CHAPTER 2

Commodity Futures Market in India: A Theoretical Perspective

2.1 Introduction

Commodity futures market has experienced phenomenal growth in recent years. Policy makers have been trying to put their policies to stabilise the market where producers and investors can extract benefit from the futures trading. However, due to complexity in understanding futures market, lack of proper information and large contract size, marginal producers are unable to participate in futures trading. Therefore, it is indispensable to understand fundamentals of futures market and the way the mechanism works. The study devotes this chapter on evolution, theoretical underpinning and recent developments of commodity futures market in India.

Hedging, speculation and arbitrage are key concepts used by market participants during trading period that need to be clarified fundamentally. These features help market participants to hedge risk and reap profit from futures market. Therefore, this chapter gives the fundamental ideas of these features including other features. Five different commodities i.e. gold, silver, copper, crude oil and natural gas are selected for the analysis as those commodities are playing significant role in growth and development of Indian economy. Therefore, the study gives glimpse of description of commodities, and factors affecting demand and supply of the commodities under study.
2.2 Evolution of Global Futures Market

Commodity futures market has an old history globally. The development of modern futures trading began in the US in the early 1800 A.D. which was tied up closely to the development of commerce in Chicago. There was glut of commodities at the time of harvest and severe shortages in off-harvest time and lack of proper storage facilities that led farmers and merchants to contract for forward delivery. Some of the first forward contracts were in corns. To reduce the price risk of storing corns in winter, these merchants went to Chicago in spring and entered into forward contracts with processors for the delivery of grain. The grain was received from farmers during late fall or early winter.

The first forward contract was introduced on March 13, 1851. As the grain trade expanded, a group of 82 merchants gathered at a flour store in Chicago to form the Chicago Board of Trade (CBOT). Forward contracts dominated in the futures exchange. However, certain drawbacks of forwards such as lack of standardization and non-fulfillment of commitments made CBOT step in 1865 to formalize grain trading. Commodity futures trading has also long history in other developing countries. The Buenos Aires Grain Exchange in Argentina set up in 1854 is one of the oldest exchanges in the world. In India, futures trading was introduced in 1875.

2.3 Evolution of Indian Commodity Futures Market

The institution of formal commodity futures market in India is almost as old as in the USA and the UK. The Indian Experience, however, is much older as references to such markets in India appear in Kautialya’s Arthasastra (FMC). The first organized futures market was established in 1875 with the setting up of the Bombay Cotton Trade Association Limited. However, very soon, leading cotton mill owners and merchants expressed discontent over its
functioning. This led to the establishment of the Bombay Cotton Exchange Limited in 1893. Following cotton, futures trading was introduced in other agricultural commodities. In 1900, the Gujarati Vyapari Mandali was established to carry out futures trading in oilseeds, groundnut, castor seed and cotton. The states of Punjab and Uttar Pradesh were also trading futures on wheat. The Hapur Chamber of Commerce established the futures exchange for wheat in 1913 at Hapur (NICR)\(^{14}\).

Futures trading in raw jute and other jute goods began in Kolkata with the setting up of the Calcutta Hessian Exchange limited in 1919. However, organized futures trading in raw jute started only in 1927 with the establishment of the East Indian Jute Association limited. These two associations were merged in 1945 to form the East Indian Jute and Hessian limited to conduct organized trading in both raw jute and jute goods. Futures trading in bullion began in Mumbai in 1920 and were later introduced at Rajkot, Jaipur, Jamnagar, Kanpur, Delhi and Kolkata.

The Union Government prohibited futures trading during the Second World War. After independence, futures markets were brought under the union list in the constitution of India. The responsibility or the regulation of commodity futures markets hence came under the central government. In the early stage, forward markets functioned under the rules and procedures laid down by individual trade associations. Wide differences in regulations followed by various associations led to variety of malpractices which resulted in frequent disputes among traders. Enactment of the Bombay Forward Contract Act, 1947 felt the need of regulation. The Indian Constitution (1950) placed the matter of futures market in the Union list, hence the responsibility of regulating the market devolved on the Central Government. The Government drafted a bill, modelled on the Bombay Act and set up a

Committee under the chairmanship of Shri A. D. Shroff to frame model Rules for Associations. The committee submitted its report in August, 1950. The Forward Contracts (Regulations) Bill, 1950 was revised in the light of the A.D Shroff Committee and was forwarded to a Select Committee of Parliament. The Committee submitted its report in August, 1951, but the Bill lapsed with the dissolution of the Parliament in 1952. A new Bill was drafted and after scrutiny by another Select Committee, the Forward Contracts (Regulation) Act was passed by parliament in December, 1952. The Forward Markets Commission (FMC) was established in 1953 to regulate and develop commodity futures market in India (Karande, 2006)

Futures markets prospered in India during the early 1960s. In the mid 1960s, due to the war in 1965, and natural calamities, there was a shortage in commodities. As a result, in order to have control on price movement of many agricultural and essential commodities, futures trading was banned in 1966 in most commodities except pepper and turmeric. Futures trading in some commodities like guar (Muzaffarnagar and Hapur, 1982), potatoes (Hapur, 1985) and castor seed (Mumbai and Ahmeadabad, 1985) were permitted. With liberalization of the Indian economy in early 1990s, there was renewed emphasis on development of commodity futures market in India. The Government in 1993 set up a Committee under the chairmanship of Shri Kamal Nayan Kabra to examine the feasibility and role of commodity futures market in India. The Committee submitted its report in September, 1994. The main recommendations of Kabra Committee that had been implemented were, introduction of futures trading for several commodities such as coffee (Bangalore, 1998), cotton (Mumbai, 1999), soya oil (Indore, 1999), sugar (2001), tea (2002) and bullion (2003) and introduction of international

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futures contract for pepper (Cochin, 1997) and castor oil (Mumbai, 1999). In 2007, Government of India set up a committee under the chairmanship of Prof. Abhijit Sen to look into whether futures trading causes inflation. The committee submitted its report in 2008. The report found that there was no strong evidence that futures trading caused inflation.

2.4 Fundamentals of Commodity Futures Market

Commodity is defined as any goods, merchandise or produce of land that can be bought and sold. As we know, prices of commodities are generally at their lowest at the time of production as the supply far exceeds the immediate, short term demand by the consumers, processors and other stakeholders associated with the commodity markets. On the other hand, the prices of commodities increase substantially in the lean season when the demand by the consumers, processors etc exceeds the supply. This adversely affects the producers as they realize lower prices of their produce in the time of production. It also unfavourably affects the consumers as they have to pay higher prices in the lean season to meet their requirements. Furthermore, manufacturers can not rely on spot market for their smooth and flexible production in a year as seasonal variations in demand of their product and supply constraint of raw materials. Therefore, futures market gives platform to producers for managing risk which arises from price fluctuations of their produces. Similarly, manufacturers get their raw materials in time through futures market for smooth and flexible production.

Futures market provides a market mechanism to balance this inequality of the supply-demand pattern of commodities. Futures trading provides a means of appraising the supply and demand conditions and dealing with price risks over time and distance. Trading in futures not only provides price signals to the market of today, but also of months ahead, and provides
guidance to sellers (farmers/ growers/ processors) and buyers (consumers) of the commodities in planning ahead, and in financing and marketing commodities from one season to another. Futures markets, therefore, has two broad economic objectives, i.e. price discovery and price risk management which are beneficial to all sectors of the economy including farmers and consumers (Bhattacharya, 2007)\textsuperscript{16}. However, due to lack of knowledge, complexity in understanding futures terminology and complication in mechanisms, marginal farmers and investors are often away from the participation in futures market.

Practically, the mechanism of commodity futures market is very simple. For example, in futures market, a buyer agrees to buy the commodity from a seller with a specified price and on a specified date in the future. The agreement between buyer and seller is called ‘contract’. The contract specifies both the quantity and quality of the commodity, price, delivery date, and delivery location. The act of buying is called ‘taking long position’, while the act of selling is called ‘taking short position’. At the time of delivery, there may arise the risk of default in payments, known as ‘credit risk’. Here, the clearing house plays a key role to sort out the issues related to the default payment. Clearing house is an agency associated with one or more futures market exchanges with the objectives: (i) to match, process, register, confirm, settle, reconcile, or guarantee trades; (ii) to become a party to each trade so as to nearly eliminate credit risk; (iii) to operate the mark-to-market process (collecting and paying variation margin); and (iv) to handle the delivery process. Futures markets act as market surveillance through monitoring price and volume movements, detecting potential market manipulation at the early stages and neutralizing market participants’ ability to collude and

influence prices. Proper monitoring and surveillance bring confidence among participants and increase market liquidity. If futures market fails to deliver its objectives (hedging risk and price discovery) then the market is likely to be riskier as it destabilises the spot market prices and fails in discovering fair price of commodity. Pricing of the commodity futures plays an important role for the participants who involve in the futures trading. Spot price and cost of carry play a key role in deciding fair value of futures contract. Cost of carry is defined as the cost incurred on account of an investment position taken by a participant in the futures market. Cost of carry comprises storage costs, financing costs, insurance costs and transport costs. Thus, the fair value of a futures contract is the sum of the spot price and cost of carry.

All the open positions of members are marked to market every day, based on the settlement price for each contract. The difference is settled in cash on a T+1 basis. In other words, the daily profits or losses of the traders, due to daily price movement, are calculated every day and settled the next day. On the day of entering into the contract, the difference between the entry price and daily settlement price is calculated. On the expiry date, if a member has an open position, the difference between the final settlement price and the previous day’s settlement price is taken into account. On the intervening days when the member holds an open position, the difference between the daily settlement price for that day and the previous day’s settlement price is calculated. All members and their constituents are bound by the daily settlement price notified by exchange. Whenever members have to pay to the exchanges to cover losses, the pay-in must be made before 10:30 AM the same day or on the next day. This ensures that the obligations of members are valued at the most recent market prices and adequate margins are maintained to mitigate default risk. In case of profit, pay out would be made by 10:30 AM on the next day.
Mark-to-Market settlement system is described through suitable example in the table 2.1. Suppose, that on a particular day in March, a trader buys a May futures contract for wheat at Rs. 1500 per quintal. The daily settlement price for that day is Rs. 1550 per quintal. Hence, the buyer of the contract will get a profit of Rs.50 per quintal, which he can collect in the form of pay-out during the following day. However, the seller of the contract would incur a loss of Rs. 50 per quintal, which he must settle in the form of pay-in by or before 10:30 AM during the subsequent day. Next day, both the buyer and the seller would start their day’s position with Rs.1550 per quintal. The contract would be marked-to-market in the same manner at the end of the day. The table 2.1 gives an example of continuous mark-to-market settlements till the contract is squared off. On the day of squares off, net gain is Rs. 25 and net loss is Rs. 20.

<table>
<thead>
<tr>
<th>Date</th>
<th>Buy Position</th>
<th>Sell Position</th>
<th>Daily Settlement price</th>
<th>Profit/(loss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/03/2012</td>
<td>Rs.1500/-Per Qt.</td>
<td>Rs 1500/-Per Qt.</td>
<td>Rs. 1550/-Per Qt.</td>
<td>Buyer gain=Rs50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Seller loss=Rs.50</td>
</tr>
<tr>
<td>17/03/2012</td>
<td>Rs. 1550/-Per Qt.</td>
<td>Rs. 1550/-Per Qt.</td>
<td>Rs. 1525/-Per Qt.</td>
<td>Buyer loss=Rs.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Seller gain=Rs.25</td>
</tr>
<tr>
<td>18/03/2012</td>
<td>Rs. 1525/-Per Qt.</td>
<td>Rs. 1525/-Per Qt.</td>
<td>Rs. 1535/-Per Qt.</td>
<td>Buyer gain=Rs 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Seller loss=Rs. 10</td>
</tr>
<tr>
<td>19/03/2012</td>
<td>Squares off @ Rs.1525/-Per Qt.</td>
<td>Squares off @ Rs.1520/-Per Qt.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Net gain=Rs.25</td>
<td>Net loss=Rs.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Example set by author
2.5 Hedging in the Futures Market

Commodity trading involves sizeable price risks due to volatile prices in the spot market, which may affect the value of the underlying commodity. Hedging is an important strategy to manage price risk. Hedgers include various types of people such as producers, consumers, processors and traders. Producers want to transfer the risk arising from the possibility that price could decline by the time their produce is ready for sell. Therefore, he uses commodity futures market platform for hedging (hedging means to prevent risk of price fluctuations of the commodity) for their commodity. They prefer hedging to protect themselves from the risks of potential adverse price changes in commodity. Through hedging operation, the value change (profit or loss) of a commodity in spot market can be covered by value change (loss and profit) in futures market, thereby, minimizing price risk, which is one of the objectives of hedgers. Consumers, on the other hand, want to transfer the risk arising from the possibility that the prices will increase before purchases are made. Therefore, consumers also use hedging to manage price risk.

2.6 Speculation in the Futures Market

Speculation is one of the integral parts in any futures markets. Groups of speculators, acting in unison and completely controlling large spot and futures positions in commodities with the intent of manipulating prices may obviously have a detrimental effect on the market. Despite this, it is widely acknowledged that speculation, in general, improves the efficiency of the futures market. This is so because speculators are willing to enter the market to take advantage of even small changes in prices as they bear the price risk that hedgers seek to transfer. Speculators also provide liquidity to the futures market so that hedging in large volumes may be conducted with minimal execution costs.
There are two contradictory views concerning the effects of speculation on price variability. One view is that, speculation increases price variability as speculators tend to buy as prices rise and tend to sell as prices fall. The additional buying when price rise exacerbates the price rise even more. Similarly, the increased selling when prices fall causes them to fall even more. This results in larger swings in commodity prices and thus more price volatility. The opposing view argues that speculation actually reduces price variability. Speculators naturally buy commodities when they are cheap, and store them until be brought again into the market when they become costlier. The tendency of this operation is to equalize price, or at least to moderate its variability. The prices of commodities are neither so much depressed at one time, nor so much raised at another, as they would be if speculative dealers did not exist (Kamara, 1982)\(^\text{17}\).

### 2.7 Arbitrage in the Futures Market

Arbitrage is one of the important tools to restore equilibrium among spot and futures of a commodity, if any distortions in prices exist when futures contract matures. It is a process of taking advantage of price differences in futures of same or identical commodities between two market places. An arbitrage could also take benefit of the excess price difference between spot and future prices. An arbitrager might also exploit an opportunity to make profit, presented by the future prices for the same commodity at two different points of time in future. Arbitrage opportunities also become available in two commodities which are substitutes. Prior to the delivery day or days, the futures price will not necessarily be equal to

the spot market price of the deliverable commodity. However, during the delivery period, the futures market price should converge to the related spot market price. If convergence has not occurred during delivery period, there will be opportunity for arbitrage profits, for example if the futures price is greater than the spot market price during delivery period, arbitrager could buy the spot market commodity, sell the futures contract, and deliver the commodity at the higher futures market price. On the other hand, if the futures price is less than cash market price, the arbitrager could buy the futures contract and short the spot market commodity. Such arbitrage transactions which generate profits for the arbitrager tend to make the futures price converge to the spot market price (Jones, 1982)\(^\text{18}\).

### 2.8 Convergence of Spot and Future Market

Basis is one of the important concepts in the futures trading which refers to the difference between spot and futures prices. As futures contract nears expiration, the basis keeps reducing till it reaches zero on expiration, i.e. at expiration, there is a convergence of the futures price with spot price of the underlying asset, e.g. the closing price for August gold futures contract is the closing value of gold in the spot market on that day. As the delivery date approaches, both cost of carry and the convenience yield approach to zero where convenience yield refers to the benefit or premium associated with holding an underlying commodities rather than the contract or derivative commodities.

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The basic reason for convergence is that, if any one of the prices, spot price or future price, exceeds to the other, there is scope for arbitrage. Exploitation of the arbitrage opportunity by traders will bring back convergence. If the futures price is above the spot price during the delivery period, the traders can short the futures contract, by the underlying asset and make the delivery. This will lead to a profit equal to Futures-Spot. As other traders follow this opportunity, the futures price will fall, leading to convergence of the futures price with the spot price. If, on the other hand, the futures price is below the spot price during the delivery period, traders will go long on the futures contract, sell the underlying asset in the spot market and make a profit equal to Spot-Futures. As more traders take the long position, future prices would rise, leading to convergence.

2.9 Backwardation and Contango in Futures Market

As for the spot and futures price variation there are two major theoretical strands, namely, ‘backwardation’ and ‘contango’. ‘Backwardation’ is the market condition wherein the price of a futures contract is trading below the expected spot price at contract maturity. The opposite market condition to backwardation is known as ‘contango’, Keynes (1930) observed that the futures price should be below the expected spot price in order that this “backwardation” provides speculators with a risk premium for holding a long position in the futures contract. Keynes regarded hedgers as primarily holding short positions. Later, subsequent development of this topic in the literature (Cootner, 1960) led to the understanding that hedgers would sometimes prefer long positions to reduce their risk. Such a case would arise when inventories are small prior to a harvest, and producers “hedge” by

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going long. In that case speculators must take short positions, and contango must prevail in order for speculators to receive a risk premium. Thus, the “complete” risk premium theory demonstrates that backwardation or contango would occur depending on whether speculators were “net long” or “net short,” which would be a seasonal phenomenon (O’Brien and Schwarz, 1982).  

2.10 Regulation of Indian Commodity Futures Market

The forward markets commission (FMC) is the regulator for commodity futures trading in India under the provisions of the forward contracts (Regulation) Act 1952. The regulations generally aim to control both the entry into and operation of futures markets and also focus on the operation or performance of the market. They provide a market place that fulfils the economic functions of futures markets by prohibiting practices that can interfere with the process of price discovery or the efficient transfer of risks. Major challenges for regulation are to prevent distortion of prices through price manipulation and insider trading. The major functions of the FMC are to advise the central government in respect of the recognition or the withdrawal of recognition of any association. FMC keeps forward markets under observation and may exercise, if necessary, the powers assigned to it by or under the Act. It publishes information, if necessary, regarding the trading conditions in respect of goods including information regarding supply, demand and prices. It also makes recommendations generally with a view to improving the organization and working of forward markets. FMC undertakes the inspection, whenever it considers it necessary, of the accounts and other documents of any recognized association or registered association.

Acting on another recommendation of Kabra Committee to strengthen the FMC, the Government upgraded the post of FMC Chairman to Additional Secretary. The Government in 1995 set up a separate Department of Consumer Affairs to focus on commodities. The idea of a National multi-Commodity Exchanges (NCE) was proposed in 1999. A Core group was set up to work out modalities for constituting NCE and a decision to set up the NCE was taken in July, 2000 (Karnade, 2006)\(^{22}\).

### 2.11 Description of the Commodity

Five commodities are taken for this study i.e. gold, silver, copper, crude oil and natural gas. The commodities are chosen according to MCX’s world ranking in terms of number of futures contracts traded in 2011. All the commodities under the study have their special characteristics and applications, and also different factors affect demand and supply of the commodities. This section is devoted to description of the commodities, and demand and supply situation in the world.

#### 2.11.1 Gold

The symbol of gold is Au. It is a dense, soft, shiny, malleable and ductile metal. Pure gold has bright yellow colour and lustre. It is one of the most precious metals since the ancient times. There is a number of intrinsic features that separate gold from the rest of the commodities, such as its function in central banks’ reserve asset management, and the exceptional physical and chemical properties that make it ideal for use in technological

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applications. The combination of these and many other features make gold stand out from other commodities. It is widely acknowledged that gold is synonymous with luxury and wealth. Half of all gold in above ground stocks still exists in the form of jewellery, yet it is also an important financial asset and is considered by many as a currency in its own right. It is accepted that gold is a store of wealth and an efficient diversifier of risk. It also acts as a reliable and essential component used in a range of electronics, medical and dental applications, and is continually proving its wider significance as an innovative enabler to new technologies. Gold’s ability to reduce credit and counterparty risk by which gold can add liquidity, increase diversification and preserve wealth even during the times of economic uncertainty or in the presence of systemic market risk (WGC)\textsuperscript{23}.

A) Factors Influencing Gold Prices

There are several factors that affect gold prices such as inflation, interest rate, exchange rate, financial uncertainty etc. Some of the factors affect positively while others affect negatively to gold prices.

i) Gold and Inflation

Inflation is one of the determinants of gold price. There have been many different institutional settings for gold such as the gold standard, the Bretton Woods system, free floating price for gold, and the migration of gold for use as an everyday currency to an investment vehicle. Still, on the long run, purchasing power of gold has remained remarkably stable over time. The tendency for gold to hold its real terms value over long periods has

\textsuperscript{23} World Gold Council
often led to gold being described as an “inflation hedge”. Therefore, gold is used as hedge against inflation.

ii) Gold and Real Interest Rate

It is widely studied that there is inverse relationship between real interest rates and price of gold. Real interest rates fall and therefore, investors buy gold. Besides, there is a number of reasons for which investors buy gold. Firstly, lower real interest rates could imply higher inflationary expectations in the future therefore gold is bought as a hedge against this possible inflation. Secondly, lower real returns in Treasuries drives investors into risk assets in search of a higher return which also makes gold price higher. Finally, when real interest rates go down then it sends a message that the economy is in a bad place therefore investors buy gold as it is safe haven asset.

iii) Gold and Exchange Rate

In early 1970s, floating exchange rates had been adopted by most of the countries. Therefore, exchange rate has had a significant influence on short-term gold price movements. Some of the studies (IMF, 2008) also find relations between price of gold and exchange rate. This relationship exists because of the two major reasons. Firstly, for example, falling dollar increases the purchasing power of non-dollar area countries (and a rising dollar reduces it) driving up prices of commodities including gold (or driving them down in case of a stronger dollar). Secondly, in periods of dollar weakness, investors look for an alternative store of value, driving up gold prices. This includes dollar-based investors concerned about possible inflationary consequences of a weak dollar. In strong dollar periods the dollar itself is often
seen as an appropriate store of value. Recent history confirms the close association of the gold price with the value of the dollar.

iv) Gold and Financial Uncertainty

Significant and commonly observed influence on the prices of gold is the level of financial uncertainty which is called financial/economic crisis. In the recent financial crisis 2008, gold demand and prices increased significantly. Therefore, gold is used as “a crisis hedge” at the time of financial/economic crisis. During financial crisis gold demand may rise for a number of reasons: Steep declines in the value of other assets such as equities and high volatility of asset prices, lead to demand for a more stable store of value uncorrelated with other assets. Fear of the security of other assets such as bonds due to the possibility of default, and even fears of cash if the health of the banking system is in question. Therefore, investors prefer gold as investment asset at the time of financial uncertainty in the economy.

v) Demand and Supply Scenario of Gold

The total gold demand in 2010 reached a 10 year high of 3,812.2 tonnes as a result of strong growth in jewellery demand and a paradigm shift in the official sector, where central banks became net purchasers of gold for the first time in 21 years. China was the world’s largest gold producer with 340.88 tonnes in 2010, followed by the United States and South Africa. In 2010, India was the world’s largest gold consumer with an annual demand of 953 tonnes. The total supply of gold coming into the market in 2010 reached 4,108 tons, a rise of 2% from 2009 levels. India is the largest market for gold jewellery in the world. 2010 was a record year for Indian jewellery demand at 745.7 tonnes, annual demand was 13% above the
previous peak in 1998. In local currency terms, Indian jewellery demand was more than double in 2010. A 20% rise in the rupee price of gold combined with a 69% rise in the volume of demand, pushed up the value of gold demand by 101% to `1,342 billion. It can be compared with 2009 demand of `669 billion. The rising price of gold particularly in the latter half of 2010, created a ‘virtuous circle’ of higher price expectations among Indian consumers, which fuelled purchases, thereby further driving up local prices (Source: GFMs Ltd. WGC).

2.11.2 Silver

Silver is a metallic chemical element whose chemical symbol is Ag. It has unique properties such as its strength, malleability, ductility, electrical and thermal conductivity, sensitivity, high reflectance of light, and reactivity. Many well known uses of silver are precious metal properties, including currency, decorative items and mirrors. It has also long been used to confer high monetary value as objects such as silver coins and investment bar. Industrial uses, photography, and jewellary account almost 77% of annual silver consumption. These are the major applications of silver which increase its demand.

A) Demand and Supply of Silver

The demand for silver in India approximates 2500 tonnes per year, whereas the country’s production was around 206.95 tonnes in 2010. Nearly 60% of Indian demand comes from farmers, who store their saving in silver bangles and coins. Silverware achieve an increase of 4.6%, owing to stock related gains in India. Demand for coins and metals surged yet higher from 2008, rising by 20.70% to reach a new high of 2447 tonnes on the back of heavy investment demand. In 2009, implied net investment soared to 4258 tonnes buoyed by safe havens concerns, which led to strong inflows into ETFs and physical investment.
Scrap supply continued to decrease in 2009 by almost 6 percent, despite a strong recovery in prices over the year. Most notable increases were seen in Bolivia and Argentina with by largest single decline coming from Australia. Net government sales fell by just over one half to 426 tonnes in 2009, primarily driven by lowest stock sales from Russia, coupled with the continued absence of any disposal from China and India. World silver mine production grew by almost 4 percent in 2008. Higher mine output from primary silver and gold sectors drove the increase. Peru was the world’s largest silver producing country in 2009, followed by Mexico, China, Australia, and Bolivia. Global primary silver supply recorded a percent increase to account for 30 percent of total mine production in 2009.

2.11.3 Copper

Copper is a chemical element whose symbol is Cu. It is a ductile metal with very high thermal and electrical conductivity. Pure copper is soft and malleable; a freshly exposed surface having a reddish orange colour. Copper is the best metal conductor of electricity. The metal's exceptional strength, ductility, and resistance to creeping and corrosion, makes it the preferred and safest conductor for building wiring. Copper is also used in power cables, either insulated or non-insulated, for high, medium, and low voltage applications. Copper is an essential component of energy efficient motors and transformers and automobiles.

i) Demand and Supply Scenario of Copper

Copper mine production was up nearly 2 percent from 15.805 million metric tonnes (MT) in 2009 to 16.099 million MT in 2010. Global refined copper production was 19.186 million MT in 2010, up from 18.653 million MT in 2009, and global refined copper consumption was
19,200 million MT, compared with 18.243 million MT in the previous year. While Chile accounts for 34 percent of the total world copper mine production, Peru, the USA, China, Australia and Indonesia, together are responsible for around 32 percent.

India’s production of refined copper is approximately around 4 percent of the total world production and in terms of figures it is around 600,000 MT. Consumption of refined copper per annum is around 535,000 MT, which accounts for only 3 percent of the world copper market. Sterilite Industries, Hindalco, and Hindustan copper are three major producers of copper in India. India is emerging as net exporter of copper from the status of net importer on account of rise in production by these three companies. Copper goes into various usage such as building, cabling for power and telecommunications, automobiles etc. Two major state owned telecommunications service providers; BSNL and MTNL consume 10 percent of country's copper production24. Growth in the building construction and automobile sector would keep demand of copper high.

2.11.4 Crude oil

Crude oil is a mixture of molecules formed by carbon and hydrogen atoms. There are different types of crude oil existing on the earth. Heavy crude oil is very thick and viscous and is difficult to produce, whereas light crude oil is very fluid and much easier to exploit. Crude oil is therefore compared and described by density, the most commonly used scale is °API (American Petroleum Institute, the association based in Washington, DC that standardizes the industry’s equipment and procedures), which is inversely, linked to specific gravity.

24 Data Source: Multi Commodity Exchange
Crude oil is also classified as sweet and sour on the basis of their sulfur content. By definitions, sweet crude oil has less than 1 percent sulfur by weight. The adjective sour refers to other, less desirable grades. Sulfur in hydrocarbons is burden: when it is burnt, it forms sulfur dioxide, a gas that pollutes the air and contributes to acid rain. By definition, a benchmark is a standard crude oil against which other grades are compared and prices are set. There are three major benchmarks in the world of international trading today as follows:

a. West Texas Intermediate, or WTI, in the US (38-40°API and 0.3% S) and, to a lesser extent, West Texas Sour (33° API and 1.6%S).

b. Brent blend, the reference crude oil for the North Sea, which is very similar to WTI in quality: 38°API and 0.3%S.

c. Dubai, the benchmark crude oil for the Middle East and Far East (32°API and 2%S), which comes from off-shore local fields: Fateh, SW Fateh, Falah and Rashid.

A) Factors Influencing Price of Crude Oil

i) Crude Oil and OPEC

Crude oil production by the Organization of Petroleum Exporting Countries (OPEC) is an important supply side factor that affects crude oil prices. This organization seeks to produce oil actively in its member countries by setting a production target. Historically, crude oil prices had been increasing in time when OPEC production targets were reduced and vice versa. OPEC member countries produce about 40 percent of the world’s crude oil and OPEC’s oil exports represent about 60 percent of the total petroleum traded internationally. Therefore, OPEC’s actions (production as well as exports) influence crude oil prices.
ii) **Crude Oil and Non-OPEC**

Another supply side factor is non-OPEC production which is a determinant of crude oil price. Share of oil production from countries outside the Organization of the Petroleum Exporting Countries (OPEC) currently is around 60 percent of world oil production. Non-OPEC producers make independent decisions about oil production as its production is mostly in the hands of national oil companies (NOCs), international or investor-owned oil companies (IOCs) do most of the production activities in non-OPEC countries. IOCs seek primarily to increase shareholder value and make investment decisions based on economic factors. While some NOCs operate in a similar manner as IOCs, many have additional objectives such as providing employment, infrastructure, or revenue that impact their country in a broader sense. As a result, non-OPEC investment, and thus future supply capability, tends to respond more readily to changes strictly in market conditions.

iii) **Crude Oil and Inventories**

Inventories act as the balancing point between supply and demand. During periods when production exceeds consumption, crude oil and petroleum products can be stored for unexpected future use. In the economic downturn of late 2008 and early 2009, for example, the unexpected drop in world demand led to record crude oil inventories in the United States and other OECD countries. In contrast, when consumption outstrips current production, supplies can be supplemented by draws on inventories to satisfy the needs of consumers. Given the uncertainty of supply and demand, petroleum inventories are often seen as a precautionary measure.
Refineries and storage terminals can store crude oil and/or finished products like motor gasoline, heating oil, and diesel to stay prepared for seasonal fluctuations, refinery maintenance, or unexpected weather. Some petroleum products, such as heating oil and gasoline, have pronounced seasonal demand variance; inventories rise when consumption is low and are drawn down when consumption increases. For this reason, inventory levels are most usefully assessed in relation to prior year levels for the same calendar quarter. Therefore, inventories also major fact that affects price of the crude oil.

iv)  **Crude oil and Futures Market**

Market participants not only buy and sell physical quantities of oil, but also trade contracts for the future delivery of oil and other energy derivatives. One of the roles of futures markets is price discovery, and as such, these markets play a role in influencing oil prices. Oil market trading activity involves a range of participants with varying motivations, even within individual participants. Some, such as oil producers and airlines, have a significant commercial exposure to changes in the price of oil and petroleum-based fuels, and may seek to hedge their risk by buying and selling energy derivatives. For example, an airline may want to buy futures or options in order to avoid the possibility that its future fuel costs will rise above a certain level, while an oil producer may want to sell futures in order to lock in a price for its future output.
v) **Crude Oil and Non-OECD**

The Organization of Economic Cooperation and Development (OECD) consists of the United States, much of Europe, and other advanced countries. At 53 percent of world oil consumption in 2010, these large economies consumed more oil than the non-OECD countries, but had much lower oil consumption growth. Oil consumption in the OECD countries actually declined in the decade between 2000 and 2010, whereas non-OECD consumption rose 40 percent during the same period.

Structural conditions in every country's economy influence the relationships among oil prices, economic growth, and oil consumption. Developed countries tend to have higher vehicle ownership of per capita. Because of this, oil use within the OECD transportation sector usually accounts for a larger share of total oil consumption than that of non-OECD countries. Economic conditions and policies that affect the transport of goods and people thus have a significant impact on the total oil consumption in OECD countries. Many OECD countries have higher fuel taxes and policies to improve the fuel economy of new vehicles and increase the use of bio-fuels. This tends to slow down the growth in oil consumption even in times of strong economic growth. Furthermore, the economies in OECD countries tend to have larger service sectors related to manufacturing. As a result, strong economic growth in these countries may not have the same impact on oil consumption as it would have in non-OECD countries.
vi) Demand and Supply Scenario of Crude Oil

India ranks among the top 10 largest oil-consuming countries. Oil accounts for about 30 percent of India’s total energy consumption. The country's total oil consumption is about 2.2 million barrels per day. India imports about 70 percent of its total oil consumption and it does not export. India faces a large supply deficit as domestic oil production is unlikely to keep pace with the demand. India’s rough production was only 0.8 million barrels per day. The oil reserves of the country are located primarily in Mumbai High, Upper Assam, Cambay, Krishna-Godavari and Cauvery basins. Balance recoverable reserve was about 733 million tons in 2003 of which offshore was 394 million tons and on shore was 339 million tonnes. 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.

2.11.5 Natural Gas

Natural gas is a colourless, odourless, environment friendly energy source. It mainly consists of methane which occurs naturally in the earth’s crust. It is often found in association with crude oil. It is naturally occurring hydrocarbon gas mixture consisting primarily of methane with up to 20% of other hydrocarbon as well as impurities in varying among such as carbon dioxide. Natural gas is widely used as an important energy source in many applications including heating building, generating electricity, providing heat and power to industry, as fuel for vehicles and as chemical feed stock in manufacture of products such as plastics and other commercial important organic chemicals.
A) Demand and Supply of Natural gas

The proven natural gas reserves of the world as on January 1, 2009 are estimated at 185.2 trillion cubic meter, of which almost three-quarters is located in the Middle East and Eurasia. Russia, Iran, and Qatar together account for about 57 percent of the total reserves. Natural gas consumption has increased largely over the past decade. The total global production of natural gas in 2008 is estimated to be 3065.6 billion cubic meter (bcm) with the main producing countries being Russia Federation with 602 bcm, US with 582 bcm, Canada with 175 bcm and Iran with 116 bcm. The total global consumption of natural gas in 2008 is estimated to be 3018.7 billion cubic meter with the main consuming countries being US with 657 bcm, Russia Federation with 420 bcm, Iran with 117 bcm, Canada with 100 bcm. The total global trade in 2008 as piped natural gas and as LNG is reported to be 587.3 bcm and 226.5 bcm. While major exporters of piped natural gas are Russia with 154 bcm, Canada with 103 bcm and Norway with 93 bcm, the major importers are US with 104 bcm, Germany with 87 bcm and Italy with 75 bcm. The major exporters of CNG are Qatar with 40 bcm, Malaysia with 29 bcm, Indonesia with 27 bcm and the major importers are Japan with 92 bcm, South Korea with 36 bcm and Spain with 30 bcm (Source: MCX).

Natural gas has gained prominence in India too as in the rest of the world over the last decade. India has consumed around 41.4 bcm of natural gas in 2008, out of which domestic production is 30.6 bcm and imports as LNG has been 10.79 bcm. The share of imports is expected to increase in the coming years and cross 30 percent from current level of around 25 percent. Fertilizer (41 percent) and power (37 percent) are the major users of natural gas in
India\textsuperscript{25}. The fertilizer sector in India is highly subsidized by the Government and it fixes the rate at which natural gas is provided to the fertilizer manufacturing units.

\section*{2.12 Conclusion}

For the efficient function of futures market, least regulation is desirable so that market fundamentals can play major role in hedging risk and price discovery. Least regulation encourages market participants to process information quickly and therefore, it reflects in the prices of the commodities. However, policy makers in India have been regulating futures market in such a manner that fundamentals have least role to play in hedging risk and price discovery. Options, (it is a right but not an obligation to buy and sell an asset with specified price and date) on the other hand, should be allowed into the commodity futures market as Indian futures market is mature enough to handle options trading. Small and marginal producers are unable to participate in the futures market due lack of information, large contract size and complexity in the market functions. Therefore, regulators as well as exchanges should arrange awareness programme so that small and marginal producers can be part of futures market.

\begin{footnotesize}
\textsuperscript{25} Data Source: Multi Commodity Exchange
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