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Abstract

Recent price surge in commodity markets has stipulated the intensity of various factors which lead the price volatility. There are multiple-factors namely, traditional supply and demand, excess global liquidity (i.e., monetary inflows in commodity markets), and financialization i.e., financial investors (portfolio investment and speculation) attitude. This paper is an attempt to investigate for the evidence and impact of speculation on volatility of commodity prices in Indian commodity markets. And, results exhibit that speculation has played decisive role in the commodity price bubble during the global crisis in India.

JEL Classification: G12, G18, G28

Keywords: Commodity Markets, Speculation, Price Volatility, Financialization and Investor's behaviour

DISCLAMIAAR: Comments and conclusions of this paper reflect my personal opinion and do not necessarily represent the position of ICRIER, New Delhi.

An evidence of speculation in Indian commodity markets

Vijay Kumar Varadi¹

There are two primary ways we make money trading, catching a big price move with a small position or having a large position and catching a small move.

-Bill Meehan

1. Introduction:

Global commodity markets have experienced significant price swings in recent years. Following a prolonged rise that peaked in mid 2008, led by soaring crude oil prices, global commodity markets fell sharply and bottomed out in early 2009. Since then, prices have been rising again, with the speed of the rise accelerating since the fall of 2010 (Bank of Japan, 2011). Global academia have found, the following factors for high and volatile commodity prices including a) traditional demand and supply factors, b) monetary factors; and finally financialization of commodity markets² (including speculation, particularly by institutional investors such as hedge funds, pension funds and investment banks and other exchange traded funds and notes).

Recently, commodities have been treated as an “asset class³” because it would develop a vibrant, active and liquid commodity market and help investors hedge their commodity risk, take speculative positions in commodities and exploit arbitrage opportunities in the market. A few characteristics including a) Liquidity transmission into commodity assets, b) Volatile stock market – “commodity markets are investors’ heaven”, c) Low interest rates in the host nations; and d) Hedge against weak dollar are major influential factors caused for investors to treat commodity markets as a “asset class”.

The transformation of commodities (commodity derivatives) into financial assets is often blamed for the instability of commodity prices. A new breed of market participants are demanding commodities only on paper including institutional investors, pension funds, endowments and other corporate investors. Commodity index investment is an activity typically characterized by

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² The financialization of commodity trading has increasingly jeopardized this function of commodity exchanges. Financial investors in commodity markets base their position-taking on risk and return considerations for which information about other asset markets and the overall economy play a key role, as do financial motives more generally. Such trading behavior, while relying on similar types of information, also anticipates the price impact of that information in similar ways. Taken together, the financialization of commodity trading poses the risk of herd behavior and of self-fulfilling prophecy due to the pecuniary power of these market participants.

³ A group of securities that exhibit similar characteristics, behave similarly in the marketplace, and are subject to the same laws and regulations. Asset classes and asset class categories are often mixed together. These investment vehicles are asset class categories, and are used for diversification purposes. It should be noted that in addition to the three main asset classes, some investment professionals would add real estate and commodities, and possibly other types of investments, to the asset class mix.

a passive strategy designed to gain exposure to commodity price movements as part of portfolio diversification strategy. Investors have seen portfolio diversification advantages in adding a proportion of commodity futures to equity and bond portfolios i.e., obtaining a higher return for the same level of risk – Gorton and Rouwenhorst (2006). The index investors engaged in commodity markets include index funds, swap dealers, pension funds, hedge funds and mutual funds that have a fiduciary or other obligation to track the value of similar commodity or basket of commodities in an essentially proactive manner. Index Investment in commodity markets has a tendency to increase speculative activity in futures markets, leads to large percentage of market place has no intent of taking futures to delivery, causing price volatility and commodity markets have started setting price of commodities as an asset, which may offer a possible explanation through sunspot equilibrium⁴. In this scenario, the objective of the paper is to examine whether Indian commodity markets do have any significant role of institutional investors/speculators by employing three possible explanations.

The paper is organized as follows. Section I provides some background information about commodities and commodity indices. Section II documents the role of speculation in commodity markets. We discuss Indian commodity markets and its regulatory reforms in Section III, and an extensive review on financialization of commodity markets has been done in Section IV, and objectives, data and proxies for financialization in commodity markets and results have been discussed in Section V, and finally Section VI concludes the paper.

2. The role of speculation in commodity markets:

Recent global financial and food crisis is evidenced and realized the assumptions of speculation trading. Speculators⁵ are trend-spotters. The concern is that trend spotting creates the trends that are subsequently identified. J.M. Keynes and J.R. Hicks are well known for the “theory of risk-transfer hypothesis”⁶. Major distinction between hedgers (“commercials”⁷) and speculators (“non-commercials”⁸) is that speculators are relatively risk-tolerant individuals who are rewarded for accepting price risks from risk-averse “hedgers”. Speculators in the forwards or futures

⁴ Uncertainty about the economic fundamental is intrinsic uncertainty. Market uncertainty is not transmitted through the fundamentals; it can be driven by extrinsic uncertainty. ‘Sunspots’ is short-hand for ‘the extrinsic random variable’ upon which agents coordinate their decision. In proper sunspot equilibrium, the allocation of resources depends in a non-trivial way on sunspots. Sunspot models are complete rational-expectations; general-equilibrium models offer an explanation of excess volatility.

⁵ Speculators can be classified as scalpers, day traders, or position traders. A person who trades derivatives, commodities, bonds, equities or currencies with a higher-than-average risk in return for a higher-than average profit potential. Speculators take large risks, especially with respect to anticipating future price movements, in the hope of making quick, large gains. **Scalpers** are watching for very short-term trends and attempt to profit from small changes in the contract price. They usually hold their position for only a few minutes. **Day traders** hold their positions for less than one trading day. They are unwilling to take the risk that adverse news will occur overnight. **Position traders** hold their positions of much longer periods of time.

⁶ J.M Keynes (1930) V.2, Chapter 29 and Hicks (1946), PP. 137-139

⁷ An investment in a commodity index, involved in the buying and/or selling of goods and/or services that is expected to generate cash flow. A commercial investment can be assumed by an individual, group or institution. Frequently, a commercial investment is shared by a group of investors combining assets in order to fund the investment. A commercial investment arise where an investor commits money or capital to purchase, either entirely or a percentage of, a for-profit property or business.

⁸ A classification used by the Commodity Futures Trading Commission (CFTC) to identify traders that use the futures market for speculative purposes.

markets may be on the long or on short side of any single such transaction, but in aggregate their commitments must offset any net imbalance of the long and short hedger's positions. An common view of speculation is ordinarily understood to mean the purchase of a good for later re-sale rather than for use, on the temporary sale of a good with the intention of later re-purchase – in the hope of profiting from an intervening price change⁹, which is having the following fundamentals and idealizing assumptions includes a) speculation occurs only in “informative situations”, b) in informative situations individuals must adjust both to “price risk” and “quantity risk”, c) in an informative situation there are two inter-related market equilibrium; and d) speculative behaviour is conditioned upon the scope of markets.

Speculation in commodity derivatives markets performs a valuable economic function. Firstly, speculation in these markets allows for the transfer of price risk from those least willing to bear it (commodity producers and consumers, or ‘end users’) to those with the greatest appetite and capacity to do so (generically, ‘speculators’). Secondly, derivatives markets transmit valuable information about supply and demand conditions. In recent times, increased amounts of capital have been flowing into the commodity futures trade, and there is thus a need to analyze the role futures market participants can possibly play in forming or distorting prices in the market for the underlying commodity¹⁰. Increasing speculative activity in futures markets i.e., large percentage of market place has no intent of taking futures to delivery, causing price volatility, commodity markets have started setting price of commodities as an asset. Therefore speculators can create a price distortion and speculative bubble with anticipating making significant profits form major movements in the markets¹¹. Persistent inflationary pressures in global commodity prices in the recent past has sparked a debate over its nature with speculation in commodity markets being singled out as the primary factor behind rising prices, even leading to a demand for a ban on futures trading for several important commodities.

Index investments are different form traditional speculative positions in three respects, such as a) traditional speculators can be long or short positions. Index investors are almost invariably long, b) traditional speculators hold for short periods. Index investors hold over long periods and roll positions forward at contract maturity; and c) traditional speculators pick markets (details, see table 1 in Annexure). Index investors track specific indices rather than taking positions on specific markets. They can also be large (up to 30-40% of total interest) in relation to the overall market. Now the question is whether speculators (traditional or dynamic) can influence movements in commodity prices, if so, whether they have created any distortion and bubble in Indian commodity markets. A more appropriate characterization of this debate is the scope for commodity markets to be affected by destabilizing speculation. The present analysis shed some light to provide empirical evidence for the above.

3. Indian Commodity Markets:

The commodity futures market in India dates back to more than a century. The first organized futures market was established in 1875, under the name and style of 'Bombay Cotton Trade

⁹ J. Hirshleiper (1977), “The theory of Speculation under alternative regimes of markets”

¹⁰ Shushimita Bose (2009), “The role of futures market in aggravating commodity price inflation and the future of commodity futures in India”.

¹¹ John C. Hull (2010), “Options, Futures and Other derivatives”, PP.40

Association' to trade in cotton derivative contracts. The mechanism of forward trading has actually developed and advanced considerably in the major trading nations of the world, like USA, UK, France, Japan, etc. In these countries, forward trading has been permitted in many new items/services including financial futures, shipping freights and interest rates etc. In comparison, commodity futures markets in India are much simpler and are at present dealing in single futures contracts in commodities. The forward contracts in commodities ensures that the manufacturers, processors, or producers to get continuous supply of the raw materials.

In 1952, Forward Contracts (Regulation) Act, (FCT Act) was enacted to regulate the commodity futures market and Forward Market Commission (FMC) was set up as a commodity futures market regulator in 1953. FMC performs the flow of approving the rules and regulations of the exchange subject to which the trading is to conducted, accord permission for commencement of trading in different contracts, monitor market conditions continuously and take remedial measures whenever the trading tends to go outside the permissible limits. The system of regulation of the commodity futures markets contributes to the overall objectives of ensuring an efficient market, reducing information asymmetry and promoting confidence in the market. The regulations aimed at the prevention of market manipulation focus on maintaining the integrity of the market price of commodities.

The apprehension in the minds of policy makers about deleterious effects of speculation in the commodity futures, futures markets were prohibited in most of the commodities, which continued for about 3 decades. With reference to various committee reports such as Kabra (1994), World Bank and UNCTAD report (1996) India revived the futures trading and allowed national level commodity exchanges to set up. Three National level exchanges i.e., NMCE (Jan, 2003), MCX (Sep, 2003) and NCDEX (Nov, 2003) were granted recognition for commodity futures trading with demoralized and corporative (online electronic trading). At present 113 commodities are notified in 21 exchanges for futures trading and actual trading is taking place in about 50 commodities. The value of trading which was just Rs. 66 thousand crores in 2002-03 increased to Rs.119.49 lakh crores in 2010-11 i.e., 181% increase during the period.

4. Literature Review:

The empirical evidence on this subject has been mixed. Sanders, Irwin, and Merrin (2008) expressed skepticism about the assertion that speculation has led to bubbles in agricultural futures prices. Other authors share somewhat different views. Robles and others (2009) identified speculative activity in the futures market as a source of the 2007/08 agricultural commodity price increases. Plastina (2008) concluded that between January 2006 and February 2008, investment fund activity might have pushed cotton prices 14 percent higher than they would otherwise have been. In the non-ferrous metals market, Gilbert (2007) found no direct evidence of the impact of investor activity on the prices of metals, but found strong evidence that the futures positions of index providers had affected the prices of soybeans (though not of maize) in the US futures exchanges. Perhaps, the strongest evidence is a subsequent study by Gilbert (2010: 420) who concluded that “By investing across the entire range of commodity futures, index based investors appear to have inflated food commodity prices.”

The increase in long speculative positions was surpassed by an increase in short hedging in commodity markets (Sanders et al., 2008), long-only index trading which pushes prices up, irrespective of the market situation (Lines. T 2010), financial investment in commodity trading appears to have caused prices may deviate, at least in the short run (Mayer J 2009), index speculators frustrated the futures market (Van et al 2009), the recent wide fluctuations of commodity prices have been driven by the financialization of commodity markets (UNCTAD 2009), speculators that invest in commodity markets determines commodity spot prices and commodity futures risk premia in equilibrium (VV Acharya, 2010), consistent with speculation affecting prices, and show that index-based investment has a significant and persistent price impact (Gilbert 2008), speculative price spikes built up, and the gap between spot and futures prices widened, causing to halt grain futures trading (Miguel Robles 2009), speculative buying by index funds in commodity futures and over-the-counter derivatives markets created a “bubble” in commodity prices (S. H. Irwin 2009), speculation has driven prices up to current levels (Davidson 2008), speculation on food prices has played the decisive role in the price bubble in 2007/2008 (Peter Wahl , 2008), speculation was a major force that pushed commodity prices up during 2003-2008 (Jeffrey A. Frankel 2008), financial investors (the so-called “financialization of commodities”) may have been partly responsible for the 2007/08 spike (John Baffes et al 2010), financial speculation in commodities futures markets is the real culprit (L. Randall Wray 2009 and 2010), speculators on futures markets played a minor impact on prices, but exuberant expectations of all market participants had an influence (Rolf Kappel, 2010) the oil price spike was a speculative bubble driven by financial flows requires neither disapproval of purely financial investments in oil nor a judgment about motives (John E. Parsons 2009), financial regulators turn their attention to financial markets in agricultural commodities, which show signs of the speculation and overshooting have resulted crises in global finance (Sandra Polaski 2008), the grains and oilseeds sector corn, the soybean sub-sector and the wheat sub-sector all exhibited speculative bubbles in US (Peter Went 2009), as speculative hoarding takes place, the price of commodities jumps (Ricardo caballero, 2008), the role of speculation in commodity price volatility is a highly contentious (Cyn-Young, 2006), price deviations between futures and spot markets, rational and informed speculators are seen to drive any price deviations in the market quickly (Susan Newman, 2009), speculative activity tends to respond to price movements suggesting that the causality runs from prices to changes in speculative positions (Thomas Helbling, 2008). There is a consensus and evidence of financialization (speculation) in commodity markets and which is being a real culprit for the recent price surge during the financial and food crisis. In this scenario this paper tries to examine whether Indian commodity markets have any significant impact by institutional investors.

5. Objectives and Results of the Study:

This paper made an effort to investigate the speculation in commodity prices, which would be of interest to the investors, commodity exchanges and policy makers and regulators etc.; further this study provides useful insight for the market activity with respect to price volatility. Objectives of the study includes, to investigate the impact of speculation on commodity markets in India, and to elucidate relationship between investor’s behaviour and financialization in commodity markets. The hypotheses formulation is as under: Speculators have not significantly influenced the commodity markets in India in recent period and liquidity of capital inflows (value of trade) does not cause price volatility in commodity markets. Data is collected form the FMC (forward

markets commission) – fortnightly data is aggregated as monthly series for MCX (Multi-Commodity Exchange), NCDEX (National Commodity & Derivative Exchange Ltd.), and NMCEX (National Multi-Commodity Exchange Ltd.). These markets are performing significantly huge volume and value of trade in the national commodity markets. We have aggregated all the above markets data such as Trading Volume, Open Interest and Near Month Contracts. Data employed in this study is from April 2006 to December 2010 (Monthly Data) time series data. Spot and Futures commodity index prices have been collected from the MCX, NSE.

There are three possible explanations to establish the evidence of speculation in commodity markets. **First**, finding outliers in the study using three proxies such as volume of traded contracts, capital flows in the commodity markets i.e., value of trade and open interest are considered. A possible explanation for being outlier in any month is the actual trade, turnover and open interest is higher than the average of its actual, then those observation respective months are considered as a potential speculative months in the commodity markets. **Second**, the volatility spillovers between cross-markets i.e., if the risk increases in any asset, the potential investment would reduce and it yields lesser returns or even negative, in order to avoid such idiosyncratic risks, investors may search for the alternative assets, which yields more or less the same returns. In academia recently it is found that commodity markets are treated as “safe heaven for assets”, in this paper an attempt has been made to find the volatility spillovers between assets i.e., equities and commodities. **Finally**, third explanation is based on basis, contango and backwardation¹², the shape of the futures curve is an important indicator for the hedgers and speculators or price discovery analysis.

Speculators in the futures markets may be on the long and short side of any single such transaction, but in the aggregate their commitments must offset any net imbalances in the long and short hedger’s position¹³. This analysis of the role of financial speculation in the behaviour in the recent years focuses on trading activities. For the analysis, we have taken aggregate data from FMC. To capture the size of the change in speculative behaviour, we analyze the following indicators, including a) Volume of Futures Contracts¹⁴ (Trading Volume), b) Value of the Contracts¹⁵ (Trading Value), c) Open Interest in futures contracts¹⁶ (OI, All Contracts in Commodity markets).

¹² Basis is the difference between the spot price and the futures price at a given time, t. Contango is a condition where forward prices exceed spot prices, so the forward curve is upward sloping. Backwardation is the opposite condition, where spot prices exceed forward prices, and the forward curve slopes downward.

¹³ Robels et.al (2009), “Why speculation Matters”,

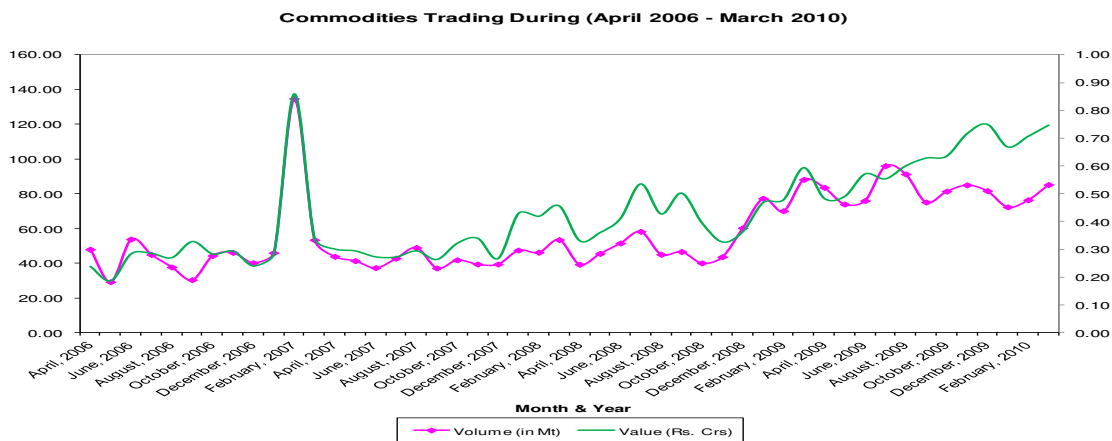
¹⁴ Monthly volume of futures contracts: this indicator captures the total number of trades in commodity futures contracts in MCX, NCDEX, and NMCEX on monthly basis, aggregating contracts with different maturities. Typically, contracts with maturities of 24 months or less are traded. Volume represents the total amount of trading activity or contracts that have changed hands in a given commodity market. The greater the amount of trading during a market session the higher will be the trading volume. It also represents a measure of intensity or pressure behind a price trend. The greater the volume, the more we can expect the existing trend to continue rather than reverse.

¹⁵ Monthly value of futures contracts: This is an indicator for the liquidity of funds inflows in the commodity markets. Price is the most important factor which influences the trader’s activity.

¹⁶ Monthly open interest in futures contracts: Open interest describes the total number of futures contracts in the markets that have not yet been offset by the opposite futures position or fulfilled by delivery of the commodity. Every time a trader takes a position in the futures market (either long or short), it immediately generates an open

Masters and White (2008)¹⁷ recommended specific regulatory steps to address the alleged problems created by index fund investment in commodity futures markets, including the re-establishment of speculative position limits for all speculators in all commodity futures markets and the elimination or severe restriction of index speculation. Figure 1 shows, during the global financial and food crisis, there are bubbles in traded volume and investment inflows in the commodity markets which are above the average trade, and there are few huge bubbles in the period of starting 2010 and it would have a recursive carry forward effect for the further. This explains that, speculators may have influenced the market with their short positions and made investments in long positions. During recent global crisis, the bubble size of trade is 14,00,0000 thousands of metric tonnes, which is 5-8 times greater than the average trade, similarly value of trade is also increased suddenly from 300 thousands crores to 900 thousands crores which again 4-5 times greater than the average value of trade. This is explained by Petzels (2009)¹⁸ through his testimony at a CFTC hearing on position limits in energy futures markets, “Seasoned observers of commodity markets know that as non-commercial participants enter a market, the opposite side is usually taken by a short-term liquidity provider, but the ultimate counterparty is likely to be a commercial. In the case of commodity index buyers, evidence suggests that the sellers are not typically other investors or leveraged speculators. Instead, they are owners of the physical commodity who are willing to sell into the futures market and either deliver at expiration or roll their hedge forward if the spread allows them to profit from continued storage. This activity is effectively creating “synthetic” long positions in the commodity for the index investor, matched against real investors held by the shorts. We have seen high spot prices along with large inventories and strong positive carry relationships as a result of the expanded index activity over the last few years”.

Figure 1: Volume and Value of Trade¹⁹ (April 2006 – March 2010)



position until this trader takes the opposite position or the contract expires. Where volume measures the pressure or intensity behind a price trend, open interest measures the flow of money into the futures market.

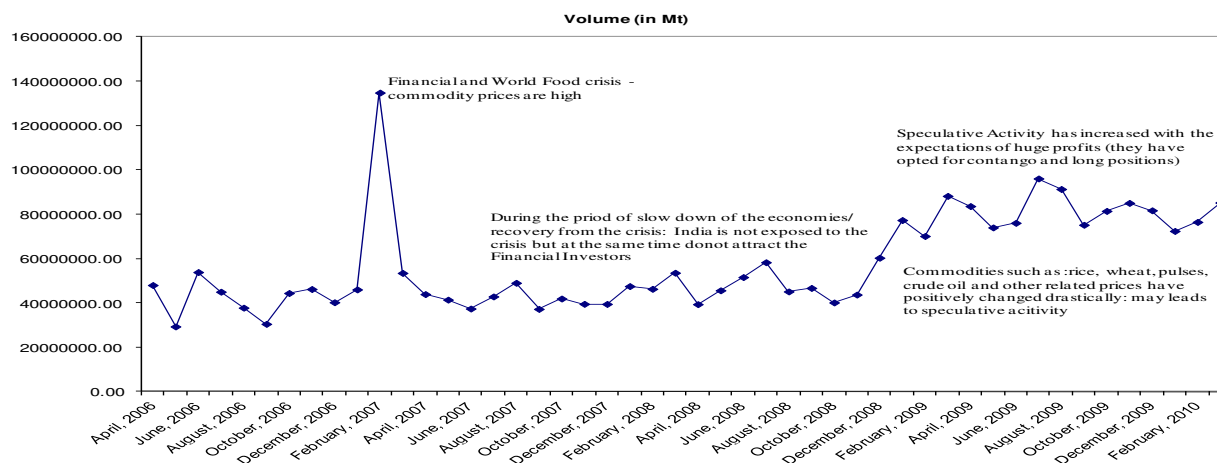
¹⁷ Masters, M.W and A.K. White (2008), “The accidental hunt brothers: How institutional investors are driving up food and energy prices”

¹⁸ Petzel, T (2009), “Testimony before the CFTC”, July 28.

¹⁹ GOI ordered to delist of futures contract in Feb 2007 for commodities like urad, tur, wheat and rice with a suspection that futures trading in these commodities had been contributing to the rise in their domestic prices. In figure, we have shown the far-month contracts that mean the contacts are before February 2007.

Theoretical models that show uninformed or noise traders impacting market prices rely on the unpredictable trading patterns of these traders to make arbitrage risky. Because the arbitrage – needed to drive prices to fundamental value – is not risk less, noise traders can drive a wedge between market prices and fundamental values. Working (1960)²⁰ argued that speculation must be gauged relative to hedging needs. In particular, speculation can only be considered “excessive” relative to the level of hedging activity.

Figure 2: Volume of Trade



As shown in Fig 2, for Volume of Trade in mid-2007 through mid-2008 – where it is evidence appears to be a close correspondence between index trader positions (long positions) and global financial crisis. Further mid-2009 provides significance of long positions (i.e., index trader positions, passive, large and long-only positions in swap agreements with banks, which in turn hold futures contracts to offset their short positions, able to benefit only in rising or backwardated markets; transparent positions) in Indian commodity markets. Active, large positions can improve liquidity and make hedging easier for large commercial users. In periods of rapid and sharp price changes, large positions are a “liquidity sponge”, making it difficult for hedgers with commercial interests to place orders. This is evident from figure 2. The ratio of volume to open interest also captures speculative market activity, under the assumption that the majority of speculators prefer to involve in a short period of time, Hence a speculator taking opposite positions (buying and selling contracts) in the market within days or weeks will generate an increase in monthly registered volumes but little change in monthly open interest.

First, let Monthly Value of Trade =A, Monthly Volume of Traded contracts = B and Monthly open interest in commodity markets in India =C. Let’s suppose the speculation might have occurs in the following:

²⁰ Working H (1960), “Speculation on Hedging Markets”, Food Research Institute studies, 1:185-220

$$\text{Speculative activity in A} \begin{cases} 0(\text{No}), \text{if } A \leq \bar{A} \\ 1(\text{Yes}), \text{if } A \geq \bar{A} \end{cases} \quad (1)$$

$$\text{Speculative Activity in B} \begin{cases} 0(\text{No}), \text{if } B \leq \bar{B} \\ 1(\text{Yes}), \text{if } B \geq \bar{B} \end{cases} \quad (2)$$

$$\text{Speculative Activity in C} \begin{cases} 0(\text{No}), \text{if } C \leq \bar{C} \\ 1(\text{Yes}), \text{if } C \geq \bar{C} \end{cases} \quad (3)$$

Table 1: Occurrences of Speculative Activity in commodity markets

Assumptions	<i>a) Value of Trade</i>		<i>b) Volume of Trade</i>		c) Open Interest	
	If $a \geq \text{mean}(a)$, then Yes; otherwise No		If $b \geq \text{mean}(b)$, then Yes, otherwise No		If $c \geq \text{mean}(c)$, then Yes, otherwise No	
	Yes	No	Yes	No	Yes	No
Actual Occurrences	20	28	18	30	17	31
% of Chance of Occurrences	41.67%	58.33%	37.5%	62.5%	35.41%	64.58%
Odds Ratio ²¹	1.015		1.023		1.028	
Total No. of Months estimated	48(100%)		48(100%)		48(100%)	

Source: Author's estimations

Table 1 depicts that, the total occurrences that the actual values greater than and equal to mean of the actual is significantly high i.e., in value of trade is 20 (41.67%), total number of contracts traded in commodity markets are 18 (37.5%) and the open interest which is a significant factor having 17 (35.41%). The odds ratio (OR) is one of a range of statistics used to assess the risk of a particular outcome (or Speculation in commodity markets) if a certain factor (A, B and C are greater than or equal to mean (A, B, C) respectively) is present. The odds ratio is a versatile and robust statistic. The OR measures the ratio of the odds that an event or result will occur to the odds of the event not happening. We have measured the ratio of the odds of a speculative activity occurring or a common trade from three indicators. The odds ratio is a measure of effect size (as is the Pearson Correlation Coefficient) and therefore provides information on the strength of relationship between two variables. The Odds ratio is greater than 1 in all the above indicators, indicates that the condition is more likely to occur in the speculative activity.

Based on the above analysis, it is found about 17 months are having the common behavior in above three indicators. Three indicators performance according to the above method, we found 17 out of 48 months are shown peculiar behavior in the commodity markets i.e., the speculative

²¹ The odds ratio is the ratio of the odds of an event occurring in one group to the odds of it occurring in another group. The term is also used to refer to sample-based estimates of this ratio. These groups might be men and women, an experimental group and a control group, or any other dichotomous classification.

evidence based on various policies and initiatives by FMC and GoI. The government intervention or regulatory bodies by imposing margin on spread positions, banning few commodities from exchanges, policies to allow foreign investment in commodity exchanges and to trade in evening times, approval to granting permission launching new contracts in commodities and new commodity exchanges, permission to accredit the warehouses of procurements, extending to hedge positions and to early delivery system, approval of transfer equity shares, revised open position limits etc., may draw attention of investors to play a significant role in commodity markets during the spikes of the months (see table 2 in annexure).

Second, Volatility spillovers between cross markets, i.e., commodities and equity markets may improve the chances for speculators to shift their investments from one market to another. For this purpose, we have employed both MCX Commodity Spot Index and S&P CNX Nifty Index. By utilizing the bivariate GARCH model the following estimations are depicted.

Table 2: Multivariate GARCH estimations between commodities and equities

	Variable	Coefficients	Std Error	T-Stat	Significance
1	Mean(1)	0.011	0.006	1.690	0.091
2	Mean(2)	0.004	0.010	0.391	0.696
3	C(1,1)	-0.016	0.008	-2.084	0.037
4	C(2,1)	0.053	0.010	5.295	0.000
5	C(2,2)	0.000	-0.023	0.000	1.000
6	A(1,1)	0.449	0.209	2.148	0.032
7	A(1,2)	-0.623	0.378	-1.646	0.100
8	A(2,1)	0.109	0.096	1.133	0.257
9	A(2,2)	0.522	0.257	2.033	0.042
10	B(1,1)	-0.771	0.191	-4.033	0.000
11	B(1,2)	-0.317	0.446	-0.711	0.477
12	B(2,1)	-0.338	0.121	-2.783	0.005
13	B(2,2)	0.098	0.200	0.491	0.624

Source: Author's Estimations

From the above table, we depict that, A&B matrix measures the cross market effects such as shock and volatility spillovers effects among the markets. Estimation results found that, there is bilateral shock and a volatility spillover exists between commodities and equity indices. In particular B(2,1) with -0.33 focus are being main transmitters within the markets, indicates the level of volatility transmission. Volatility transmission from Nifty to Commodity Spot is -33.75% which implies that a 1% increase in returns of the S&P CNX Nifty index transmits about -33% volatility in commodity index. There is a strong relationship between volatility and market performance. Modern portfolio theory (MPT) describes, volatility creates risk that is associated with the degree of dispersion of returns around the average i.e., the greater the chance of a lower-than-expected return, the riskier the investment. When volatility increases, risk increases and returns decrease. Hence, we can expect that the players in equity markets may have shifted to the equities to reduce their investment risks and increasing their returns from commodities, which may causes the speculative bubble in commodity markets.

Finally, over the last few years commodity prices have undergone strong fluctuations as a consequence of economic, political and financial issues that have reshaped the global economic equilibrium. Most of the anomalies recorded during this period were attributed to the growing role played by financial instruments, specifically derivatives. In fact, although it is well known that derivatives provide economic benefits, such as information dissemination, price discovery and efficient allocation of resources (Chan 1992, Schwarz, Szakmary 1994), the tightened cross-market linkages that result from derivatives trading also fuel a common public and regulatory perception that derivatives generate or exacerbate volatility in the underlying asset markets, since they represent not only an important tool for managing risk exposure, but also an opportunity for trading and speculation. In particular, the low cost of futures trading may induce excessive speculation which, in turn, may cause commodity prices to vary excessively, with destabilizing effects in the markets. Because inventories have been plentiful in the last couple of years (combined with weak demand due to a global recession), many commodities have traded in contango. Holding a long commodity position differs from holding a stock in that commodity futures have expiration dates and one must buy or “roll” into a new contract when their existing contract expires. Contango is the “normal” or “cost of carry” upward curve shape of futures prices rising with time to maturity. Backwardation is the downward curve shape when prices fall with time to maturity.

Figure 3: Basis of Commodity Markets i.e. spot - futures

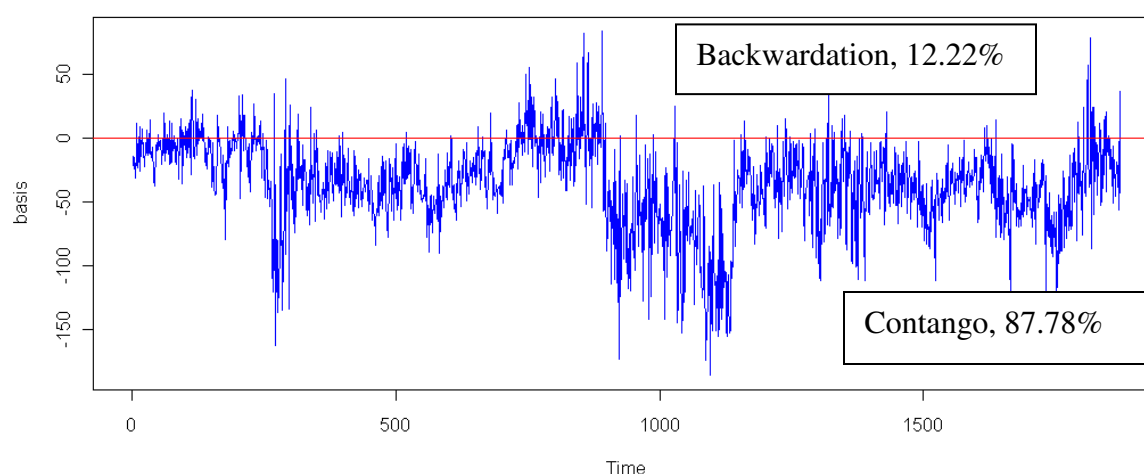


Figure 3 provides the information about the markets behavior i.e. basis of commodity markets, in which we can find 12.22% of backwardation and 87.78% trades in contango. Contango refers to a condition in commodity futures markets where the forward price of a contract is greater than the current (spot) price – an upward sloping forward curve. The higher forward price is partially based on the “cost of carry” related to the underlying physical commodity (e.g., storage, insurance and security costs). For a passive commodity index investor, this condition can create a return headwind²². In contrast to a passive indexer, an intelligent index investor can employ a range of strategies to mitigate the impact of contango while also retaining the inherent benefit of diversification and inflation hedging that this asset class has traditionally provided²³. As

²² They are forced to sell low and buy high, which creates a negative “roll yield” when doing an ex-post return attribution on the index.

²³ An intelligent index investor, on the other hand, may recognize the characteristics, and actually benefit from the totally passive indexers while disguising his own market actions. He can roll from nearby to distinct contracts on

contango widens to record levels in many commodity markets, many investors have discovered the advantages of market neutral strategies that exploit the commodity indices out performance without taking a directional view on commodity price levels. Institutional investors have also looked to bespoke indices that apply index methodology to each underlying commodity within, say, the MCX commodity Index. At present, the arguments for and against commodity investments are complex. On one hand, rising inventories, falling industrial output and weak consumption have undercut prices. On the other, those very factors will discourage investment in exploration and production. In time, this is likely to aggravate the very supply bottlenecks that gave rise to the commodity super cycle of the past years.

Cross autocorrelation (See figure 4) between spot and futures commodity markets provides the useful insights of information; in spot market the information has impact of 2 days lag and futures contains 3 day lag information, whereas futures does have information impact on spot markets about a week. Vector autoregressions are a concise way of summarizing data in which generally have little serial correlation in residuals and can be used to examine complex relationships among variables such as, information content in prices in different commodity indices i.e., spot and futures market prices with effects of arbitrage options.

Table 3: VAR Estimations

Variable	Futures Price Returns	Current (Spot) Price Returns
C	0.000421 (0.00025)	0.000224 (0.00021)
FRT(-1)	-0.020696 (0.02663)	0.760164*** (0.02220)
FRT(-2)	-0.038541 (0.03576)	0.538052*** (0.02981)
SRT(-1)	0.071985** (0.03174)	-0.508280*** (0.02646)
SRT(-2)	0.049739 (0.03552)	-0.377665*** (0.02961)

Values in parenthesis are p-values, ** and *** indicates 5 and 1% level of significance

Source: Author's Estimations

Table 3 depicts the relationship between the commodity spot and futures returns, and it is significant about 2 lags. Futures price returns have a positive impact on the current prices, where as spot prices returns have a significantly negative impact on futures prices, and also found the model is stationary based on inverse AR roots. It is also found, the long-run equilibrium relationship between spot and futures prices using conventional cointegration analysis, use a refined methodology to analyze the existence of a potential structural break in the cointegration vector in order to gather the time dynamic of the relationship, which is important in a period of high price movements.

days other than those specified by the passive index. He can hold positions at points on the forward curve that are different from the index rules. He can hold his positions on exchanges other than those specified by the published index. All of these strategies tend to prevent the intelligent index from being "arbed" by active market participants because he is action.

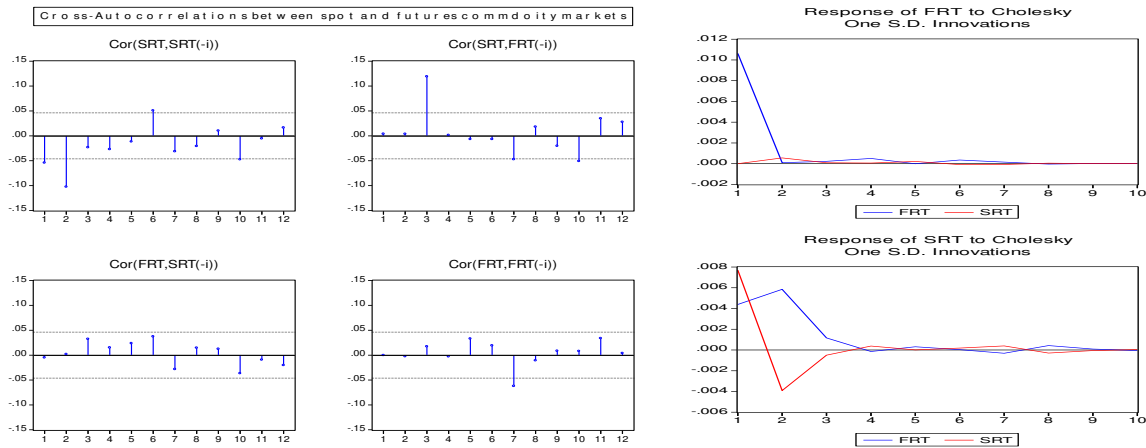
Table 4: VAR Granger Causality/Block Exogeneity Wald Tests

<i>Hypothesis</i>	<i>Chi-square value</i>	<i>p-value</i>
Futures index price returns does not cause Spot returns	1069.399	0.0000
Spot index price returns does not cause Futures Returns	7.312465	0.0258

Source: Author’s Estimations

And we also find empirical data highlight that there are bidirectional information flows between spot and futures markets. In line with Irwin et al.. (2009), it can be argued that demand and supply pressures over physical commodities are as important as trading on the futures market to increase the price discovery role of spot markets. This finding emphasizes the price discovery drivers for this commodity, more related to than financial trading patterns rather fundamental patterns on futures markets

Figure 4: Cross Correlations and Impulse Responses to VAR



The dynamic adjustment of reciprocal dependency is immediately not considerable. The impulse response test shows the effects of an exogenous shock on the whole process over time. Therefore, one can detect the dynamic relationships over time. The idea is, initially; look at the adjustment of the endogenous variables over time, after a hypothetical shock in it. This adjustment is compared with the time series process without a shock, i.e. the actual process. The impulse response sequences plot the difference between this two time paths. Figure 4 depicts the responses adjusts about 4 days information of spot and futures prices.

6. Concluding Remarks:

There is a widespread belief and assumption in commodity markets that especially after global financial crisis, the speculative activity has increased dramatically with involvement of exchange traded funds and active index investors in commodity markets. It is easy to agree that speculators affect price developments as they help in the discovery of future prices, which are important, but unknown fundamental variables, created bubble in commodity markets. As a result of too optimistic bets on certain maturity, the futures price set on an “incorrectly high level”, which would move the whole price curve due to arbitrage if stocks are high. Thus also the spot price would rise to an artificially high level if bets are on rising prices. Higher-than-fundamental prices

would induce inventory accumulation, although the very low price elasticity's of both supply and demand would diminish the smoothness of adjustment.

What is the economic impact of the rapid growth of commodity index investment? To address this question, it is important to recognize the concurrent economic transition of commodities markets precipitated by the rapid growth of commodity index investment (volatility spillovers between asset and commodities). The increased commodity price co movements reflect the financialization process precipitated by the rapid growth of commodity index investment. This process can have significant economic consequences on commodities markets. On one hand, the presence of commodity index investors can lead to a more efficient sharing of commodity price risk; on the other, their portfolio rebalancing can spill over price volatility from outside to commodities markets and also across different commodities. While the data sample after 2004 may be too short to give a reliable measure of changes in commodity risk premia, it is sufficient for uncovering a significant volatility spillovers effect between commodity and equity markets since the investors treated commodities as an asset class and safe heaven for their investments.

Empirical findings generally support the price discovery role of futures markets, i.e. spot prices are usually discovered in the future markets. Indeed, spot and futures prices on the same commodity have the same fundamentals and change if new information emerges that causes market participants to revise their estimates of physical supply and/or demand. Since contracts sold on futures markets generally do not require the delivery of the commodity but can be implemented immediately with little up-front cash, futures markets generally react more quickly than spot markets. Investors are assumed as intelligent investors, and recorded during this period were attributed to the growing role played by financial instruments, specifically derivatives. In fact, although it is well known that derivatives provide economic benefits, such as information dissemination, price discovery and efficient allocation of resources between spot and futures markets may also have additive effect for the investors to make more returns from index investments in commodities.

To the best of our knowledge, there is no applied research on this subject in Indian commodity markets on speculative activity with which to further compare our findings. This paper provides an evidence for “speculation” during the crisis period and which might be a cause for “excessive volatility” in commodity markets. As it shows, speculation can cause unreasonable or unwarranted price fluctuations. Hence, the regulator or policy makers should take initiative steps in order to reduce the impact of excessive speculation in future. The policy recommendations include a) Impose speculative position limits for the purpose of preventing “excessive speculation”. Monitor daily potential violations in the market, b) Implementation of CFTC (2010) [Dodd-Frank Act] for position reporting requirements for commodity futures contracts traded on or subject to designated contract markets (DCMs). The CFTC believes that the data generated from such reporting requirements are “reasonably necessary for implementing and enforcing aggregate position limits for certain physical commodity derivatives”, c) Surveillance of individual/institutional trader's activities and potential market power and enforces speculative position limits by using a large trader reporting system (LTRS), d) Exercise the special call provision for preventing insider trading and prevent manipulation or abusive practices, e) Ban on high frequency trading in commodity markets.

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Annexure I

Table: Commodity futures trading behaviour: Traditional speculators, managed funds and index traders

	Traditional speculators	Managed funds	Index traders
General Market position	Active positions on both sides of the market; able to benefit in both rising and declining markets	Active, often large, positions on both sides on market; able to benefit in both rising and declining markets; relatively opaque positions	Passive, large and long-only positions in swap agreements with banks, which in turn hold futures contracts to offset their short positions, able to benefit only in rising or backwardated (spot price > forward price) markets; transparent positions.
Position taking behaviour	React to changes in commodity market fundamentals (supply, demand, inventories); mostly trade in one or two commodities of which they have intimate knowledge; leveraged positions	Some (e.g., hedge funds) conduct research on commodity-market fundamentals and thus react to changes in those fundamentals. Others (e.g., commodity trading advisers) mostly use statistical analyses (trend identification and extrapolation, automatic computerized trading), which extract information from price movements. They thereby risk misinterpreting noise trader position taking for genuine price information, engaging in herd behaviour and causing snowball effects; leveraged positions.	Not interested in fundamentals of specific commodity markets but may have views on commodities as a whole; relative size of positions in individual commodities determined by an index weighting formula; idiosyncratic position taking such as rolling at predetermined dates; position changes are relatively easy to predict; fully collateralized positions
Impact on liquidity	Improve liquidity	Active, large positions can improve liquidity and make hedging easier for large commercial users. In periods of rapid and sharp price changes, large positions are a “liquidity sponge”, making it difficult for hedgers with commercial interests to place orders	Passive, large positions act as a “liquidity sponge”
Reaction to sharp price changes	May be taken by surprise if price changes are unrelated to fundamentals; can be forced out of the market if they lack liquidity to meet margin calls triggered by sharp price increases.	Taking and closing positions are often automatically triggered by computer programs; risk of causing a snowball effect	Different price developments for individuals commodities require decompositions of relative investment positions to preserve a predetermined index weight pattern; sharp price declines may cause disinvestment
Reaction to changes on other markets	Operative only in commodity markets; normally concentrate on one or a few	Operate across different asset classes. Commodities tend to have a fixed weight in managed fund portfolios, so that price	Operate across different asset classes. Potentially strong links between commodity futures activity and development on

	commodities, and thus react little to developments in other markets	movements in other markets can lead to position changes in commodity markets	equity and bond markets, in two ways: a) risk-return combinations in other asset classes can become more attractive, causing a withdrawal from commodity markets; b) margin calls on other investments can trigger closing of positions in commodity and accelerate contagion across asset classes
Classification in CFTC Commitment of Traders Reports	Non-commercial user category	Mostly in non-commercial user category	Mostly in commercial user category

Source: UNCTAD, 2009.

Table 2: Causes/Policies are impacted on Speculative Months

Year	Name of the Months	Policies/Causes/Remarks
2007	February	The government ordered a delisting of futures contracts in February 2007 for commodities like urad, tur, wheat and rice with a suspicion that futures trading in these commodities had been contributing to the rise in their domestic spot prices. Reversing the mood, sugar, oil, rice and potato were added to the list in 2007.
	November	Forward Markets Commission, on 19 th October 2007, directed the National Exchanges to impose margin on spread positions ²⁴
2008	March	The Commission has approved for change in trade timings by 45 minutes during the period from 4 th March to 20 th March, 2008 due to 'Sun Outage' i.e. upto 17:45 hours during weekdays and 14:45 hours on Saturdays. Policy on Foreign Investment in commodity exchanges ²⁵

²⁴ With the following guidelines: (i) At least one-third of the Initial Margin (inclusive of Exposure and Volatility margin) will be charged on both the legs of the calendar spread. Such benefit will be given only if there is positive correlation in the prices of the months under consideration and the far month contracts are sufficiently liquid. (ii) No benefit of calendar spread will be given in the case of additional and special margins. (iii) As far as (i) above is concerned, the Exchanges are free to charge margins higher than the minimum specified depending upon their risk perceptions

²⁵ The Commission has conveyed to all the exchanges the policy on foreign investment in commodity exchanges approved by the Government, vide Press Note No.2 (2008) issued by the Department of Industrial Policy and Promotion dated 12th March, 2008, as follows: (a) Overall foreign investment in a Commodity Futures Exchange shall be limited to 49%. FII component will be capped at 23% and FDI component at 26%. (b) FII purchases will be restricted to secondary market only; (c) No single entity shall hold more than 5 % equity; (d) FDI will be allowed with specific prior approval of the Foreign Investment Promotion Board (FIPB); and (e) FIIs shall not seek and will not get any representation on the Board of Directors of the Commodity Exchanges. The instructions regarding the bringing down the existing FDI / FII to the prescribed level so as to be in alignment with the aforesaid policy, wherever applicable, will be issued in due course.

	July	The Commission, on the 14th May 2008, issued guidelines for grant of recognition to new Commodity Exchanges under the provisions of the FCRA, 1952 and gave a Permission for launching new contracts in commodities was granted to the Exchanges and In-principle approval was granted on 17 th July 2008 to MMTC & India Bulls Financial Services Ltd, for setting up of Nationwide Multi Commodity Exchange in NCR (Gurgaon).
	October	The Commission has granted permission to National Multy Commodity Exchange of India Ltd., Ahmedabad, on 27 th August, 2008 to replace the Coffee Robusta Cherry AB contract with Robusta Cherry Estate Pounded (REP) Bulk. Permission for launching new contracts in the commodities was granted to the Exchanges
	November	Permission for launching new contracts in the commodities was granted to the Exchanges. During the period from 17.11.2008 to 29.11.2008, 22 commodities were traded at the Exchange. Out of these, Gold, Crude Oil & Silver had the highest volumes of trade. The Commission, on 31 st November, 2008, has revised the daily price limits in respect of following 18 commodities
2009	April	The Commission, on 16 th March, 2009, permitted the NCDEX to accredit the warehouses of producers/ processors/ similar participants within 50 km of the municipal limits of the delivery centers to enable such participants to deliver the goods on the Exchange platform ²⁶
	June	Permission for launching contracts in the commodities was granted to the Exchanges
	July	Permission for launching contracts in the commodities was granted to the Exchanges

²⁶ This facility was also extended in respect of bulk commodities which have annual production base of not less than one million tons in India. Further, the Commission allowed the Exchange to accredit the warehouses of producers / processor / similar participants located within a radius of additional 100 km beyond the 50 km radius from the municipal limits at present stipulated for the accredited warehouses at the delivery centres. Such warehouses can thus be located within a radius of 150 km of the municipal limits of the delivery centre and are to be called as "Satellite Warehouses". Each Satellite Warehouse will act as an extension for feeding an already existing accredited warehouse at the delivery centre and are subject to the following conditions: (a) The commodity lying in satellite warehouses, as assayed/demat, as is the practice in the existing accredited warehouses, becomes 'Stocks available for delivery'. The demat credit for goods lying in such warehouses will be for the main accredited warehouse to which the said accredited warehouse is a satellite warehouse. (b) The "Stocks available for delivery" in the Satellite Warehouses shall remain physically segregated and can not be exchanged/replaced with other stocks of the same commodity in the warehouse (c) The goods may remain in the "Satellite Warehouses" until they are marked for delivery. The said goods would be arranged to be transported by the seller at his cost, including transportation charges, incidental costs like handling at both the ends, applicable taxes, octroi, etc., through the Warehouse Service Provider, to the main accredited warehouse at the delivery centre to which it is linked. Physical delivery would be effected from such main warehouses. (d) The Exchange should treat these warehouses at par with other Exchange-accredited warehouses and all the systems, such as clearing, pay in, pay-out, assaying etc. remain the same. (e) The Exchange takes the responsibility for quality assurance in the goods stored in the said warehouses and ensures delivery to the satisfaction of the buyers. (f) The Exchange puts in place a strict supervisory mechanism in place, so that credibility of these warehouses is not compromised in the eyes of the market participants. (g) The accreditation of such satellite warehouses should be initiated only in the case of bulk commodities, i.e. with an annual production base of not less than one million tonnes in India, for the purposes of this circular. (h) Stocks of participants other than the person(s) whose warehouse has been accredited as satellite warehouse will not be allowed to be delivered in the satellite warehouses.

	August	Permission for launching contracts in the commodities was granted to the Exchanges
	September	The Commission, on 18 th September, 2009, has directed all Nation wide Multi Commodity Exchanges that they may decide upon the suspension of the trading during ‘Sun Outage’ taking into consideration the connectivity used by the Exchange and its members during the period from 22 nd September 2009 to 9 th October 2009 (both days inclusive). However, there would be no extension of the trade timings beyond normal timings during that period.
	October	<p>The Commission, on 5th October 2009, has permitted the extension in evening trade timings at Nationwide Multi Commodity Exchanges from the existing 11:30 pm to 11:55 pm during the period from 2nd November 2009 to 13th March 2010 (both days inclusive) in respect of the permitted international referenceable commodities due to the US Daylight Saving Time.</p> <p>The Ministry of Consumer Affairs, Food and Public Distribution, Government of India, on 9th October 2009, has granted recognition to M/s. Indian Commodity Exchange Limited (ICEX), NCR, Gurgaon, on permanent basis in respect of forward contracts in all the commodities in which Section 15 is applicable and the commodities to which neither Section 17 nor Section 15 of FC(R) Act, 1952 is applicable, with prior permission of the FMC²⁷.</p>
	November	Permission for launching contracts in the commodities was granted to the Exchanges ²⁸
	December	The Commission, on 7 th December, 2009 has issued following instructions to National Exchanges ²⁹
2010	January	The Commission, on 8 th January 2010, has extended the permission for hedge positions exemptions to the Tinna Oil and Chemicals Ltd. and ITC Limited in Soybean contracts till 31 st March 2010.

²⁷ At present, the provisions of the Prevention of Money Laundering Act, 2002 (PMLA) do not cover the intermediaries of the Commodity Markets. As large valued transactions also take place in the commodity market, the Commission felt that a proper policy framework on anti-money laundering measures is required to be put in place. The Commission has, therefore, taken up the matter with the Finance Ministry through the Ministry of Consumer Affairs for coverage of intermediaries of the commodity markets under the PMLA. As per the suggestion of the Finance Ministry, guidelines for the intermediaries in the commodity markets have been issued the National Exchanges on 30th October 2009 for further necessary action.

²⁸ The Forward Markets Commission, in pursuance of Section 14A / 14B of the Forward Contracts (Regulation) Act, 1952 (74 of 1952) (hereinafter referred to as the ACT), hereby grants Certificate of Registration to the Indian Commodity Exchange Limited (ICEX), New Delhi a recognized association u/s 6 of the ACT, on a permanent basis for conducting forward trading in the Commodities to which neither Section 17 nor Section 15 of the ACT is applicable. The Commission, on 21st November 2009, has given its approval to the Bye-laws, Rules of the new multi-commodity exchange, Indian Commodity Exchange (ICEX).

²⁹ The Commission, on 7th December, 2009 has issued following instructions to National Exchanges in respect of dealing with inactive clients: (i) ‘An Inactive Client’ would be one who has not executed any trade during the last six months. (ii) The member should keep close watch on the accounts of inactive clients. (iii) The members should not accept trades in these accounts without specific written request from the client to re-open those accounts along with compliance of all required formalities of KYC. (iv) After receipt of written request from the client and fulfillment of requirements of KYC, the member may execute his orders with the same client code, i.e., the client code issued earlier by the member to the concerned client. (v) If trade takes place in such inactive accounts without following the above procedure, the same would be treated as members’ proprietary trade for all practical purposes. (vi) Such members will be liable for penal action by the Exchange/FMC for any misuse of client UCC.

		The Commission, on 8 th January 2010, has permitted the Early Delivery System in Soybean (for MCX) / Soy Oil (for NMCE) contracts expiring in January 2010 and onwards.
	March	<p>The Commission, on 26th February, 2010, has approved the following transfers of equity shares of MCX³⁰</p> <p>The Commission, on 3rd March 2010, has revised the open position limits for aggregate and near month futures contract of Wheat</p> <p>The Commission, on 5th March, 2010, has approved the transfer of 1,323,529 equity shares of Rs. 5 each comprising of 1.622 % of the total equity capital of MCX from Fidelity Funds - India Focus Limited acting through FIL Investment Management (Hong Kong) Limited to Intel Capital (Mauritius) Limited.</p> <p>The Commission, on 12th March, 2010, has permitted the Indian Commodity Exchange Limited (ICEX) to levy transaction charges at the rate of Re. 1/- per Rs.1, 00,000/- turnover of the members for a further period of three months, i.e., upto 26th May 2010.</p>

³⁰ The Commission, on 26th February, 2010, has approved the following transfers of equity shares of MCX: (a) transfer of 1,655,476 Equity Shares of MCX (2.03% of the total Equity Capital) from Fid Funds (Mauritius) Limited Mauritius to M/s. Passport India Investments (Mauritius) Ltd., Mauritius, (b) transfer of 3,907,540 Equity Shares of MCX (4.79% of the total Equity Capital) from M/s. Citigroup Strategic Holdings Mauritius Ltd., to M/s. Aginix Enterprises Limited, Cyprus.