Financialization of Commodities: A Study on the Indian Commodity Markets

Extended Abstract

Over the past few decades, commodity financialization has emerged as a key trend in financial markets worldwide. Commodity financialization refers to the entry of institutional investors into commodity futures markets (Basak & Pavlova, 2016). Previously, institutional investors were not allowed to participate in the Indian commodity futures market, impacting market quality dimensions. However, SEBI allowed the participation of institutional participants in the Indian commodity futures markets, namely Category III AIFs, Portfolio Management Services, and Mutual Funds from June 21, 2017, May 22, 2019, and May 21, 2019, respectively. Furthermore, direct participation of foreign participants with exposure to physical commodity markets in India was permitted from October 9, 2018, for hedging purposes, and from September 29, 2022, they were allowed to participate from a trading perspective, as well. This unique setting in the Indian context allows for testing the impact of financialization on commodity futures markets.

Financialization is sometimes linked to enhanced correlation between commodity and stock markets, particularly when asset returns are decreasing—a process referred to as "contagion." Empirical studies have seen and recorded this increased correlation between equities and commodities during times of crisis, emphasizing the intricate relationships that are established as a result of financialization.

There are several different aspects that are covered in the literature on the financialization of commodity markets. Comparative research conducted by Tang and Xiong (2012) and Irwin and Scanders (2012) investigates the impact that financialization has on risk-sharing frameworks. The research conducted by Buyuksahin and Robe (2014) as well as Chong and Miffre (2010) investigates the changing interaction that exists between the stock market and the commodity market. Cheng and Xiong (2014) carried out study that investigates the ways in which financialization influences the process of price discovery in commodity markets. Study undertaken by Bohl et al. (2023) and Main et al. (2018) investigates the impact that financialization has on the dynamics and prices of the spot market.

While significant research has been conducted globally on financialization, there is a need for more focused research on the Indian context, particularly on individual commodities and the

impact of SEBI regulations on financialization. Existing studies primarily analyze commodity indices, leaving a gap for more granular investigations. The primary objectives of this study are to assess the presence of financialization in Indian commodity markets and examine the contagion effect under financialization. Additionally, the study aims to investigate the interlinkages between commodity futures and the stock market, particularly post-SEBI regulation.

Methodology

The study analyzes the closing prices of futures contracts for five non-agricultural commodities (namely aluminum, copper, gold, crude oil, and natural gas) traded on the MCX exchange. The Nifty index, representing the stock market, is also included in the analysis. The analysis spans from January 1, 2010, to December 31, 2022, including sub-period studies before and during the implementation of SEBI regulations. The methodological techniques utilized in this study include the Johansen Cointegration Test, Granger Causality analysis, and DCC GARCH models. These tools investigate the interlinkages and correlations between variables. Specifically, the study addresses the following research questions:

RQ1: Is there any interlinkage between commodity futures and the stock market?

RQ2: Does the interlinkage between commodity and stock markets vary following SEBI regulation permitting institutions to trade in the commodity futures market?

RQ3: Is the correlation between commodity and stock markets negatively associated with asset returns as a result of financialization? This question will be answered using the regression equation:

$$Corrt = \alpha + \beta 1 * Stockt + \beta 2 * Commodityt + \mu t. \quad (1)$$

Where, Stockt (Commodityt) is the logarithm returns of the stock index (commodity futures)

RQ4: Does the relation between correlation and asset returns change in different market states?

$$Corrt = \alpha + \beta 1 * Stockt + \beta 2 * Commodityt + \beta 3 * Eqtstresst + \beta 4 * Comstresst + \mu t \quad (2)$$

Where, Eqtstresst (Comstresst) is a dummy variable of 1 if the return of the nifty (commodity) is below than the mean return, otherwise 0.

Major Findings

The Granger Causality Test results show that the stock index can predict the prices of gold, silver, crude oil, and natural gas, but not aluminium or copper. Conversely, copper prices can predict changes in the stock index, but this predictive relationship does not exist for aluminium, gold, silver, or natural gas. There is no significant causal relationship between aluminium and the stock index in either direction. These findings highlight the specific interlinkages between the stock index and various commodities in the Indian market.

Table 1: Granger Causality (Full Period)

Relationship	F-Statistics	P-Value	Direction
Gold to Stock Index	1.07345	0.2615	Uni-Direction
Stock Index to Gold	1.36826	0.0025	
Silver- Stock Index	1.14368	0.1172	Uni-Direction
Stock Index- Silver	1.30815	0.0084	
Crude Oil- Stock Index	1.08474	0.233	Uni-Direction
Stock Index- Crude Oil	2.27978	1.00E-15	
Natural Gas-Stock Index	0.78567	0.4559	Uni-Direction
Stock Index-Natural Gas	4.02424	0.018	
Aluminium-Stock Index	1.20818	0.2989	No Casual Relation
Stock Index- Aluminium	0.91296	0.4014	
Copper-Stock Index	3.37172	0.0345	Uni-Direction
Stock Index-Copper	1.25583	0.285	

Source: Author's own compilation

Table 2: Granger Causality (Sub-Period)

	Sub-Period 1			Sub-Period 2		
Relationship	**F-Statistics**	**P-Value**	**Direction**	**F-Statistics**	**P-Value**	**Result**
Gold-Stock Index	1.22	0.30	No Causal	1.11	0.35	Uni Direction
Stock Index-Gold	1.11	0.33	Relation	1.76	0.06	
Silver-Stock Index	1.81	0.16	No Causal	1.90	0.15	Uni Direction
Stock Index-Silver	0.70	0.49	Relation	3.45	0.03	
Crude Oil-Stock Index	0.20	0.82	No Causal	1.62	0.20	Uni Direction
Stock Index-Crude Oil	0.13	0.88	Relation	3.02	0.05	
Natural Gas-Stock Index	0.27	0.76	No Causal	1.44	0.24	Uni Direction
Stock Index-Natural Gas	0.07	0.93	Relation	5.77	0.00	
Aluminium-Stock Index	2.50	0.08	Bi-Directional	0.60	0.55	No Causal Relation
Stock Index-Aluminium	5.12	0.01		0.93	0.39	
Copper-Stock Index	3.31	0.04	Bi-Directional	0.67	0.51	No Causal
Stock Index-Copper	3.32	0.04		1.18	0.31	

Source: Author's own compilation

The Granger causality results indicate that in Sub-Period 1 (period before the implementation of SEBI regulation), aluminium and copper show bi-directional causality with the stock index, while other commodities do not exhibit significant causal relationships. In Sub-Period 2 (period after the implementation of SEBI regulation), a uni-directional causality from the stock index to gold, silver, crude oil, and natural gas emerges, suggesting that the stock index can predict these commodity prices. There is no causal relationship between aluminum or copper and the stock index in Sub-Period 2. These findings demonstrate a shift in causal relationships because of the regulatory changes.

Table 3: DCC GARCH (Full Period)

	Mu (x)	Omega (x)	apha1 (x)	beta1 (x)	Mu (y)	Omega (y)	alpha1 (y)	beta 1 (y)	dcca 1	dccba 1
Gold & Stock Index	0.00	0.00	0.16	0.73	0.00	0.00	0.08	0.90	0.03	0.93
	-0.01	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	0.00	0.00
Silver & Stock Index	0.00	0.00	0.11	0.89	0.00	0.00	0.08	0.90	0.01	0.99
	-0.84	-0.68	-0.14	0.00	0.00	-0.05	0.00	0.00	-0.10	0.00
Crude Oil & Stock Index	0.00	0.00	0.14	0.85	0.00	0.00	0.08	0.90	0.03	0.93
	0.00	-0.27	0.00	0.00	0.00	-0.05	0.00	0.00	0.00	0.00
Natural Gas & Stock Index	0.00	0.00	0.09	0.90	0.00	0.00	0.08	0.90	0.00	0.95
	-0.31	-0.30	0.00	0.00	0.00	-0.05	0.00	0.00	-0.51	0.00
Aluminium & Stock Index	0.00	0.00	0.10	0.86	0.00	0.00	0.08	0.90	0.02	0.95
	-0.54	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	0.00	0.00
Copper & Stock Index	0.00	0.00	0.06	0.89	0.00	0.00	0.08	0.90	0.01	0.99
	-0.26	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	-0.01	0.00

Source: Author's own compilation

The DCC GARCH results for the full period reveal that all commodities (gold, silver, crude oil, natural gas, aluminium, and copper) exhibit significant dynamic conditional correlations with the stock index, as indicated by the high values of dccba1 (ranging from 0.93 to 0.99). The parameters alpha1 and beta1 for both the commodities and the stock index indicate persistent volatility clustering, with alpha1 values typically between 0.06 and 0.16, and beta1 values around 0.90. This suggests that past shocks have a lasting impact on volatility. The overall high dccba1 values suggest strong co-movement between commodity and stock index volatilities over the period. The DCC GARCH results indicate a strong and persistent co-

movement between the volatilities of various commodities and the stock index, reflecting increased market integration and synchronized volatility patterns.

The regression results show that both commodity returns and stock index returns significantly influence their correlation. For gold, crude oil, and aluminium, higher commodity returns are linked to lower correlations with the stock index. When distress variables are included in Model 2, they notably affect Gold and Crude Oil, reducing its correlation with the stock index, while it increases the correlation for copper. These results emphasize the dynamic link between several commodities and the stock market.

Table 4: Regression Result

Dependent Variable: Correlation between Commodity and Stock Index		**Model -1**		**Model 2**	
Commodity		**Coefficients**	**P-Value**	**Coefficients**	**P-Value**
Gold	Commodity Return	-0.34	0.00	-0.28	0.00
	Stock Index Return	-0.20	0.00	-0.03	0.67
	Commodity Distress			0.00	0.03
	Stock Index Distress			0.00	0.40
	C	0.00	0.97	0.01	0.00
Silver	Commodity Return	0.00	0.03	0.00	0.05
	Stock Index Return	0.00	0.31	0.00	0.16
	Commodity Distress			0.00	0.64
	Stock Index Distress			0.00	0.33
	C	0.01	0.00	0.01	0.00
Crude Oil	Commodity Return	-0.25	0.00	-0.04	0.00
	Stock Index Return	-0.17	0.00	0.02	0.33
	Commodity Distress			0.00	0.83

	Stock Index Distress			0.00	0.43
	C	0.00	1.00	0.00	1.00
Natural Gas	Commodity Return	-0.02	0.08	-0.01	0.29
	Stock Index Return	0.00	0.88	0.02	0.37
	Commodity Distress			0.00	0.82
	Stock Index Distress			0.00	0.25
	C	-0.02	0.00	-0.02	0.00
Aluminium	Commodity Return	0.49	0.00	0.68	0.00
	Stock Index Return	0.45	0.00	0.44	0.03
	Commodity Distress			-1.07	0.00
	Stock Index Distress			-0.74	0.02
	C	0.10	0.00	0.09	0.00
Copper	Commodity Return	-0.04	0.13	-0.08	0.05
	Stock Index Return	0.00	0.86	0.05	0.28
	Commodity Distress			0.09	0.19
	Stock Index Distress			-0.08	0.24
	C	0.00	0.00	0.00	0.00

Conclusion

The findings indicate that financialization is present in the Indian commodity market, with strengthened relationships between stock and commodity markets post-SEBI regulations, particularly in bullion and energy commodities. The contagion effect is observed in gold and crude oil but is absent in other commodities. The study concludes that financialization has significantly influenced the Indian commodity market in different market states, especially following regulatory changes by SEBI. The strengthened correlations and interlinkages

between stock and commodity markets highlight the impact of institutional investor participation, affirming the presence of financialization and its effects on market dynamics.

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