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Price Discovery and Volatility Spillover in the Commodity Derivatives Market in India

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ABSTRACT

The study has considered four futures and spot markets of the Multi Commodity Exchange (MCX) Ltd., namely composite commodity market index of metals, energy and agricultural commodities (MCXCOMDEX), Energy (MCXENERGY), Agriculture (MCXAGRI) and Metal (MCXMETAL).
The long run relationship, price discovery and volatility spillover in the commodity derivatives markets in India has been analysed through Unit Root Test using ADF and Phillips Peron Test, Descriptive Statistics, Johansen cointegration Test, Vector Error Correction Model (VECM) and the Bivariate EGARCH model.

Key Words: Price Discovery, Volatility Spillover, Cointegration, VECM and Bivariate EGARCH

Introduction:

India is a commodity dependent economy wherein more than two thirds of the populace is dependent on agriculture and agricultural commodities for their livelihood. Most surprisingly, Indian commodity markets are underdeveloped; however, in recent years investing in commodities has undergone a sea change and has witnessed sturdy growth with many innovations

In India, the commodity derivatives market plays a pivotal role in futures trading, risk sharing and information pooling, thereby, drawing extensive attention towards itself. The trading in commodity derivatives accomplishes two key functions, in particular, price risk management and price discovery, with reference to any given commodity. The commodity derivatives market offers an effective mechanism for price risk management that covers all stakeholders who are participants in the commodity trading process. The stakeholders range from the producers, traders and processors up to the exporters and importers and the consumers of a commodity. The commodity derivatives market presents trading, hedging and arbitrage opportunities to the market players. It is also useful to all sectors of the economy, as it assures stability in supply and demand positions and also eliminates the perils of price uncertainty, promotes competition and plays the role of a price guide, to the farmer and other stakeholders in the economy.

Commodity trading in India has a long history. Faced with the grudging reluctance to modernise and slow pace of introduction of fair and transparent structures by the existing exchanges, Government allowed setting up of new modern, demutualised Nation-wide Multi-commodity Exchanges with investment support by public and private institutions. As per the recommendation of the then commodity market regulator Forwards Market Commission (FMC) which is now merged with SEBI, the Government of India recognized the National Multi Commodity Exchange (NMCE), Multi Commodity Exchange (MCX) and National Commodity and Derivative Exchange (NCDEX) as nation-wide multi commodity exchanges in 2003. At present, there are six national and sixteen regional commodity exchanges operating in India and carrying out trading activities. Despite the tremendous growth in the commodity derivative market in India, future trading has been banned many times because of speculative trading and volatility in the prices of the commodities.

In the commodity markets there is a need to know whether the spot or the futures markets play a major role in the price discovery process. There is also need to know whether there is unidirectional flow of information from the futures market to the spot market, or spot market to the futures market or a bidirectional flow of information between these markets. This helps in understanding the extent of relationship between the futures and spot markets and the speed of adjustments between the markets. The important function of Commodity derivatives markets is price discovery. In order to perform the price discovery function effectively, the futures markets need to incorporate new information more quickly than the spot markets.

Review of Literature:

The commodity markets have not been adequately researched and there are limited studies in price discovery and volatility spillover in the commodity markets. Most of the studies on Indian commodity futures markets are theoretical and on policy issues.

Meenakshi Malhotra (2012) suggested that there is urgent need deliberate on issues that require to be researched so that healthy growth and development of the markets can be promoted efficiently. **Anurag Agnihotri and Anand Sharma (2011)** found that a positive correlation exists between spot and future prices of zinc, natural gas, chana and jeera.

Manta Kumar Mahalik, Debashis Acharya and M. Suresh Babu (2010) conducted a study by utilising four spot and futures indices of MCX to examine the volatility spillover and price discovery in the Indian commodity market. They found that information flows from the future to the spot commodities market. However the reverse causality was found to be absent. The authors have used Bivariate Garch model to show that an innovation in a market could prompt volatility in another market.

Srinivasan P. and Ibrahim P. (2012) examined the process of price discovery and volatility spill over during 2009 to 2011 with regards to gold spot and future markets on NCDEX. They proved that gold spot market plays a dominating role and is an effective vehicle of price discovery. The study also concluded that information spills over from spot to futures market and the innovation in information processing can expose all the latest information with respect to the gold spot market.

Pankaj Kumar Gupta and Sunita Ravi (2012) analysed the price discovery function and volatility spill over in relation to the future and spot commodity markets. The authors concluded that with respect to commodities the future market is more efficient when compared to the spot market and that the future market aids the spot market in the price discovery process.

Ajay Kumar Chauhan, Shikha Singh and Aanchal Arora (2013) concluded that the commodity futures markets very effectively served the price discovery role in the spot market and implied that there is a channel of information from the futures to the spot commodity markets. They also concluded that although innovations in one market may enable the prediction of volatility in the same other market, the volatility spillovers originating in the futures enroute to the spot market will be dominant.

Sanja Sehagal, Wasim Ahmed and Florent Desting (2014) concludes that Agriculture commodity derivatives market has been evolving in the correct direction of late and the futures market has become the pivot of the information transmission process.

The empirical research on the role of price discovery and volatility spillover is limited especially with regards to the level and direction of informational spillover in commodity market. Given the recent upheavals in the commodity derivatives market in India, there is an urgent need to find out whether the spot or futures market plays decisive role in the price discovery process and whether the volatility spillover is unidirectional or bidirectional. In order to fill the research gap, this paper investigates the price discovery and volatility spillover between spot and futures markets.

Objectives of the Study:

The objectives of the study are as follows:

1. To examine the presence of long run equilibrium relationships between each of the spot and future commodity markets representing MCXAGRI, MCXCOMDEX, MCXMETAL and MCXENERGY.
2. To examine the price discovery among the spot and future commodity markets representing MCXAGRI, MCXCOMDEX, MCXENERGY and MCXMETAL, in India.
3. To investigate the volatility spillover in the spot and future commodity markets representing MCXAGRI, MCXCOMDEX, MCXENERGY and MCXMETAL, in India.

Data and Methodology:

The data for the study includes daily closing prices of the commodity spot indices and its corresponding underlying future indices namely MCXAGRI, MCXCOMDEX, MCXENERGY and MCXMETAL of