPAS	CARDAMOM
	Values	693819	949167	1325306	705	448680
2015	% of Growth	100	100	100	100	100
	Values	1074955	1159783	716521	196	264695
2016	% of Growth	54.93	22.19	-45.94	-72.20	-41.01
	Values	866820	838006	644127	10	78973
2017	% of Growth	24.93	-11.71	-51.40	-98.58	-82.40
	Values	857969	635079	433095	0	21184
2018	% of Growth	23.66	-33.09	-67.32	-100.00	-95.28
2019	Values	845463	616164	266008	6623	13040

	% of Growth	21.86	-35.08	-79.93	839.43	-97.09
	Values	319886	1028974	42050	19766	1666
2020	% of Growth	-53.89	8.41	-96.83	2703.69	-99.63
	Values	486164	918884	44673	3491	0
2021	% of Growth	-29.93	-3.19	-96.63	395.18	-100.00
	Values	359732	648	85379	194	0
2022	% of Growth	-48.15	-99.93	-93.56	-72.48	-100.00
	Values	8650	0	76102	41	0
2023	% of Growth	-98.75	-100.00	-94.26	-94.18	-100.00

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)
Cotton, CPO, Mentha Oil, Kapas, and Cardamom saw initial growth followed by sharp declines. Cotton dropped by 98.75% by 2023.

Table 11 - Trend Analysis for Base Metals (Total Values)

Year		ALUMINIUM	COPPER	LEAD	NICKEL	ZINC
	Values	₹ 1,18,65,119	₹ 3,89,24,668	₹ 2,05,34,652	₹ 1,87,54,011	₹ 2,81,02,328
2015	% of Growth	100	100	100	100	100
	Values	₹ 1,00,31,859	₹ 3,62,16,833	₹ 2,50,29,422	₹ 1,42,25,906	₹ 4,51,67,333
2016	% of Growth	-15.45	-6.96	21.89	-24.14	60.72
	Values	₹ 1,19,28,599	₹ 3,68,16,171	₹ 2,87,82,397	₹ 1,70,56,398	₹ 5,72,31,274
2017	% of Growth	0.54	-5.42	40.17	-9.05	103.65
	Values	₹ 2,18,54,018	₹ 5,05,41,272	₹ 3,04,92,981	₹ 2,51,04,371	₹ 6,84,57,758
2018	% of Growth	84.19	29.84	48.50	33.86	143.60
	Values	₹ 76,16,561	₹ 4,38,21,622	₹ 1,79,41,763	₹ 3,09,52,466	₹ 4,73,47,272
2019	% of Growth	-35.81	12.58	-12.63	65.04	68.48
	Values	₹ 11,07,600	₹ 5,12,80,636	₹ 49,99,080	₹ 5,83,16,067	₹ 1,88,14,488
2020	% of Growth	-90.67	31.74	-75.66	210.95	-33.05

	Values	₹ 1,18,17,911	₹ 7,28,49,886	₹ 68,82,237	₹ 4,83,43,662	₹ 2,18,79,738
2021	% of Growth	-0.40	87.16	-66.48	157.78	-22.14
	Values	₹ 1,94,74,950	₹ 5,33,94,089	₹ 31,48,534	₹ 1,07,95,375	₹ 2,10,24,579
2022	% of Growth	64.14	37.17	-84.67	-42.44	-25.19
	Values	₹ 72,48,690	₹ 3,31,94,592	₹ 16,65,587	₹ 4,710	₹ 1,38,27,516
2023	% of Growth	-38.91	-14.72	-91.89	-99.97	-50.80

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

The trend analysis indicates Significant volatility with growth in specific years (e.g., Aluminium in 2018 by 84.19%) but an overall decline by 2023. Notable drops in Nickel (-99.97%) and Lead (-91.89%) by 2023. Lead and Nickel also had major drops.

Table 12 -Trend Analysis for Bullion & Energy (Total Values)

Year		Gold	Silver	Crude Oil	Natural Gas
	Values	₹ 10,40,39,990	₹ 6,48,65,457	₹ 14,88,29,932	₹ 2,85,41,409
2015	% of Growth	100	100	100	100
	Values	₹ 12,10,83,682	₹ 6,91,74,487	₹ 15,00,73,409	₹ 3,34,43,154
2016	% of Growth	16.38	6.64	0.84	17.17
	Values	₹ 6,64,68,955	₹ 4,66,92,471	₹ 11,62,11,468	₹ 3,27,91,809
2017	% of Growth	-36.11	-28.02	-21.92	14.89
	Values	₹ 6,93,53,300	₹ 4,79,32,655	₹ 15,99,01,342	₹ 3,87,13,279
2018	% of Growth	-33.34	-26.10	7.44	35.64
	Values	₹ 12,80,05,659	₹ 6,92,52,137	₹ 24,72,84,962	₹ 3,71,44,183
2019	% of Growth	23.04	6.76	66.15	30.14
	Values	₹ 17,23,69,900	₹ 13,16,33,214	₹ 14,68,82,996	₹ 9,54,85,395
2020	% of Growth	65.68	102.93	-1.31	234.55
	Values	₹ 10,46,77,889	₹ 8,65,33,546	₹ 9,54,62,110	₹ 13,31,92,962
2021	% of Growth	0.61	33.40	-35.86	366.67
	Values	₹ 9,33,35,550	₹ 8,26,03,365	₹ 11,48,25,980	₹ 13,76,33,473
2022	% of Growth	-10.29	27.35	-22.85	382.22
2023	Values	₹ 10,01,22,970	₹ 10,91,78,590	₹ 5,63,38,124	₹ 8,07,35,402

	% of Growth	-3.76	68.32	-62.15	182.87

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Gold experienced fluctuations, with a 65.68% growth in 2020 and a slight decline in 2021 (-10.29%). Silver grew in 2020 (102.93%) and 2023 (68.32%). Crude Oil grew in 2019 (66.15%) but declined by 62.15% in 2023. Natural Gas had substantial growth in 2021 (366.67%) and 2022 (382.22%), with moderated growth in 2023 (182.87%).

Table 13 - Trend Analysis for Agri-Commodities (Total Values)

Year		COTTON	CPO	MENTHA OIL	KAPAS	CARDAMOM
2015	Values	₹ 27,47,702	₹ 40,48,051	₹ 44,48,358	₹ 1,155	₹ 4,07,143
	% of Growth	100	100	100	100	100
2016	Values	₹ 49,98,456	₹ 60,46,475	₹ 23,34,907	₹ 325	₹ 2,42,076
	% of Growth	81.91	49.37	-47.51	-71.85	-40.54
2017	Values	₹ 43,88,191	₹ 44,23,700	₹ 27,75,664	₹ 21	₹ 99,580
	% of Growth	59.70	9.28	-37.60	-98.18	-75.54
2018	Values	₹ 46,13,484	₹ 37,58,481	₹ 23,17,064	₹ 0	₹ 24,439
	% of Growth	67.90	-7.15	-47.91	-100.00	-94.00
2019	Values	₹ 44,75,651	₹ 35,90,146	₹ 13,14,555	₹ 14,369	₹ 24,439
	% of Growth	62.89	-11.31	-70.45	1144.16	-94.00
2020	Values	₹ 14,47,809	₹ 77,55,921	₹ 2,41,176	₹ 41,351	₹ 5,190
	% of Growth	-47.31	91.60	-94.58	3480.47	-98.73
2021	Values	₹ 31,20,379	₹ 99,50,421	₹ 1,72,869	₹ 9,406	₹ 0
	% of Growth	13.56	145.81	-96.11	714.41	-100.00
2022	Values	₹ 7,407	₹ 778	₹ 3,15,824	₹ 778	₹ 0
	% of Growth	-99.73	-99.98	-92.90	-32.61	-100.00
2023	Values	₹ 2,49,681	₹ 0	₹ 2,63,032	₹ 129	₹ 0
	% of Growth	-90.91	-100.00	-94.09	-88.82	-100.00

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Cotton initially grew in 2016 (81.91%) but declined sharply by 2022 (-99.73%). CPO fluctuated with peaks in 2020 (91.60%) and 2021 (145.81%) but completely declined by 2023 (-100.00%). Mentha Oil showed brief growth in 2022 (92.90%) but declined by 94.09% in 2023. Kapas had exceptional growth in 2020 (3480.47%) and 2021 (714.41%) but declined sharply by 2023 (-88.82%). Cardamom consistently declined, reaching a 100% decrease by 2023.

Commodities-wise Regression Analysis

Table 14 - Model Summary – Base Metals & Bullion

Model		Base Metals					Bullion	
		Aluminum	Copper	Lead	Nickel	Zinc	Gold	Silver
R		.823[a]	.325[a]	.980[a]	.014[a]	.930[a]	.614[a]	0.679
R Square		.678	.106	.960	.000	.864	.377	0.462
Adjusted R Square		.632	-.022	.954	-.143	.845	.288	0.385
Std. Error of the Estimate		3805898	12493164	2466869	19763949	7617711	27048871	21748315
Change Statistic	R Square Change	.678	.106	.960	.000	.864	.377	0.462
	F Change	14.712	.829	165.841	.001	44.518	4.234	6.002
	df1	1	1	1	1	1	1	1
	df2	7	7	7	7	7	7	7
	Sig. F Change	.006	.393	.000	.972	.000	.079	0.044
Durbin-Watson		1.036	1.620	1.050	.918	2.725	.960	0.377

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Table 15 - Coefficients – Base Metals & Bullion

Model		Aluminum	Copper	Lead	Nickel	Zinc	Gold	Silver
Unstandardized Coefficients	B		-1.06	6.77	0.06	5.66	20.35	15.51
	Std. Error	1.72	1.17	0.53	1.52	0.85	9.89	6.33
Standardized Coefficients	Beta	0.82	-0.33	0.98	0.01	0.93	0.61	0.68
t		3.84	-0.91	12.88	0.04	6.67	2.06	2.45
Sig.		0.01	0.39	0.00	0.97	0.00	0.08	0.04
Collinearity Statistics	Tolerance	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	VIF	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Table 16 - Collinearity Diagnostics – Base Metals & Bullion

Model	Dimensions	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	Contracts
Aluminum	1	1.904	1.000	.05	.05
	2	.096	4.452	.95	.95
Copper	1	1.889	1.000	.06	.06

	2	.111	4.131	.94	.94
Lead	1	1.817	1.000	.09	.09
	2	.183	3.155	.91	.91
Nickel	1	1.824	1.000	.09	.09
	2	.176	3.215	.91	.91
Zinc	1	1.830	1.000	.09	.09
	2	.170	3.279	.91	.91
Gold	1	1.952	1	0.02	0.02
	2	0.048	6.398	0.98	0.98
	1	1.977	1.000	.01	.01
Silver	2	.023	9.195	.99	.99

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

The regression analysis for Base Metals and Bullion reveals key insights. Aluminium shows a strong positive correlation with total values (R = 0.823), despite a negative coefficient. Lead (R = 0.980) and Zinc (R = 0.930) have very strong positive relationships, significantly impacting total values. Nickel shows no significant relationship (R = 0.014). In Bullion, Silver has a moderate but significant positive relationship (R = 0.679), while Gold's relationship is moderate but not significant (R = 0.614). Lead and Zinc stand out in Base Metals, while Silver is notable in Bullion for its significant impact.

Table 17 - Model Summary – Energy & Agri-Commodities

Model		Energy		Agricultural Commodities			
		Crude oil	Natural Gas	Cotton	CPO	Mentha Oil	Kapas
R		.865[a]	.716[a]	.925[a]	.839[a]	.975[a]	.999[a]
R Square		.749	.513	.855	.704	.951	.997
Adjusted R Square		.713	.443	.835	.662	.944	.997
Std. Error of the Estimate		28272302	33182333	781950	1890749	353750	771
Change Statistics	R Square Change	.749	.513	.855	.704	.951	.997
	F Change	20.837	7.362	41.424	16.689	136.405	2517.072
	df1	1	1	1	1	1	1
	df2	7	7	7	7	7	7
	Sig. F Change	.003	.030	.0004	.005	.00001	.000
Durbin-Watson		1.777	1.538	2.669	1.118	.954	2.020

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Table 18 Coefficients – Energy & Agri-Commodities

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
CrudeOil - Contracts	2.492	.546	.865	4.565	.003	1.000	1.000
NaturalGas - Contracts	2.566	.946	.716	2.713	.030	1.000	1.000
COTTON	5.219	.811	.925	6.436	.000	1.000	1.000
CPO	6.445	1.578	.839	4.085	.005	1.000	1.000
MENTHA OIL	3.381	.289	.975	11.679	.000	1.000	1.000
KAPAS	2.096	.042	.999	50.170	.000	1.000	1.000

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

Table 19 Collinearity Diagnostics – Energy & Agri-Commodities

Model	Dimensions	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	Contracts
Crude oil	1	1.903	1.000	.05	.05
	2	.097	4.422	.95	.95
Natural Gas	1	1.893	1.000	.05	.05
	2	.107	4.216	.95	.95
Cotton	1	1.886	1.000	.06	.06
	2	.114	4.058	.94	.94
CPO	1	1.863	1.000	.07	.07
	2	.137	3.690	.93	.93
Mentha oil	1	1.704	1.000	.15	.15
	2	.296	2.399	.85	.85
Kapas	1	1.489	1	0.26	0.26
	2	0.511	1.707	0.74	0.74

Source – No. of contracts and Values are collected Multi Commodity Exchange (MCX)

The regression analysis for Energy and Agricultural Commodities shows strong positive relationships between contracts and total values. Crude Oil (R = 0.865) and Natural Gas (R = 0.716) demonstrate significant correlations, with Crude Oil being stronger. In Agricultural Commodities, Cotton (R = 0.925), CPO (R = 0.839), Mentha Oil (R = 0.975), and Kapas (R = 0.999) all show very strong positive relationships, with Kapas having the strongest correlation. These findings highlight the substantial impact of contracts on total values, especially in Agricultural Commodities.

7. Conclusion

The analysis of commodity trading trends and relationships has revealed significant insights into the performance and volatility of different segments, including Base Metals, Bullion, Energy, and Agricultural Commodities. The findings indicate that specific commodities, such as Lead, Zinc, Crude Oil, and Kapas, exhibit strong positive relationships between the number of contracts and total values. These relationships are crucial for understanding the dynamics of the market and the factors influencing commodity prices.

Some major factors, like CTT tax and the regulatory merger that FMC merged with SEBI, then the pandemic situation, and technological advances, play significant roles in driving market fluctuations. Major changes affect the interest of investors and participants in the market.

By providing a comprehensive analysis of these segments, this research paper contributes valuable insights into the intricate relationships within commodity trading. The significant positive correlations identified in this study emphasize the impact of traded contracts on total values, enhancing the importance of continuous monitoring and analysis of commodity markets. The findings not only highlight the performance of specific commodities but also emphasize the importance of understanding the factors driving market volatility. The paper makes a meaningful contribution to the understanding of the market dynamics of multi-commodity exchange.

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