CHAPTER II

COMMODITIES MARKET:

AN OVERVIEW

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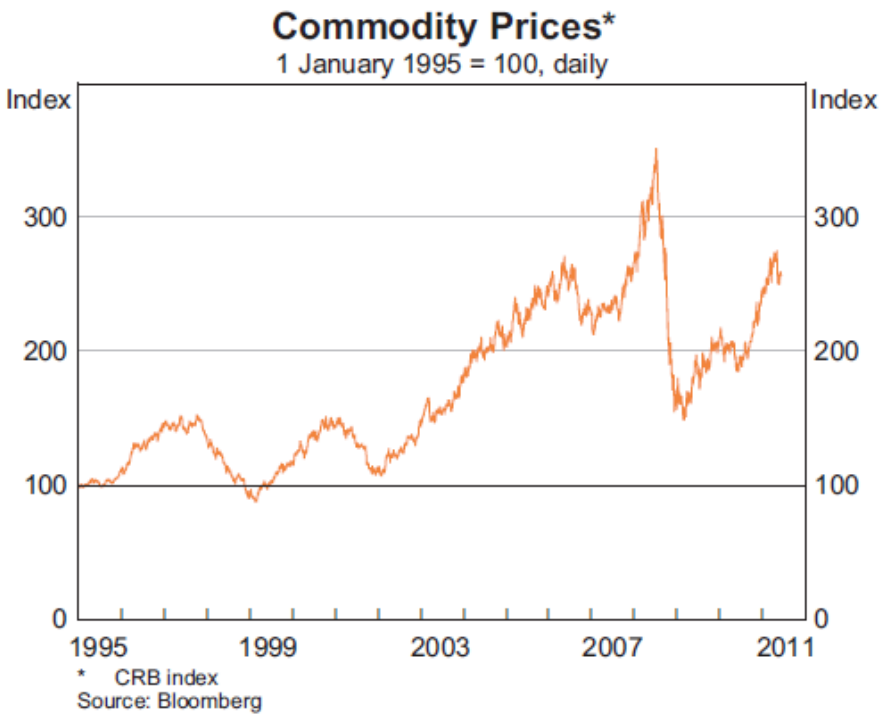
2.1 INTRODUCTION

The evolution and growth of the commodities market in India has shown an impressive record of performance. This chapter discusses the contours of development of the commodity market both in India and at a global level. Since this research is focused on the inter relationship of the spot and futures market, a decription of the features of the commodity market in India is given in this chapter. Broadly, the discussion on the market structure, role of participants, governance of the market and growth dimensions is also made in this chapter.

2.2. COMMODITY MARKET: GLOBAL SCENARIO

The World Bank report notes that the global commodity market prices continue to remain weak (Market Outlook, 2013). (see Figure 2.1) However, owing to the renewed weather-related concerns in the grain markets and resurface of geopolitical tensions in the Middle East, there exists a revivification of short term risks to the upside in energy markets. The market has experienced a sharp decline in the prices of metals and precious metals in the last year (2012). Dwyer, Gardner and Williams (2011) encountered a significant enhancement in the global commodity market with regard to the volatility and levels of prices over the recent past. These gains have awakened a number of anxieties for policymakers, permitting the potential for rising commodity prices with some developing nations particularly concerned about rising food prices. The G-20 has been devoted to ‘work to address excessive commodity price volatility’, with a direction on the role played by the growing presence of financial investors in commodity markets.

FIGURE 2.1 GLOBAL COMMODITY PRICES



The global production gap is an authoritative determinant of the orbital behaviour of commodity prices, as commodities are applied as an input to production.

Inamura et al (2011) evidenced a broad co-movement over time, between the global output gap which is assessed as the difference between actual and potential global GDP. The global theoretical relationship between futures prices and spot prices is established on a no-arbitrage assumption, where the consumers and producers remain neutral between buying and selling the physical commodity at the day's spot price, and getting into a futures contract that allows them to buy and sell the commodity at a later date determined at the day's futures price. In practice, funding restraints could limit this procedure to some magnitude. Presuming the commodity to be accumulative and the players are able to freely approach both the spot and futures markets, then an unexpected increase in the futures price

would allow brokers to profit from buying the commodity today at a relatively low spot price, and selling it in the future at a relatively high futures price.

The prices in Chicago Mercantile Exchange (CME) have attained an 18-month low on December 16, 2013. Since 2008 after sufficient rainfall contributed harvests and mines with flourished output, the S&P GSCI gauge is maneuvering for the first annual decline. The most since June 2006, the investors are found to hold a net-short status in wheat of 69,461 contracts. The USDA has declared on December 10, 2013, that before the start of the Northern Hemisphere harvests in 2014, compared to the predicted wheat inventory of 178.48 million tons in November, the global wheat inventories will be 182.78 million metric tons. Since October, buying more gold, before prices reduced the most in six weeks on signs of surplus supply, the speculators have got the nearly bullish on commodities. U.S. Commodity Futures Trading Commission data, establish that the net-long perspective across 18 U.S.-traded commodities market developed 8.9 percent to 677,505 futures and options during the week ended December 10, 2013. The chief investment officer at BMO Private Bank in Chicago, who handles $66 billion of assets proclaimed that "The trend in commodities is negative, and it would appear to me that the longer you wait to buy commodities, the better off you'll be" (Ablin, 2013).

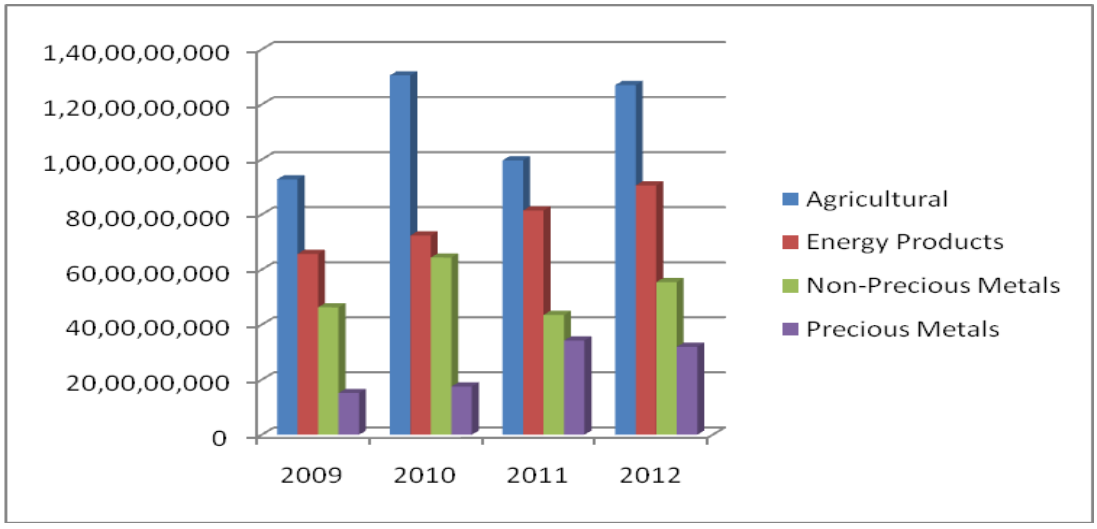
Table 2.2.1. Global Commodity Derivatives Futures and Options Volumes (Rs. in Crores)

	2009	2010	2011	2012
Agricultural	927,693,001	1,305,384,722	996,837,283	1,270,531,588
Energy Products	657,025,702	723,590,380	814,774,756	905,856,150
Non-Precious Metals	462,823,715	643,645,225	435,113,003	554,253,069
Precious Metals	151,512,950	175,002,550	342,057,656	319,267,659

Source: Economic Survey 2013

From the table 2.2.1, it is can be understood that agricultural commodities derivatives, futures and options volumes are maximum at 1.3 billion during the year 2010. With regard to the energy products, the futures and options volumes are found to experience a steady from 0.65 billion to 0.90 billion over the years from 2009 till 2012. The non-precious metals and precious metals are found to have several irregular up trend and down trend over the years. (see figure 2.2)

FIGURE 2.2 GLOBAL COMMODITY DERIVATIVES FUTURES AND OPTIONS VOLUMES



2.3 EVOLUTION OF COMMODITY MARKETS

Commodity futures markets in India, predominantly remain underdeveloped (Ramaswami and Singh, 2007). When compared to the US and UK markets, Indian commodities market has a long history of commodity derivatives trade (Vashishtha and Kumar, 2010). The comprehensive government attention in the agricultural sector in the post-independence era is a major contributor to this fact. The production of several agricultural commodities is still regularized by the state government and forwards as well

as futures trading have only been selectively familiarized with rigorous regulative measures. Under the Essential Commodities Act (ECA), 1955, free trade in many commodity items remains restricted. Under the Forward Contracts (Regulation) Act (FCRA), 1952 forwards and future contracts are limited to specific commodity items.

It was in the year 1875, with the setting up of the Bombay Cotton Trade Association Ltd., the evolution of the organized futures market in India commenced. A separate association, Bombay Cotton Exchange Ltd., was constituted in 1983 following widespread discontent among leading cotton mill owners and merchants over the functioning of the Bombay Cotton Trade Association (Agnihotri and Sharma, 2010; Barua and Mahanta, 2012; Bose, 2008; Harri *et al*., 2009; Ahuja, 2006; Kothiwal and Goel, 2012; Malyadri and Kumar, 2012). With the setting up of the Gujrati Vyapari Mandali in 1900, futures trading in oilseeds originated, which carried out futures trading in ground nuts, castor seeds and cotton. For futures trade in raw jute, the Calcutta Hessian Exchange Ltd. and the East India Jute Association Ltd. were set up in 1919 and 1927 respectively. Futures in cotton were organized in Mumbai under the auspices of the East India Cotton Association (EICA) in 1921. Several futures markets in oilseeds were functioning in the states of Gujarat and Punjab before the Second World War in 1939. Several other exchanges were established in the country in due course, alleviating trade in diverse commodities such as pepper, turmeric, potato, sugar and jaggery.

The Indian constitution listed the subject of "Stock Exchanges and Future Markets" under the union list after independence. Solely as the responsibility of the central government, the regulation and development of the commodities futures markets were defined. In December 1952, the Forward Contracts (Regulation) Act was enacted by

an expert committee headed by Prof. A.D. Shroff and selected committees of two successive parliaments. The central government in 1954 notified the Forward Contracts (Regulation) rules. The India Pepper and Spices Trade Association (IPSTA) in Cochin in 1957 first organised the futures trade in spices. Futures trade was completely banned by the government in 1966 in order to monitor the price movements of several agricultural and essential commodities. Many traders resorted to unofficial and informal trade in futures subsequent to the ban of futures trade. The government reintroduced futures on selected commodities as per the June 1980 Khusro committee's recommendations.

Expanding its coverage of agricultural commodities, along with silver, the committee submitted its report in September 1994, championing the reintroduction of futures, which are banned in 1966. The Government of India appointed an expert committee on forward markets under the chairmanship of Prof. K.N. Kabra in June 1993 following the introduction of economic reforms in 1991. The National Agricultural Policy 2000 conceived of external and domestic market reforms and disassembling of all controls and regulations in the agricultural commodity markets in order to encourage the agricultural sector. To minimize the wide fluctuations in commodity prices and for hedging the risk arising from extreme price volatilities it also proposed an expansion of the coverage of futures markets.

The commodity trading experience various regulatory decisions during the post independence period. Under the ministry of consumer affairs, the forward contract (Regulation) Act was enacted in 1952 and the FMC or the forward market commission was established in 1953. FMC acts as a regulatory body, which governs the commodity markets in India. During the mid-1960s, it was witnessed that an unprecedented rise in

the prices of major oils and oilseeds as an outcome of a sharp fall in output. Futures trade was banned in most commodities to certain speculation, which the government attributed to rising inflation.

2.4 REGULATORY FRAMEWORK: FORWARD MARKETS COMMISSION (FMC)

Forward Markets Commission (FMC) acts as a regulatory authority, which is a statutory body set up under the Forward Contracts (Regulation) Act 1952 (FC(R) Act (see figure 2.3). FMC operates under the administrative authority of the Ministry of Finance, Department of Economic Affairs, Government of India. The Commission monitors and maintains the commodity futures markets well regulated. Immoderate measures like skipping trading in certain deliveries of the contract, closing the markets for a determined period and even ruling out the contract to overcome exigency conditions are assumed during shortages. The Commission adopts pro-active steps to ensure that there is no misuse of the market and that the prices pondered on the Exchange platform are governed by the demand and supply factors in the physical markets for which the regulator calls for daily reports from the Exchanges.

Forward Contracts are the exchangeable contracts where the quantity, quality, date of maturity and place of delivery are all standardized. The parties to the contract only decide upon the price and the number of units to be traded. Through the commodity Exchanges, the futures contracts are entered which are governed by the provisions of the FC (R) Act.

2.4.1 ROLE OF FORWARD MARKET COMMISSION

The role of FMC in the forward market is substantiated in this section eith a description of its functions in detail.

a) The FMC advises the Central Government in respect of the recognition or withdrawal of acknowledgement from any association. It advises the government about the issue originating out of the administration of this act.

b) The FMC comprises the task of continuing forward markets under observation and take required actions, which should be according to controls given to the commission by the "Forward Contract Regulation Act".

c) The FMC accumulates information regarding the trading conditions in respect of goods including information concerning supply, demand and prices and publishes essential information. It also executes the task of submitting to the Central Government periodical reports on the functioning of this Act and on the working of forward markets associating to such goods.

d) The FMC makes recommendations broadly with a view of ameliorating the organization and working of forward markets.

e) The FMC undertakes the examination of the accounts and other documents of the registered association or any member of such association.

f) The FMC performs such determined duties and exercise assigned powers by the "Forward Contract Regulation Act".

2.5 COMMODITY MARKET IN INDIA

A commodity futures market is a public market where commodities are contracted for purchase or sale at an agreed price for delivery on a specified date. This process of purchase or sale of commodities must be made through an organized exchange broker and the purchase should be made under the terms and conditions of a standardized futures contract (Choudhry 2004). Commodity, besides being a unique hedging instrument, also provides for efficient portfolio management arising from diversification benefits. These benefits result in improved returns to domestic as well as international investors. The commodity futures market furnishes commercial commodity producers and consumers with a way to express price risk to speculators who have no direct commercial concern in the commodities themselves (Silber, 1985).

Producers' hedge price risk by assuming short perspectives in futures contracts on the commodity that they produce. A similar hedge demands consumers to take long positions in the futures contracts on their consumption commodities (Jecheche, 2012). Arbitrageurs and speculators prefer to take either long or short positions on a commodity futures contract founded on the market perception (Kuprianov, 1986). There is no 'long-only' market function of commodity futures contracts that investors should use as a default inactive system. Furthermore, commodity future prices tend to exhibit momentum as per the economic theory and empirical evidence. Therefore, when a commodity future price presents an upward movement, it constructs sense to take a long position (Long *et al.*, 1990).

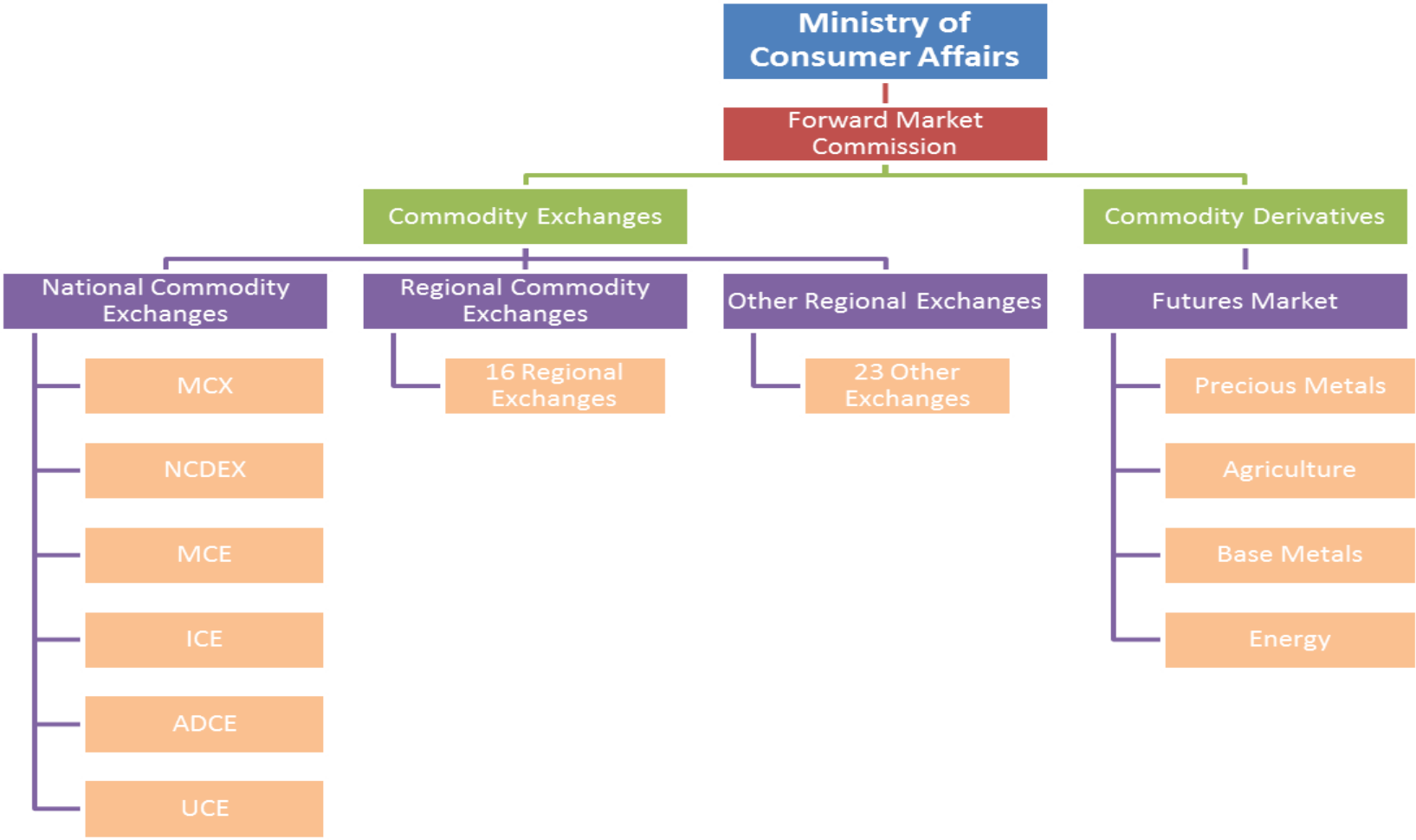
A commodity exchange is defined as a market in which multiple buyers and sellers trade commodity associated contracts on the foundation of rules and procedures

established by the commodity exchange. Commodity exchanges extend spot trade for contiguous delivery and forward contracts which involves delivery in future markets. This type of exchanges is different from wholesale market where trade is decentralized. The roles of commodity exchanges are security, market information access, positions on exchange and local market operations.

Exchanges can focus on the trade in futures and options contracts, as do most of the exchanges in western countries. Its primarily function is to act as the centers for facilitating physical trade. In both cases, exchanges depict their primary strength from their capacity to act as a focal point for trade transactions, and to increase the security of these transactions. Commodity exchanges help in the price discovery process as they are well-organized exchanges form natural reference points for physical trade. By managing to link different warehouses in the country, a commodity exchange allows trade to take place more efficiently.

The price information exhibited with exchange allowed for a good reference point to evaluate the spot prices and negotiate with traders/agents. In summary, it developed cognizance among the farmers to track the market and form an outlook on prices based on the accessible information. The price discovery process furnished them an idea about price movements. The price movement signals served them in planning their spot operations efficaciously. Commodity exchange will act as a catalyst for bringing the new to the old world by helping to make growth comprehensive. Invariably, small farmers can become part of the national and global marketplace for inputs, credit and outputs.

FIGURE 2.3. ORGANISATIONAL STRUCTURE OF INDIAN COMMODITY MARKET



Source: Forwards Market Commission

2.6 CURENT STATUS OF INDIAN COMMODITY MARKET

Throughout the past decade the commodity futures market in India and abroad has witnessed a significant growth in terms of both network and volume. In general, the commodities market survives in two distinguishable forms—the over-the-counter (OTC) market and the exchange based market. There exists the spot and the derivatives segments as in equities. Spot markets are essentially OTC markets (Perera, 2012; Culp, 2010). Participation is limited to people who are necessitated with that commodity, such as the farmer, processor, wholesaler, etc. (Birthal *et al*., 2007). Through the exchange-based markets with standardized contracts, settlements, etc., With a majority of the derivatives trading takes place (Acharya and Johnson, 2007). The exchange-based markets are fundamentally derivative markets and are like equity derivatives in function. A person can purchase a contract by paying only a percentage of the contract value and everything is standardized.

Even though there is a provision for delivery, many contracts are squared-off before expiry and are settled in cash. There are 23 exchanges operating in India and carrying out futures trading activities in as many as 146 commodity items (Sahoo and Kumar, 2010). The Government of India recognized the National Multi Commodity Exchange (NMCE), Ahmadabad; Multi Commodity Exchange (MCX) and National Commodity and Derivative Exchange (NCDEX), Mumbai, as nationwide multi-commodity exchanges as per the recommendation of the FMC. In November 2003, MCX commenced trading and NMCE in November 2002 and NCDEX in December 2003. A total of 94 commodities was traded in December 2006 in the commodity futures market, as compared to 59 commodities in January 2005. These commodities comprised major agricultural commodities such as rice, wheat, jute, cotton, coffee, major pulses, edible

oilseeds, spices, metals, bullion, crude oil, natural gas and polymers, among others. In price discovery for trading commodities, an efficient and well-organized commodities futures market is generally acknowledged to be helpful (Yang *et al.*, 2001).

2.7 COMMODITY DERIVATIVES MARKET IN INDIA

Major developments have occurred in commodity futures markets in India in the last few decades. Nair (2005) ascertained that though derivatives trading commenced in the securities market in June 2000, and it has been growing at an accelerated pace. The commodity market that is mentioned today pertains to the derivative market in the country for various commodities that are controlled by the commodity exchanges. The difference between futures price and spot prices is known as the cost of carry. This comprises of interest rate, cost of transport, and warehousing. Preferably, as the interest cost becomes negligible for say three months, the futures prices should come closer to the spot price at the time of delivery. In India, there is a weak linkage between the spot and futures markets.

A financial contract whose value is derived from the value of a stock price, a commodity price, an exchange rate, an interest rate, or even an index of prices is known as the derivative security. There are various reasons for a commodities derivatives to be traded in a market. A trader is enabled to hedge some pre-existing risk by taking positions in derivatives markets that offset potential losses in the underlying or spot market by using the derivative. Ahuja (2004) recalls that since commodity derivatives arrived in India, barely about a decade after they arrived in Chicago, the commodities futures market in India has gone through an unprecedented flourish in terms of the number of

modern exchanges, the number of commodities reserved for derivatives trading and the value of futures trading in commodities. There are several obstructions to be dealt with and consequences to be decided for a confirmed development of the Indian market. Several researchers examined how India pulled it off in such a short time span.

FitchRatings (2004) found that most of the derivatives traders in India describe themselves as hedgers and Indian laws generally require that derivatives be used primarily for hedging purposes. Nair (2005) examined the commodity derivatives, futures market in India and found that the market was in a state of hibernation for the past four decades, which was characterized by suspicion on the benefits of futures trading. This is partly a response to the predominant role being assigned to the market forces in price determination and the consequent need for providing market-based derisking tools.

2.7.1 Growth Of Commodity Futures Trading Volume In India

From Table 2.7.1, it could be realized that the commodity futures markets in India have gained a significant growth over the years. The most prominent commodity exchange in India is the Multi Commodity Exchange of India (MCX), which found a steady increase from Rs.0.63 million to Rs.14.88 million during the period 2005-2012. There are market fluctuations in the volume of trading in other exchanges in India. The National Commodity and Derivatives Exchange Limited (NCDEX) has experienced a double fold increase from Rs.0.88 million to Rs.1.59 million during the period 2005-2012. The National Multi Commodity Exchange of India Ltd (NMCE) has witnessed a growth from Rs.12 crores to Rs. 176 crores during the period 2005-2012. There has been an optimal growth in the others exchanges during the study period.

Table 2.7.1 TURNOVER IN COMMODITY FUTURES MARKETS IN INDIA

(Rs. in crores)

Exchanges	2005	2006	2007	2008	2009	2010	2011	2012	2013 *(January - March)*
Multi Commodity Exchange of India (MCX)	633,324	2,025,663	2,730,415	4,284,653	5,956,656	7,895,404	15,597,095	14,881,057	3,606,867
National Commodity and Derivatives Exchange Limited (NCDEX)	883,209	1,243,327	774,965	628,074	805,720	973,217	1,810,210	1,598,425	292,014
National Multi Commodity Exchange of India Ltd. (NMCE)	12,107	111,462	25,056	37,272	195,907	180,738	268,350	176,570	61,967
Others	108,705	104,033	124,051	83,885	132,173	445,366	450,446	390,785	123,541
Total	**1,637,345**	**3,484,485**	**3,654,487**	**5,033,884**	**7,090,456**	**9,494,725**	**18,126,101**	**17,046,837**	**4,084,389**

Source: Ministry of Consumer Affairs, Economic Survey

2.8 OPEN INTEREST AND TRADE VOLUME

Financial analysts use a three dimensional approach to market analysis, which includes a study of price, volume and open interest. Among these three, price is the most crucial variable. However, volume and open interest furnish significant secondary substantiation of the price action on a chart and frequently specify a lead denotation of an approaching change of trend. The trade volume constitutes the total amount of trading activity or contracts that have exchanged hands in a commodity market for a single trading day. The more important the amount of trading throughout a market session the more prominent will be the trading volume. As observed earlier, a higher volume bar on the chart means that the trading activity has more weighted for that day. Analysts consider that volume precedes price, which means that the loss of upside price pressure in an uptrend or downside pressure in a downtrend will come out in the volume figures before establishing itself as a reversal in trend on the bar chart.

The total number of outstanding contracts that are agreed by market players at the end of each day is known as the Open Interest. Where volume evaluates the pressure or intensity behind a price trend and open interest evaluates the flow of money into the futures market.There must be a buyer of that contract for each seller of a futures contract. Thus a seller and a buyer incorporate to create only one contract. Accordingly, to measure the total open interest for any given market, it is necessary to understand the totals from buyers or sellers. The total number of options and/or futures contracts that are not closed or delivered on a particular day is the open interest. Open interest is a computation of the number of active traders in a particular market (Gulati, 2012).

Open interest denotes to the number of contracts outstanding that have not been closed or delivered upon. A measure of how many contracts have been traded relative to the stock of futures contracts outstanding is provided in the ratio of volume of contracts traded relative to open interest therefore provides (Chinn, 2013). Several financial theories propose a positive contemporary affiliation between return volatility and trading volume.

The successive arrival of the information model and the mixture of distribution hypothesis is normally acknowledged as a Mixture of distribution hypothesis hypothesis, explain that the information is circulated consecutively to the trader, so new information to the market produces both trading volume and price movements (Clark, 1973; Copeland, 1976; Epps and Epps, 1976; Jennings and Barry, 1983; Harris, 1986; Lamoureux & Lastrapes, 1990; Morse, 1980; and Tauchen and Pitts, 1983). Mahanta (2012) described the relationship between the prevailing price trend and open interest, which is summarized in the following table:

Table-2.9.1:RELATIONSHIP BETWEEN PRICE TREND AND OPEN INTEREST

PRICE	VOLUME	OPEN INTEREST	INTERPRETATION
Rising	Rising	Rising	The market is Strong
Rising	Falling	Falling	The market is Weakening
Falling	Rising	Rising	The market is weak
Falling	Falling	Falling	The market is Strengthening

Source: http://futures.tradingcharts.com/learning/volume_open_interest.html

2.9 BENEFITS OF COMMODITY FUTURES MARKETS

The authentic price discovery and efficient price risk management are the foremost objectives of the futures exchange. The benefits of the commodity futures market are as follows:

- Price Discovery
- Price Risk Management
- Import and Export competitiveness
- Predictable Pricing
- Control over unfavorable price fluctuations for farmers/Agriculturalists
- Credit accessibility
- Improved product quality

2.10 MULTI COMMODITY EXCHANGE LIMITED (MCX)

This study being on commodity futures, it has considered one of the leading player, namely, Multi Commodity Exchange of India Limited (MCX), for the purpose of collection of data.MCX is the India's first listed commodity futures exchange that facilitates online trading, and clearing and settlement of commodity futures transactions in India.Thus it offers a platform for risk management. The MCX started operations in November 2003 that operates within the regulatory framework of the Forward Contracts (Regulation) Act, 1952.

MCX offers trading in altered commodity futures contracts across segments, including bullion, ferrous and non-ferrous metals, energy, Agri-based and agricultural

commodities. The Exchange concentrates on rendering commodity value chain participants with neutral, secure and transparent trade mechanisms, and formulating quality parameters and trade regulations, in accordance with the regulatory framework. The Exchange has an extensive national reach, with over 2100 members, operations through more than 400,000 trading terminals, spanning over 1900 cities and towns across India. MCX is India's leading commodity futures exchange with a market share of about 86 per cent in terms of the value of commodity futures contracts traded in 2013-14.

2.11 FUNCTIONS OF MULTI-COMMODITY EXCHANGE

India's first listed exchange, the Multi Commodity Exchange of India Limited (MCX), is a commodity futures exchange that facilitates online trading and clearing and settlement of commodity futures transactions. Hence, MCX provides a platform for risk management. MCX functions within the regulatory framework of the Forward Contracts Regulation Act, 1952 and regulations thereunder. Offering trading in more than 50 commodity futures contracts throughout segments, including bullion, ferrous and non-ferrous metals, energy, and agricultural commodities, MCX concentrates on providing commodity ecosystem participants with neutral, secure and transparent trade mechanisms, and formulating quality parameters and trade regulations, in accordance with the regulatory framework. The Exchange has an encompassing national reach, with over 2100 members, operations through more than 400,000 trading terminals spanning over 1770 cities and towns across India.

2.12 MARKET PARTICIPANTS

A large number of market participants with diverse risk profiles is demanded for an efficient market for commodity futures. Ownership of the underlying commodity is generally not expected for trading in commodity futures. To cover the margin requirements, the market participants need to deposit sufficient money with brokerage firms. Market participants can be typically divided into hedgers, speculators and arbitrageurs.

2.12.1 Hedgers

Hedgers are the commercial producers and consumers of the traded commodities. They enter into the market to manage their spot market price risk. Commodity prices are volatile and their participation in the futures market allows them to hedge or protect themselves against the risk of losses from fluctuating prices.

2.12.2 Speculators

Speculators are the traders who speculate on the direction of the futures prices with the intention of making money. Trading in commodity futures is an investment option for the speculators. Most speculators do not prefer to make or accept deliveries of the actual commodities; rather they liquidate their positions before the expiry date of the contract.

2.12.3 Arbitrageurs

The traders who buy and sell to make money on price differentials across different markets are the arbitrageurs. Arbitrage demands the simultaneous sale and purchase of the same commodities in different markets. Arbitrage continues to the prices in different markets in line with each other.

2.13 SELECTED NON-AGRICULTURAL COMMODITIES

The non-agricultural commodities selected for the present study are as follows:

2.13.1 Brent Crude oil

Brent crude oil is a global benchmark from North Sea, which is a light sweet crude oil. Brent crude oil is broadly applied to influence crude oil prices in Europe and in other parts of the world. India ranks among the top 10 largest oil-consuming countries, which accounts for about 30 per cent of India's total energy consumption. India faces a large supply shortfall, as domestic oil production is unconvincing to keep pace with demand. India's approximate production is only 0.8 million barrels per day.

The oil reserves of the country (about 5.4 billion barrels) are located primarily in Mumbai High, Upper Assam, Cambay, Krishna-Godavari and Cauvery basins.India had a total of 2.1 million barrels per day in refining capacity.

Government has permitted foreign participation in oil exploration, an activity restricted earlier to state owned entities.

2.13.2 Crude oil

Crude oil describes for 35 percent of the world's primary energy consumption. Crude oil is a complex mixture of various hydrocarbons found in the upper layers of the earth's crust, which is often attributed as the “Mother of all Commodities” because of its importance in the manufacturing of a wide variety of materials. Global proven oil reserves in 2011 were around 1652.6 thousand million barrels in which the OPEC had 1196.3 thousand million barrels. Global oil demand was found to be at 88.3 million

barrels per day (mmb/d) in 2011, an increase of around 0.7% from the previous year (2010). Crude oil production during the period April-March 2012 was 38.19 million metric tonnes (MMT), as equated with 37.71 MMT during the representative period last year. The total oil consumption in 2010 was approximately 3.34 mmb/d. India is the 4th largest consumer of oil and imports more than 70% of its crude oil requirement.

2.13.3 Natural Gas

A vital component of the world's supply of energy is the Natural gas, which is one of the cleanest, safest, and most useful of all energy sources. Natural gas is said to be a combustible mixture of hydrocarbon gases which is formed primarily from methane. Given the growing resource base and relatively low carbon emissions when compared to other fossil fuels, natural gas is potential to play a greater role in the world energy mix. The world's natural gas reserves are figured to be 7,360.9 trillion cubic feet (tcf). The Middle East holds 38.4% of the world's reserves, while an additional 21.4% is located in the former Soviet Union, with only 9% held in the OECD countries. In 2011, the global natural gas production was 3,276.2 billion cubic metre (bcm), up 3.1% from 3,178.2 bcm in 2010, and consumption was 3,222.9 bcm, compared with 3,153.1 bcm in the previous year. The share of natural gas in India's primary energy mix decreased to 9.8% in 2011 from11% in 2010. However, this share is quite low compared to the global average (24%), primarily due to the supply-side constraints. The natural gas (including CBM) production in 2011 was 46.1 bcm, which is 12.8% higher than the actual production of 50.8 bcm in 2010. India's consumption of natural gas was around 61.1 bcm in 2011, which accounts for only 1.9% of the world natural gas market.

2.13.4 Aluminium

The third most abundant element present in the earth's crust is Aluminium, which exists in a very stable combination with other materials particularly silicates and oxides. As aluminium is known for its durability and high resale value, it is resistant to common atmospheric gases and a wide range of liquids. In 2012, global primary aluminium production was 40.974 million metric tonnes (MMT), up from 39.930 MMT in 2011. Global primary aluminium consumption rose to 48.075 MMT in 2012, compared with 44.594 MMT in 2011. As a result of starting new smelters and restarting smelters that had been shut down in 2008 and early 2009, world's primary aluminum production increased in 2012 compared to the production in 2011. Germany, Russia and Canada are the major aluminium exporting countries, while major aluminium importing countries are USA, Germany and China. India is the fifth largest producer of aluminium in the world with an average annual production of 171,3924 MT.

2.13.5 Copper

A malleable and ductile metallic element that is an excellent conductor of heat and electricity is Copper, which is also corrosion resistant and antimicrobial and stands at the third place after steel and aluminium, in the context of consumption. It an important contributor to the national economies of mature, newly developed and developing countries. One of the most recycled of all metals and the ability to recycle metals over and over again that makes Copper a material of choice. In 2011, world’s copper mine production continued to underperform with respect to capacity, and remained at the 2010 level of 16.005 million metric tonnes (MMT). The global refined copper production was

19.630 MMT in 2011, which is up from 18.998 MMT in 2010. The global refined copper consumption was 19.988 MMT in 2011, compared with 19.375 MMT in the previous year. Growth in elaborated copper usage has been particularly strong in Asia, where demand has expanded more than fivefold in less than 30 years. India's production of refined copper in 2012 is around 4% of the total world production at 689,312 MT.

2.13.6 Lead

A very corrosion-resistant, ductile, and malleable blue-grey metal that has been in use for at least 5,000 years is Lead, which is usually found in association with zinc, silver, as well as copper ores. Lead can be recycled indefinitely, without loss of its physical or chemical properties that is more than 60% of the total lead production.The lead production process consumes less energy as compared to the production of any other metal. The global lead mine production increased by 11.5% in 2012 over that of 2011. Global refined lead production increased by 0.22% from 10.594 million metric tonnes (MMT) in 2011 to 10.617 MMT in 2012. The world's refined lead consumption rose to 10.553 MMT in 2012, up from 10.418 MMT in 2011. The refined lead production in India was around 169,301 MT in 2012.

2.13.7 Nickel

A metal with a bright future, the main alloying metal needed in the production of certain types of stainless steel, is Nickel. The world production of primary Nickel during 2011 was 1.612 million metric tonnes (MMT), which is up by 11.53% as compared with 1.446 MMT in 2010. The world's consumption during 2011 was at 1.608 MMT and in 2010 was at 1.465 MMT in 2010 that was up by 9.76%. The world's largest nickel

exporters accounting for almost 49% of world exports are Russia, Canada and Norway. China, USA and Germany are the world's largest nickel importers accounting for around 48% of world imports. The Nickel market in India is totally dependent on imports. The annual demand for nickel in India is around 40,000 MT.

2.13.8 Tin

The most important mineral ore of tin is Cassiterite. Tin is a crucial commodity in international trade, which used in hundreds of industrial processes throughout the world. The usage of Tin is found in many industries such as food packaging, culinary equipment, electronics, tin chemicals, plumbing solders, engineering alloys, pewter and bronze in music and the arts, dental amalgams, anti corrosion and engineering coatings, wine capsules and fire retardants. The world tin yield swings between 2.4 to 3.1 lakh tons. United States are believed to be the world's largest producer of secondary tin. Globally, the demand of tin is figured to be above the supply. The major referral market for futures trading in tin is the London Metal exchange. India's tin production is around 10 tons. India meets most of the tin requirements through imports. Including scrap, it is estimated that India imports around 4000 tons of tin and its alloys.

2.13.9 Zinc

A bluish white, lustrous metal is Zinc, which is commonly covered with a white coating on exposure to the atmosphere. Being the fourth most common metal in use, after iron, aluminium and copper in terms of the metal’s annual production, Zinc can be recycled indefinitely, without loss of its physical or chemical properties and is present in a wide variety of foods, and found particularly in association with protein foods. In the

global refined zinc output in 2012, there was a decrease of 3.5% when compared to the previous year, which was mainly due to a accounted 7.5% decrease in China's output, which offset the increase witnessed by Mexico, Peru, United States, Japan and the Republic of Korea. Likewise, the global refined zinc metal usage was also decreased by 2.80% in 2012 that was primarily determined by a decrease in demand from all major countries. In 2012, India's refined zinc production was 711,266 metric tonnes (MT).

2.13.10 Gold

Gold, being the oldest precious metal known to man, is primarily a monetary asset and partly a commodity and the world's oldest international currency. An important element of global monetary reserves, with regard to the investment value, more than two-thirds of total accumulated holdings, the world investment in gold has amounted to 1614 MT in 2012, broadly flat year-on-year, but the approximate value of this demand reached a new record of almost $87 billion. The gold mine production increased from 12 MT to 2848 MT in 2012 and the combined demand for bars & coins dropped from 1515 MT to 1256 MT. India is the world's largest market for gold jewellery and a key driver of the global gold demand. The rural parts demand two thirds of the Indian demand for gold.

2.13.11 Silver

A brilliant grey-white metal that is soft and malleable is Silver, which has unique properties including its strength, malleability, ductility, electrical and thermal conductivity, sensitivity, high reflectance of light, and reactivity. Lead ore is the main source of silver, though it can also be found associated with copper, zinc and gold and produced as a by-product of base metal mining activities. The worldwide silver

fabrication demand was 876.6 million ounces (Moz) in 2011 - down by 1.5% from the value in 2010, but still reaching its second highest level since 2000. Globally, in 2011, the physical silver bar investment grew by 67% to 95.7 Moz, while fabrication of coins and medals rose by almost 19% to an all-time high of 118.2 Moz. Silver is preponderantly traded on the London Bullion Market Association (LBMA) and COMEX in New York. LBMA is the metal's main physical market that the global hub of over-the-counter trading in silver. About 2500 Metric tonnes (MT) per year is the average annual demand for silver in India. The country's production was around 342.13 MT in 2011.

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