CHAPTER 1

INTRODUCTION

1.1 Overview

“I have never, ever been in the futures market myself; I don’t have the skill for it.” Philip Johnson- quoted in the wall street journal April 29 1983.

The primary objective of an investor is to maximise returns and minimise risks. Derivatives are contracts that originated from the need to minimise risk. A derivative transaction is a bilateral contract whose value derives, as the name implies, from the value of an underlying asset, reference rate, or index. Derivatives are financial instruments that do not represent ownership rights in any asset but, rather, derive their value from the value of some other underlying commodity or other asset.

Derivatives are relative newcomer to financial markets compared with stocks and shares. Derivatives are useful for hedging the risks normally associated with business and finance. They are products or contracts which do not have any value on its own, that is, they derive its value from some underlyings.

Derivatives are financial contracts designed to create pure price exposure to an underlying commodity asset, rate, index or event. In general they do not involve the exchange or transfer of principal or title. Rather their purpose is to capture in the form of price changes, some underlying price change or event. The term derivative refers to how the price of these contracts is derived from the price of some underlying security or commodity or from some index, interest rate or exchange rate.¹

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¹ Financial policy forum, (2002),
1.2 Definition

A derivative can be defined as a financial instrument whose value depends on (or derives from) the values of other, more basic underlying variables. Very often the variables underlying derivatives are the prices of traded assets. A stock option, for example, is a derivative whose value is dependent on the price of a stock.  

Accounting standard SFAS 133 defines a derivatives thus: A derivative instrument is a financial instrument or other contract with all three of the following characteristics.

a) It has one or more underlings, and one or more notional amounts or payment provisions or both. Those terms determine the amount of the settlement or settlements, and in some cases, whether or not a settlement is required.

b) It requires no initial net investment or an initial net investment that is smaller than would be required for other types of contracts that would be expected to have a similar response to changes in market factors.

c) Derivative instruments require or permit net settlement, it can readily be settled net by a means outside the contract, or it provides for delivery of an asset that puts the recipient in a position not substantially different from net settlement.  

1.3 Evolution of Derivatives

Derivatives are definitely not a modern invention. They were known and were used from ancient times. Bernstein (1992) attributes the first option transaction to the Greek Philosopher Thales from Miletus who was adept at forecasting the harvest of olives in the ensuing season. He predicted an outstanding next autumn and so also the demand for the olive presses. Therefore, he entered into agreements with olive press owners before autumn for the exclusive use of their

2 Hull (2005),
3 http://www.bionomicfuel.com/all-you-need-to-know-about-commodity-derivatives/
presses. For this he paid the deposits in advance with an agreement that he will not demand his money if the harvest is not good. When the harvest time came, there was plenty of demand for the presses and since he had the rights to use them, he hired them out at high prices and made big money. Though Thales was not interested in making money, all he wanted to prove was that philosophers can make money if they so desire. This is a primitive form of derivative where Thales knew well in advance that his maximum losses will be the advance he paid while his profits depended on what he demanded.

Most futures markets had evolved from the basic commodity markets and agricultural futures were the foremost contacts that made their appearance long before financial futures. Agricultural futures are not unfamiliar contracts - in most parts of the world money lenders used to compel most of their borrowers to sell their forthcoming crop at a price agreed upon at the time of taking the loan. That way these agreements are futures but their prices are not determined at arm’s length distance nor are the contracts liquid enough. Still they represent the forerunners to the relatively organised futures that evolved subsequently in the 18th century in the United States, though there are reports of futures trading on Amsterdam bourse after its creation in 1611.

The futures industry got a shot in the arm with the establishment of the Chicago Board of Trade in 1848. The Butter and Cheese exchange of New York was founded in 1872; today’s New York Mercantile Exchange (NYMEX) in 1877; London Metal Exchange, Chicago Mercantile Exchange (CME) was founded in 1898 and later it became CME in 1919. But the real action in financial derivatives started with the commencement of trading futures on foreign currency in 1972 at Chicago Mercantile Exchange. With the publication of the Black-Scholes Option Pricing Model in 1973, trading of options became a reality. In 1975, American Stock Exchange (AMEX) and Philadelphia Stock Exchange began trading in options. Quickly interest rate futures in 1976 and stock index futures in 1982 began trading in USA and other western markets

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4 Kumar (2007).
1.4 Types of Derivatives

There are many ways in which the derivatives can be categorised such as, based on the markets where they trade, and based on the underlying assets. The important types are; (1) Forwards (2) futures (3) options and (4) swaps.

1.4.1 Forward

Forward contract is an agreement between a buyer and a seller in which the buyer has the right and obligation to buy a specified asset on a specified date and at a specified price. The seller is also under an obligation to perform as per the terms of the contract. The party buying at the future date is said to be taking a long position and the counter party who will deliver at the future date is said to be taking a short position. The underlying asset can be just anything, namely, a stock a commodity or a bond. Forward contracts are tailor-made to meet the requirements of both the parties. This gives flexibility to the amount and delivery dates. A forward contract is traded in the over – the counter market usually between two financial institutions or between a financial institution and one of its clients. Forward agreement exposes the counter parties the risk of default- the failure by the other party to deliver on the agreement. The risk grows in proportion to the extent to which the spot price diverges from the forward price as the incentive to refuse increases.

1.4.1.1 Delivery Price

The specified price in a forward contract is referred to as the delivery price. At the time when the contract is entered into, this is chosen so that the value of the contract to both parties is zero. The delivery price is determined by supply and demand considerations.

1.4.1.2 Forward Price

The forward price of a contract is the delivery price that would apply if the contract was negotiated on the same day. That is, the forward price and the delivery price are by definition equal at the time the contract is entered into. However, as time passes, the forward price is liable to change while the delivery
price remains the same. Generally, the forward price at any given time varies with the maturity of the contract being considered.

1.4.1.3 Features of Forward Contracts
1. Forward contracts are private arrangements between two parties. They contain terms and conditions applicable to the contracting parties. So they are not generalised or standardised.
2. There is generally a single delivery date in a forward contact. The delivery and payments are to be made on the stipulated date.
3. A forward contract is not usually settled until the end of its life, and most contracts do in fact lead to the delivery of the underlying assets or a cash settlement at this time.
4. The forward contracts are not traded in organised exchange as they are not standardised.

1.4.1.4 Type of Forward Contracts
On the basis of the underlying assets, forwards are of different types, such as commodity forwards, foreign exchange forwards and equity forwards.

1.4.1.4.1 Commodity forwards
These are the traditional forward contracts. In the case of commodity forwards, the producer/farmer agrees to sell a certain quantity of a commodity to the manufacturer/dealer at a given price, the delivery and payment take place on a future date. It provides a guaranteed market for the seller in view of the risk of low demand or low price. Similarly the buyer is relieved from the risk of low supply or increase in price. However, both the parties are subjected to the risk of adverse price change. That is, if the price increases the seller could not take the advantages as he has to sell the commodity at the agreed price. Likewise, if the price decreases, the buyer could not take the advantage of it he has to pay the agreed price. Commodity forwards are popular in spices, petroleum, cotton, ores, minerals etc.
1.4.1.4.2 Forward Contracts on Foreign Exchange

The foreign exchange rates vary frequently. In order to be protected from the risk of adverse exchange rate variations the exporters and importers enter into forward contracts with foreign exchange dealers. The rates at which these contracts are entered into are called forward exchange rates. The forward exchange rates are frequently quoted alongside the spot rates. There may be separate forward rates for buying and selling or for exporters and importers. The difference between the forward rate and spot rate is called the forward premium. Normally the foreign exchange rates are quoted in relation to US Dollars.

1.4.1.4.3 Equity Forwards

As in the case of commodity forwards forward contracts can be made in the case of equity shares also with the exception that delivery will not be insisted. Such a transaction is called settlement transaction. Under this system shares could be purchased without the requisite money or they could be sold without actually possessing them.

1.4.2 Futures

*Futures* contract is an agreement between two parties to buy or sell an asset at a certain time in the future for a certain price. *Futures* contracts represent obligations on the part of the buyer and seller but the terms and conditions of the contract are specified by the exchange where they actually trade. To make trading possible the exchange specifies certain standardised features of the contract. As the two parties to the contract do not necessarily know each other, the exchange also provides a mechanism that gives the two parties a guarantee that the contract will be honored.

1.4.2.1 Features of *Futures* Contracts

The main features of *futures* contracts are as follows:

1. *Futures* contracts are traded on organised exchanges.
2. *Futures* contracts have standardized contract terms
3. Futures exchanges are associated with clearing houses to guarantee fulfillment of obligations.

4. Futures positions can be closed easily

5. Futures trading require margin payment.

1.4.2.2 Organised Exchange

Futures are traded only on organised exchanges. In the USA there are more than 10 organised exchanges, which deal in futures contracts, the Chicago Board of Trade being the oldest one. There are over 90 such exchanges all over the world.\(^5\) The importance of having an organised exchange is that they provide a central trading place in the absence of which there will not be enough potential to generate the depth of trading activity necessary to support a secondary market. In a circular way the existence of a secondary market encourages more traders to enter the market and in turn provide additional liquidity.

An organised exchange also encourages confidence in the futures market by allowing the effective regulation of trading. Thus, organised exchanges ensure liquidity generated by a central trading place, effective regulation, and the flow of information which necessary for the development of any market.

1.4.2.3 Standardisation in Futures

Each futures contract has a standard set of specifications:

1. **Underlying asset**- It represents the commodity, currency, financial instrument, or index upon which it is based.

2. **Size**- The amount of the underlying commodity which is represented by the contract. For instance, 1 corn futures represents 5,000 bushels, while 1 crude oil futures usually represents 1,000 barrels.

3. **Price Fluctuation**- This is the maximum and minimum fluctuations that the contract can take. To prevent massive volatility many futures contracts are limited to the amount by which their price can fluctuate in

one trading day, if the price reaches the upper or lower limit then the contract will be halted until the next trading day.

4. **Trading Months** - This is the specified months for which the particular *futures* contract can be traded.

5. **Expiration Date** - The date by which the *futures* trading month ceases to exist at which all obligations are terminated.

6. **Deliverable Grade** - The quality of commodity that is to be delivered.

7. **Delivery Location** - Where the physical commodity is to be delivered.

8. **Settlement Mechanism** - The terms of the physical delivery of the underlying item or of the cash payment.

### 1.4.3 Options

Options are a form of forward contacts wherein the buyer will have a right but not an obligation, and on the expiry of the contract he will decide whether or not to exercise his right. Options are traded both on exchange and in the over-the-counter market.

There are two basic types of options namely call option and put options. A call option gives the holder the right to buy the underlying asset by a certain date for a certain price. A put option gives the holder the right to sell the underlying asset by a certain date for a certain price. The price in the contract is known as the exercise price or strike price, the date in the contract is known as the expiration date or maturity. It should be emphasised that an option gives the holder the right to do something. The holder does not have to exercise this right. This distinguishes option from forwards and *futures*, where the holder is obligated to buy or sell the underlying asset.

#### 1.4.3.1 Types of options

Options are classified on the basis of nature, settlement, position, and underlying asset.
a) **On the basis of nature**, options are basically of two types, namely, call option and put option.

b) **On the basis of settlement.** Options are of two types, namely, American option and European option.

c) **On the basis of profit.** Options are of three types, namely in-the-money options, at- the-money and out-of the money options.

d) **On the basis of underlying asset.** Options are classified into stock options, index options, currency options, interest rate options and *futures* options.

e) **Exotic options**- Which include Asian options, barrier options, look back options, currency translated options, and binary options.

i. **Call Option**

A call option gives the holder (buyer or the one who is long call) the right to buy a specified quantity of the underlying asset at the strike price on or before the expiration date. The seller (the writer or the one who is short call) however, has the obligation to sell the underlying asset if the buyer of the call option decides to exercise his option to buy. In general, a call option will always be exercised at the expiration date if the market price of the underlying assets is above the strike price.

ii. **Put Option**

A put option gives the holder (buyer or the one who is long put) the right to sell specified quantity of the underlying assets at the strike price on or before the expiration date. He may or may not exercise the right. The seller or the writer of the put option has the obligation to buy the underlying asset at the strike price if the buyer decides to exercise his option to sell. A put option will be exercised only if the exercise price is greater than the current market price of the underlying asset.
iii. **American Option and European Option**

An American Option is the one which can be exercised by the holder on or before the expiration date, that is, any time between the date of purchase of the option and the date of its expiry.

A European option on the other hand is one which can be exercised by the holder only on the expiration date and not any time before that.

iv. **In the money, At the money and Out of the money**

a) **At the Money**

When the current market price of the underlying asset is equal to the exercise price of the option, the option is said to be at the money or near the money. This is true for both call and put options. In this case the option holder gets nothing on exercising the option and he loses nothing on not exercising the option. So he is indifferent to exercise his option as he gets nothing in either case.

b) **In the Money**

When the exercise of an option would produce a positive return to the holder, the option is said to be in the money. In the case of a call option when the current market price of the underlying asset is higher than the strike price, the option is said to be in the money. In the case of put options, when the current market price is less than the strike price, the holder can gain by exercising the option and the option is said to be in the money.

c) **Out of the Money**

When the exercise of an option is unprofitable to the option holder, the option is said to be out of the money. In the case of a call option when the strike price is higher than the current market price of the underlying asset, the option is said to be out of the money. That is, in the case of put options, when the exercise price is less than the market price of the underlying asset the option is said to be out of the money.

In summary, it can be stated that if it were exercised immediately, an in the money option would lead to a positive cash flow, an at the money option would
lead to zero cash flow, and an out-of-the-money option would lead to a negative cash flow to the holder.

If $S$ is the spot price of the underlying asset and $X$ is the exercise price:

A call option is

- **In the money** when $S > X$
- **Out of the money** when $S < X$
- **At the money** when $S = X$

A put option is

- **In the money** when $S < X$
- **Out of the money** when $S > X$
- **At the money** when $S = X$

**1.4.3.2 Long positions and Short position**

Every option has at least two parties. On the one side is the investor who has taken the long position (who has bought the right) and on the other side who has taken the short position (who has sold or written the right). This is applicable for both call and put options. Thus there are four basic positions. They are:

a) A long call- bought a call option

b) A long put- bought a put option
c) A short call- Sold or written a call option
d) A short put- sold or written a put option

**1.4.3.3 Type of Underlying Asset**

On the basis of underlying asset, options are classified into stock options, index options, currency options, interest rate options, and options on futures.

1) **Stock Options**

Stock options are the most popular type of options. A stock option is a contract which gives the holder the right to buy or sell a specified number of shares at a specified price without having the obligation to perform. These options are traded in organised exchanges, stock options are used for hedging speculation and arbitrage purposes. In India trading in stock options began in July 2001 on NSE’s F&O segment.
2) **Index Options**

An index option is a call or put based on a stock market index such as S & P 500, Nasdaq 100, Nifty etc. Index options are traded on several broad based indexes as well as on several industry-specific indexes and even commodity price indexes. In contrast to stock options, index options do not require that the call writer actually “deliver the index” upon exercise or that the put writer “purchases the index”. Instead a cash settlement procedure is used. The payoff that would accrue upon exercise of the option is calculated, and the option writer simply pays that amount to the option holder. The payoff is equal to the difference between the exercise price of the option and the value of the index.

3) **Futures Options**

*Futures* options give their holders the right to buy or sell a specified *futures* contract, using as a *futures* price the exercise price of the option. The option holder receives upon exercise a net payoff equal to the difference between the current *futures* price on the specified asset and the exercise price of the option.

4) **Foreign Currency Options**

A currency option offers the right to buy or sell a quantity of foreign currency for a specified amount of domestic currency. Currency option contracts call for purchase or sale of the currency in exchange for specified number of US Dollars.

5) **Interest Rate Options**

An interest rate option is a financial contract which derives its value from interest rates. This includes two types of contracts namely calls and puts. A call buyer believes that there will be a rise in interest rates and put buyer anticipates that the interest rates will decrease. This type of option helps the holder to hedge against the interest rate risks in securities.

6) **Exotic Options**

Options markets have been tremendously successful. There is considerable innovation in the range of option instruments available to investors. Many of these options have very special and customised terms. Those options which have
uncommon, specific and customized terms are known as exotic options. The popular such options are as follows:-

a. **Asian Options**

Asian options are options with payoffs that depend on the average price of the underlying asset during at least some portion of the life of the option.

b. **Barrier Options**

Barrier options have payoffs that depend not only on some asset price at option expiration, but also on whether the underlying asset price has crossed through some “barrier”. For example a down- and-in option will not provide a payoff unless the underlying asset price does fall below some barrier at least once during the life of the option.

c. **Look back Options**

Look back options have payoff that depend in part on the minimum or maximum price of the underlying asset during the life of the option. For example, a lookback call option might provide a payoff equal to the maximum stock price during the life of the option minus the exercise price instead the final price minus the exercise price.

d. **Currency translated Options**

Currency translated options have either asset price or exercise price denominated in a foreign currency.

e. **Binary Options**

Binary or “bet” options have fixed payoffs that depend on whether a condition is satisfied by the price of the underlying asset. For example, a binary call option might pay off a fixed amount of Rs. 100 if the underlying asset price at maturity exceeds the exercise price.

**1.4.4 Swaps**

Swaps are financial structures that allow the counterparties to exchange the obligations. A swap is a contract between two parties to deliver one sum of
money against another sum of money at periodic intervals. The most basic form of a swap is an interest rate swap, which is relatively uncomplicated concept—two parties agree to exchange interest payments for a certain period of time.\(^6\)

### 1.4.4.1 Types of Swaps

There are five types of swaps, namely, (1) Interest Rate swaps, (2) Currency Swaps, (3) Commodity Swaps (4) Equity Swaps and (5) Credit Default Swaps.

1) **Interest Rate Swaps**

The most common type of swap is a “Plain Vanilla” interest rate swap. It is the exchange of a fixed rate loan to a floating rate loan. The life of the swap can range from 2 years to over 15 years. The reason for this exchange is to take benefit from comparative advantage. Some companies may have comparative advantage in fixed rate markets while other companies have a comparative advantage in floating rate markets. When companies want to borrow they look for cheap borrowing from the market where they have comparative advantage. However this may lead to a company borrowing fixed when it wants floating or borrowing floating when it wants fixed. This is where a swap comes in. A swap has the effect of transforming a fixed rate loan into a floating rate loan or vice versa.

2) **Currency Swaps**

Currency swaps may be used where a borrower can get a better rate in one currency, but where the borrowing is linked to assets or cash flows in another and therefore a currency rate risk can be eliminated by borrowing in the latter currency. A company in this position can do is to borrow in the currency in which they get the better rate (often the company’s home country), and then enter into an agreement with another party (usually a bank), in which the counterparty pays the original debt in exchange for a stream of (fixed) payments in the other currency.

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\(^6\) Hull (2005).
3) **Commodity Swaps**

This is a swap where payments are based on the prices of commodities. One party pays a fixed price for the good over life of the swap while the other pays a floating price for the good, depending on current market prices.

4) **Equity Swaps**

With an equity swap, payments are made based on a notional principal which is an equity portfolio. The payments are fixed and floating. The floating rate sum is based on the return on the relevant index for the period while the fixed rate sum is agreed in advance.

5) **Credit Default Swap**

A credit default swap (CDS) is a swap contract in which the buyer of the CDS makes a series of payments to the seller and, in exchange, receives a payoff if a credit instrument typically a bond or loan – goes into default (fails to pay). Less commonly, the credit event that triggers the payoff can be a company undergoing restructuring, bankruptcy or even just having its credit rating downgraded CDS contracts have been compared with insurance, because the buyer pays a premium and, in return, receives a sum of money if one of the events specified in the contract occur. Unlike an actual insurance contract the buyer is allowed to profit from the contract and may also cover an asset to which the buyer has no direct exposure.

6) **Other Variations**

There are myriad different variations on the vanilla swap structure, which are limited only by the imagination of financial engineers and the desire of corporate treasurers and fund managers for exotic structures.

i. **A total return swap** is a swap in which party A pays the total return of an asset, and party B makes periodic interest payments. The total return is the capital gain or loss, plus any interest or dividend payments. Note that if the total return is negative, then party A receives this amount from party B. The parties have exposure to the return of the underlying stock or
index, without having to hold the underlying assets. The profit or loss of party B is the same for him as actually owning the underlying asset.

ii. An option on a swap is called a swaption. This provides one party with the right but not the obligation at a future time to enter into a swap.

iii. A variance swap is an over-the-counter instrument that allows one to speculate on or hedge risks associated with the magnitude of movement, a CMS, is a swap that allows the purchaser to fix the duration of received flows on a swap.

iv. An amortising swap is usually an interest rate swap in which the notional principal for the interest payments declines during the life of the swap, perhaps at a rate tied to the prepayment of a mortgage or to an interest rate benchmark such as the LIBOR.

1.5 Purpose of Derivatives

There are two main social functions of derivatives markets-price discovery and hedging.

1.5.1 Price Discovery

Price Discovery is the revealing of information about future cash market prices through the futures market. In buying or selling a futures contract, a trader agrees to receive or deliver a given commodity at a certain time in the future for a price that is determined now. In such a circumstance, it is not surprising that there is a relationship between the futures price and the price that people expect to prevail for the commodity at the delivery date specified by the futures contract. By using the information contained in futures price today, market observers can form estimates of what the price of a given commodity will be at a certain time in the future. The forecasts of future prices that can be drawn from the futures market compare in accuracy quite favourably with other types of forecasts. Futures markets serve a social purpose by helping people make better estimates of futures
prices, so that they can make their consumption and investment decision more wisely\(^7\).

1.5.2 Hedging

The main objective of commodity *futures* market is the hedging. Hedging is the process of minimising or eliminating the risk of a commodity due to adverse price changes. The prices of commodities, shares and currencies are highly fluctuating because of many unforeseen events. *Futures* are one of the measures to reduce risk. The hedging process can be implemented by holding simultaneously an offset position in *futures* market while dealing in spot market. Thus the impact of fluctuation in the price movements in the spot market can be managed by the counter action in the *futures* market.

1.6 Participants in the Derivatives Market.

Derivatives have a wide range of applications in business as well as in finance. There are four main participants in the derivative market; dealers, hedgers, speculations and arbitrageurs. The same individuals and organisations may play different roles in different market circumstances. There are also large numbers of individuals and organisations supporting the market in various ways.

1.6.1 Dealers

Derivative contracts are bought and sold by dealers who work for major banks and securities houses. Some contracts are traded on exchanges; others are over the counter transactions. In a large investment bank the derivatives operation is now a highly specialised affair. Marketing and sales staff speak to clients about their requirements. Experts help to assemble solutions to those problems using combinations of forwards, swaps and options. Meantime, risk managers keep an eye on the overall level of risk the bank is running and mathematicians - known as ‘quants’ devise the tools required to price new products.

\(^7\) Kolb(1996)
1.6.2 Hedgers

Corporations, investing institutions, banks and Government use derivative products to hedge or reduce their exposures to market variables such as interest rates, share values, bond prices, currency exchange rates and commodity prices. The classic example is the farmer who sells futures contracts to lock into a price for delivering a crop on a future date. The buyer might be a food-processing company which wishes to fix a price for taking delivery of the crop in the future, or a speculator. Another typical case is that of a company due to receive a payment in a foreign currency on a future date. It enters into a forward transaction with a bank agreeing to sell the foreign currency and receive a predetermined quantity of domestic currency, or it buys an option which gives it the right but not the obligation to sell the foreign currency at a set exchange rate.

1.6.3 Speculators

Derivatives are very well suited to speculating on the price of commodities and financial assets, and on key market variables such as interest rates, stock market indices and currency exchange rates. Generally speaking, it is much less expensive to create a speculative position using derivatives than by actually trading the underlying commodity or asset. As a result, the potential returns are that much greater. A classic application is the trader who believes that increasing demand or reduced production is likely to boost the market price of a commodity. As it would be too expensive to buy and store the physical commodity the trader buys an exchange traded futures contract agreeing to take a delivery on a future date at a fixed price. If the commodity price increases, the value of the contract will also rise and can then be sold back into the market at a profit.

1.6.4 Arbitrageurs

An arbitrageur is a dealer that produces risk-free profits by exploiting a mispricing in the market. A simple example occurs when a trader can purchase an asset cheaply in one location and simultaneously arrange to sell it in another at a higher price. Such opportunities are unlikely to persist for very long, since arbitrageurs would rush into buy the asset in the cheap location, thus closing the
pricing gap. In the derivatives business arbitrage opportunities typically arise because a product can be assembled in different ways out of different building blocks. If it is possible to sell a product for more than its cost, then a risk free profit can be generated. In practice the presence of transaction costs often means that only the larger market players can benefit from such opportunities.

There are, in addition, many individuals and organisations who support the derivatives market and help to ensure orderly and efficient dealings. For example, those who are not members of a futures and options exchange have to employ a broker to transact or ‘fill’ their orders on the market. A broker acts as an agent and takes an agreed fee or commission. Trading in derivatives generally overseen and monitored by government appointed regulatory organisations\(^8\).

All resident Indians, NRI’s, FIIs and mutual funds can trade in derivatives market. However, mutual funds can use derivatives only to offset potential losses from cash positions and for portfolio rebalancing purposes but they cannot speculate in derivatives markets. Another way of viewing the participants is to consider the nature of roles performed and accordingly, SEBI categorised derivatives market participants as follows:

### 1.6.5 Others

**i) Trader Member**

A trade member is the member of an exchange and one who trade on behalf of his clients.

There are two main types of traders executing trades; commission brokers and locals. Commission brokers are following the instructors of their clients and charge a commission for doing so. Locals are trading on their own account.

Individual taking positions, whether locals or the clients of commission brokers, can be categorised as hedgers, speculators of arbitrageurs. Speculators can be classified as scalpers, day traders or position traders. Scalpers are watching for very short term trends and attempt to profit from small changes in the contract

\(^8\) Chisholm( 2010) pp3-4
price. They usually hold their positions 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 for much longer periods of time. They hope to make significant profits from major movements in the markets.

ii) Clearing Member

One who undertakes to settle his own trades as well as the trades of the other non-clearing members, known as trading members, who have agreed to settle the trades through them.

iii) Self – Clearing Member

Self clearing members are those who clear and settle their own trade only. Apart from the above three on NSE, there is another category of members known as ‘professional clearing members’ who perform only clearing functions and they do not trade on their own or on behalf of their clients.

1.7 Specification of the futures Contract.

When developing a new contract, the exchange must specify in some detail the exact nature of the agreement between the two parties. In particular, it must specify the asset, the contract size, where delivery will be made, when delivery will be made, contract multiplier, lot size, tick size etc.

1.7.1 The Asset

When the asset is a commodity, there may be quite a variation in the quality of what is available in the marketplace. When the asset is specified, it is therefore important that the exchange stipulate the grade or grades of the commodity that are acceptable. The financial assets in futures contracts are generally well defined and unambiguous.

1.7.2 The Contract size

The contract size specifies the amount of the asset that has to be delivered in one contract. This is an important decision for the exchange. If the contract size is too large, many investors who wish to hedge relatively small exposures or who wish
to hedge relatively small speculative positions will be unable to use the exchange. On the other hand, if the contract size is too small, trading may be expensive as there is a cost associated with each contract traded.

The correct size for a contract clearly depends on the likely user. SEBI stipulated that the minimum contract size of the derivatives should not be below Rs.2 lakhs at the time of introducing the contract and it has been raised to Rs. 5 lakhs for equity derivatives from 8th January 2010 in the market and this is being followed on both exchanges.9

1.7.3 Settlement Price

The settlement price is the average of the prices at which the contract is traded immediately before the bell signaling the end of trading for the day. The settlement price is important, because it is used for calculating daily gains and losses and margin requirements.

At the end of each trading day, the settlement price defines the price at which outstanding contracts are marked to markets. Typically the settlement price is set equal to the closing price, a weighted average price of the trades done in the last few minutes of the day. For instance, on BSE, it is the last 15 minutes and on NSE, it will be the last 30 minutes. It is however possible that no trades have taken place in any day; then the exchange authorities may decide settlement price based on some standard pricing model. If the contract is expiring on that day, then the settlement price will be equal to the closing price of the security in the spot market.

1.7.4 Delivery Arrangements

The place where delivery will be made must be specified by the exchange. This is particularly important for commodities that involve significant transportation costs.

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1.7.5 Delivery Months

A futures contract is referred to by its delivery month. The exchange must specify the precise period during the month when delivery can be made. The delivery months vary from contract to contract and are chosen by the exchange to meet the needs of market participants. The exchange also specifies the last day on which trading can take place for a given contract. This is generally a few days before the last day on which delivery can be made.

1.7.6 Contract Multiplier

Contract multiplier is the predetermined value used to arrive at the contract size. In the context of index futures, it is the price per index point. For example, the contract multiplier for Sensex future is Rs.50. This means that each Sensex point is worth Rs.50. Contract multiplier is not constant across the exchanges and across the contracts also. Contract multipliers are fixed by the respective exchanges.

1.7.7 Lot size

Lot size refers to the number of underlying securities in one contract. The lot size is determined by considering the minimum contract size requirement at the time of introduction of derivative contracts on a specific underlying. For instance, the shares of Bharati Tele are quoted at Rs. 200 each and since the minimum contract size is Rs. 2 lakhs, the lot size for Bharati will be $2,00,000/200 = 1000$ shares, i.e., one futures contract in Bharati covers 1000 shares.

1.7.8 Tick Size

Tick size is the minimum price movement allowed. In the case of Sensex futures, the tick size is 0.05 points or Rs.2.50 (0.05× Rs.50 Per point).

1.7.9 Volume of trade

The total number of contracts that are traded on a given day is termed as volume. Since the number of contracts bought will be equal to the number of contracts sold, volume on any given day will be equal to either of the numbers, that is, and
number of bought or sold contracts. Therefore, volume measures the trading activity over a certain period of time, may be a day or a week or a month.

1.7.10 Open Interest

In the derivatives market, an open contract is any contract that is not yet exercised, closed or expired. Open Interest measures the number of such open contracts at a particular point of time, typically at the end of the trading for the day. This is also the total number of contracts outstanding. The open interest is the number of long positions or, equivalently the number of short positions.

In the derivatives market, trading volumes and open interest convey information about the liquidity of a contract. When both volumes and open interest are high for a particular contract, this can be considered as an indication that there is significant trading interest in this contract. It is risky to hold illiquid contracts or contracts that have low open interest and volumes, as there might not be buyers or sellers when you want to square up the positions. When the spot price and open interest are both increasing, it is considered as a bullish signal as new long positions are being established. On the other hand, if both the prices and open interest are decreasing, it is an indication that players are closing out their long positions. Generally at the beginning of any calendar month, volumes and open interest are very high for the nearby contract and they increase as the delivery date approaches but a week before the delivery day, volumes will start declining as traders will start liquidating their positions or rolling over in to the next contract. So liquidity will be high in the nearby contracts and will be low for the far month contracts.

1.7.11 Daily Price Movement Limits.

For most contracts, daily price movement limits are specified by the exchange. If the price moves down by an amount equal to the daily price limit, the contract is said to be limit down. If it moves up by the limit, it is said to be limit up. A limit move is a move in either direction equal to the daily price limit. Normally, trading ceases for the day once the contract is limit up or limit down. However, in some instances the exchange has the authority to step in and change the limits.
The purpose of daily price limits is to prevent large price movements from occurring because of speculative excesses. However, limits can become an artificial barrier to trading when the price of the underlying commodity is increasing or decreasing rapidly. Whether price limits are, on balance, good for futures market is controversial.

1.7.12 Position Limits

Position limits are the maximum number of contracts that a speculator may hold. Bonafide hedgers are not affected by position limits. The purpose of the limit is to prevent speculators from exercising undue influence on the market.

1.7.13 Marking to Market Margins.

When an investor has contracted to buy futures contracts for a certain price the broker will require the investor to deposit funds in a margin account. The amount that must be deposited at the time the contract is entered into is known as the initial margin. At the end of each trading day, the margin account is adjusted to reflect the investor’s gain or loss. This practice is referred to as marking to market the account.

Suppose that by the end of contract month the futures price has dropped then the investor had a loss. The balance in the margin account would therefore be reduced. Similarly, if the price of the futures contract rose by the end of the first day the balance in the margin account would be increased. A trade is first marked to market at the close of the day on which it takes place. It is then marked to market at the close of trading on each subsequent day.

Marking to market is not merely an arrangement between broker and client. When there is a decrease in the futures price so that the margin account of an investor with a long position is reduced, the investor’s broker has to pay the exchange and the exchange passes the money on to the broker of an investor with a short position. Similarly, when there is an increase in the futures price, brokers for parties with short positions pay money to the exchange and brokers for parties with long positions receive money from the exchange.
The investor is entitled to withdraw any balance in the margin account never becomes negative a maintenance margin, which is somewhat lower than the initial margin is set. If the balance in the margin account falls below the maintenance margin, the investor receives a margin call and is expected to top up the margin account to the initial margin level the next day. The extra funds deposited are known as variation margin. If the investor does not provide the variation margin, the broker closes out the position by selling the contract.

Many brokers allow an investor to earn interest on the balance in a margin account. The balance in the account does not therefore represent a true cost, provided that the interest rate is competitive with what could be earned elsewhere. To satisfy the initial margin requirements (but not subsequent margin calls), an investor can sometimes deposit securities with the broker. Treasury bills are usually accepted in lieu of cash at about 90 percentage of their face value. Shares are also sometimes accepted in lieu of cash-but at about 50 percentage of their face value.

The effect of the marking to market is that a futures contract is settled daily rather than all at the end of its life. At the end of each day, the investor’s gain or loss is added to or subtracted from the margin account, bringing the value of the contract back to zero.

Minimum levels for initial and maintenance margins are set by the exchange. Individual brokers may require greater lower margin from their clients than those specified by the exchange. However, they cannot require lower margins than those specified by the exchange. Margin levels are determined by the variability of the price of the underlying asset. The higher is the variability, the higher the margin levels. The maintenance margin is usually about 75 percentage of the initial margin.

Margin requirements may depend on the objectives of the trader. A bonfide hedger, such as a company that produces the commodity on which the futures contract is written, is often subject to lower margin requirements than a speculator. The reason is that there is deemed to be less risk of default. Day trades and spread transactions often give rise to lower margin requirements than
do hedge transactions. In a day trade the trader announces to the broker intent to close out the position in the same day. In a spread transaction the trader simultaneously takes a long position in a contract on an asset for one maturity month and a short position in a contract on the same asset for another maturity month.

Note that margin requirements are the same on short futures position as they are on long futures positions. It is just an easy to take a short futures position as it is to take a long one. The spot market does not have this symmetry. Taking a long position in the spot market involves buying the asset for immediate delivery and presents no problem. Taking a short position involves selling an asset that you do not own. This is a more complex transaction that may or may not be possible in a particular market.

1.7.14 The Clearing House and Clearing Margins

The exchange clearing house is an adjunct of the exchange and acts as an intermediary in futures transactions. It guarantees the performance of the parties to each transaction. The clearing house has a number of members. Brokers who are not clearing house member themselves must channel their business through a member. The main function of the clearing house is to keep track of all the transactions that take place during a day so that it can calculate the net position of each of its members.

Just as an investor is required to maintain a margin account with a broker, a clearing house member is required to maintain a margin account with the clearing house. This is known as a clearing margin. The margin accounts for clearinghouse members are adjusted for gains and losses at the end of each trading day in the same way as are the margin accounts of investors. However, in the case of the clearing house member, there is an original margin, but no maintenance margin. Every day the account balance for each contract must be maintained at an amount equal to the original margin times the number of contracts outstanding. Thus, depending on transactions during the day and price movements, the clearing house member may have to add funds to its margin account at the end of the day. Alternatively, it may find it can remove funds from
the account at this time. Brokers who are not clearing house members must maintain a margin account with a clearinghouse member.

In determining clearing margins, the exchange clearing house calculates the number of contracts outstanding on either a gross or a net basis. The gross basis simply adds the total of all long positions entered into by clients to the total of all the short positions entered into by clients. The net basis allows these to be offset against each other. Suppose a clearinghouse member has two clients: one with a long position in 20 contracts, the other with a short position in 15 contracts. Gross margining would calculate the clearing margin, on the basis of 35 contracts, net margining would calculate the clearing margin on the basis of 5 contracts. Most exchanges currently use net margining.

It should be stressed that the whole purpose of the margining system is to reduce the possibility of market participants sustaining losses because of defaults. Overall the system has been very successful. Losses arising from defaults in contracts at major exchanges have been almost nonexistent.

1.7.15 Convergence of Futures price to Spot Price

As the delivery month of a futures contract is approached, the futures price converges to the spot price of the underlying asset. When the delivery period is reached, the futures price equals or is very close to the spot price.

When the futures price is above the spot price during the delivery period, then traders have a clear arbitrage opportunity.

i) Short a futures contract
ii) Buy the asset
iii) Make delivery

These steps are certain to lead to a profit equal to the amount by which the futures price exceeds the spot price. As traders exploit this arbitrage opportunity, the futures price will fall.

When the futures price is below the spot price during the delivery period, companies interested in acquiring the asset will find it attractive to enter into a
long futures contract and then wait for delivery to be made. As they do so, the futures price will tend to rise.

1.7.16 Delivery of the Underlying Asset
In the trading of derivatives very few of the futures contracts that are entered into lead to delivery of the underlying asset. Most are closed out early.

The period during which delivery can be made is defined by the exchange and varies from contract to contract. The decision on when to deliver is made by the party with the short position. When the party decides to deliver, his broker issues a ‘notice of intention to deliver’ to the exchange clearinghouse. This notice states how many contracts will be delivered and, in the case of commodities, also specifies where delivery will be made and what grade will be delivered. The exchange then chooses a party with a long position to accept delivery.

In the case of a commodity, taking delivery usually means accepting a warehouse receipt in return for immediate payment. The party taking delivery is then responsible for all warehousing costs. In the case of livestock futures, there may be costs associated with feeding and looking after the animals. In the case of financial futures, delivery is usually made by wire transfer. For all contracts the price paid is usually the settlement price immediately preceding the date of the notice of intention to deliver.

There are three critical days for a contract. These are the first notice day, the last notice day and the last trading day. The first notice day is the first day on which a notice of intention to make delivery can be submitted to the exchange. The last notice day is the last such day. The last trading day is generally a few days before the last notice day. To avoid the risk of having to take delivery, an investor with a long position should close at his contracts prior to the first notice day.

1.7.17 Cash settlement
Some financial futures, such as those on stock indices are settled in cash because it is inconvenient or impossible to deliver the underlying asset. In the case of the futures contract on the S&P 500, for example, delivering the underlying asset would involve delivering a portfolio of 500 stocks. When a contract is settled in
cash, it is simply marked to market on the last trading day, and all positions are declared closed. To ensure that the *futures* price converges to the spot price, the settlement price on the last trading day is set equal to the spot price of the underlying asset at either the opening or close of trading on that day.

### 1.7.18 Types of Orders

Trading of derivatives contracts on both NSE and BSE is through an order-driven automated online system. For the trading of derivatives, NSE and BSE have adopted various forms of computerised trading platforms such as NEAT (National Exchange for Automated Trading) – F&O of NSE and DTSS (Derivatives Trading and Settlement System) of BSE. These systems are actually electronic limit order book for recording and executing orders. As soon as a trader enters his order, the system will immediately search for an opposite but matching order. If a corresponding order is found, the deal will be made and the completed order will be removed from the system. In case the order is not fully met, further matching orders will be searched and the process will be repeated till the order gets exhausted or no more matchable orders are found. If the order is not fully done, the system will retain the order in the pending order book. Order matching will be done on the basis of price and time.

The following are the important types of orders allowed for trading in derivatives.

1) **Market Order**

A market order is the simplest type of order placed with a broker. This is an order to buy or sell at the best price prevailing in the market at the time of submission of the order.

2) **Limit Order**

A limit order specifies a particular price. The order can be executed only at this price or at a price which is more favourable to the investor. There is no guarantee that the order will be executed at all, because the limit price may never be reached. Any unexecuted portion of the order remains as a pending order till it is matched or its duration expires.
3) **Stop Loss Order**
A stop loss order specifies a particular price. The order is executed at the best available price once a bid or offer is made at that particular price or a less-favourable price. Suppose a stop order to sell at $30 is issued when the market price is $35. It becomes an order to sell when and if the price falls to $30. In effect, a stop order becomes a market order as soon as the specified price has been hit. The purpose of a stop order is usually to close out a position if unfavorable price movements take place. It limits the loss that can be incurred.

4) **Good Till Cancelled**
This is an order which remains in the system until the trader cancels it.

5) **Good Till Days or Date**
This order will remain till a specified number of days or till a specified date.  

1.8 **Risks Associated with Derivatives**
Apart from the explicit risk which arises from various market risk exposures stemming from the pure service or position taken in a derivative instrument, other implicit risks are also associated with derivatives. These are the same types of risks - credit, market, operational, liquidity and legal risk that many financial institutions and firms face in their traditional businesses.

Credit risk is the risk that a loss will be incurred because a counter party fails to make payments as due. In the event of the default, the loss on a derivative contract is the cost of replacing the contract with a new counter party. Concern has been expressed that financial institutions may have used derivatives to take on an excessive level of credit risk that is poorly managed.

Market risk is the risk that the value of a position in a contract, financial instrument, asset, or portfolio will decline when market conditions change. Concern has been expressed that derivatives expose firms to new market risks, while increasing the overall level of exposures.

[10](http://www.investopedia.com/university/futures/).
A risk that arises in all business is operational risk- the risk that losses will be incurred as a result of inadequate systems and control, inadequate disaster or contingency planning, human error, or management failure. While no aspect of operational risk is unique to derivatives, it is still important for institutions actively engaged in derivative activities to have adequate oversight of well-trained and knowledgeable staff by informed and involved senior management.

Legal risk is the risk of loss because a contract cannot be enforced or because the contract terms fail to achieve the intended goals of the contracting parties. This risk, of course, is as old as contracting itself. Because of the relative newness of derivatives transactions, however, their treatment under existing laws and regulations is often ambiguous. This legal uncertainty can result in significant unexpected losses. Users of derivatives like other firms, attempt to manage and minimise legal risks. In certain cases public action, regulatory or legislative may be necessary to reduce legal uncertainty.

1.9 Commodity and Commodity Derivatives
1.9.1 Commodity
India, a commodity based economy where a two – third of the one billion population depends on agricultural commodities, surprisingly has an under developed commodity market. Commodities actually offer immense potential to become a separate asset class for investors, arbitrageurs and speculators. The commodities are easy to understand as far as fundamentals of demand and supply are concerned.

A commodity is a good that is normally sold and/or produced by a number of different companies and has the same quality regardless of which company sells it. There are one 113 different commodities that are traded on commodity exchanges throughout India.

A commodity can be any tangible good, but commodities that are traded in commodity markets are usually bulk goods and food product, including natural gas, gold, silver, oil, wheat, corn, oats, grains like barley and rice, coffee, pork bellies, beef, and others. The meaning of the term commodity has changed through the years, because the word traditionally meant a good that was subject
to barter or sale, but the modern definition can include investment vehicles, like commodity futures.

Before trading any commodities, a new trader on this market should know and understand the ups, downs and volatility of that commodity. Grains are one of the oldest commodities traded, and they have been around for decades on the markets. Summer is the most volatile time for these commodities, and they include corn, wheat, any soybeans. Energy commodities are another group and they include heating oil, crude oil and gasoline natural gas. These commodities are very popular in futures trades. Metals are commodities that are traded every day. Precious metals are used to help hedge inflation, and they can also be used for the purpose of industry, construction, photography, and many other things. Metal commodities include copper, gold and silver. Soft commodities are another group, and these consist of a number of food products and many industrial materials. These include cotton, sugar, cocoa, tea, and coffee. Livestock commodities are agricultural products that consist of meat only, such as cattle and hogs. These commodities usually have reliable trending patterns, because the production numbers can be estimated well in advance due to the herd statistics and breeding patterns.

A commodity may be defined as an article, a product or material that is bought and sold. It can be classified as every kind of movable property except, actionable claims, money and securities.

The commodities can be broadly classified into the following:

a) Precious metals : Gold, Silver, Platinum etc.,
b) Other metals: Nickel, Aluminum, Copper etc.
c) Agro Based Commodities : Wheat, Corn, Oils, Oil Seeds
d) Soft Commodities: Coffee, Cocoa, Sugar, Cotton etc.
e) Live Stock: Live Cattle, Pork Bellies etc.
f) Energy: Crude oil, Natural Gas, Gasoline etc.

11 www.bioeconomicfuel.com all-you-need-to_know_about_commodity_derivatives.
1.9.2 Commodity markets

India has very large agriculture production in a number of agricultural commodities, which needs use of futures and derivatives as a price-risk management system. For an agricultural country like India, trading in over 100 crops, the issues in price dissemination, standards, certification and warehousing are bound to occur. Commodity market will serve as a suitable alternative to tackle all these problems efficiently.

The commodities markets are one of the oldest prevailing markets in the human history. Commodity market is a place where trading in commodities takes place. It is similar to an equity market, but instead of buying or selling shares one buys or sells commodities.

The commodities market exist in two distinct forms namely the over the counter (OTC) market and the exchange based market. Also as in equities, there exist the spot and the derivatives segment. The spot markets are essentially over the counter markets and the participation is restricted to people who are involved with that commodity say the farmer, processor, wholesaler etc. Derivative trading takes place through exchange based markets with standardised contracts, settlements etc\(^\text{12}\).

1.9.3 Equity market in India

The equity market is an important division of Indian Economy. The quantity and quality of equity market in a nation is one of the essential indicators for the assessment of economic development. A stable and efficient equity market increases the capital formation of a country. The following are some of the differences between the commodity and equity market in India.

\(^{12}\) Rajoria, (2006)
Table 1.1 Comparative Analysis of Commodity and Equity Markets

<table>
<thead>
<tr>
<th>Factors</th>
<th>Commodity Markets</th>
<th>Equity Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage Returns</td>
<td>Gold gives 10-15% returns on the conservative basis</td>
<td>Returns in the range of 15-20% on annual basis</td>
</tr>
<tr>
<td>Initial Margins</td>
<td>Lower in the range of 4-6%</td>
<td>Higher in the range of 25-40%</td>
</tr>
<tr>
<td>Arbitrage Opportunities</td>
<td>Exists on 1-2 months contracts. There is a small difference in prices, but in case of commodities, which it is in large tonnage makes a huge difference.</td>
<td>Significant Arbitrage Opportunities exists</td>
</tr>
<tr>
<td>Price Movements</td>
<td>Price movements are purely based on the supply and demand</td>
<td>Price movements based on the expectation of future performance.</td>
</tr>
<tr>
<td>Price Changes</td>
<td>Price changes are due to policy changes, changes in tariff and duties</td>
<td>Price changes can also be due to Corporate actions, Dividend announcements, Bonus shares/Stock splits</td>
</tr>
<tr>
<td>Future Predictability</td>
<td>Predictability of future prices is not in the control due to factors like Failure of Monsoon and Formation of El-ninos at Pacific.</td>
<td>Predictability of futures performance is reasonably high, which is supplemented by the history of management performance</td>
</tr>
<tr>
<td>Volatility</td>
<td>Lower Volatility</td>
<td>Higher Volatility</td>
</tr>
<tr>
<td>Securities Transaction Act</td>
<td>Securities Transaction Act is not applicable to commodity futures trading</td>
<td>Securities Transaction Act is applicable to equity markets trading¹³.</td>
</tr>
</tbody>
</table>

Source: www.indiainfoline.com/markets

1.9.4 Derivatives Market in India

Derivative markets can broadly be classified as commodity derivatives market and financial derivatives markets. As the name suggest, commodity derivatives markets trade contracts for which the underlying asset is a commodity. It can be an agricultural commodity like wheat, soya beans, rapeseed, cotton, etc or precious metals like gold, silver, etc. Financial derivatives markets trade contracts that have a financial asset or variable as the underlying. The most popular financial derivatives are those, which have equity, interest rates and exchange rates as the underlying. Financial derivatives are used to hedge the

¹³ Kulkarni www.coolavenues.com
exposure to market risk. The commodity derivatives differ from the financial derivatives mainly in the following two aspects: Firstly, due to the bulky nature of the underlying assets, physical settlement in commodity derivatives creates the need for warehousing. Secondly, in the case of commodities, the quality of the asset underlying a contract can vary largely.

1.9.5 Commodity Derivatives

Commodity derivatives made their appearance before financial derivatives in the world and also in India. Informal trading in commodity derivatives was there even in ancient India, but the formal market took shape in the late nineteenth century Forward trading in commodities existed in India from ancient times (it was mentioned in Kautilya’s Arthashastra). The commodity futures market made the true restart in early 2000s with establishment of a number of nationwide multi commodity exchanges.

Commodity derivatives have a crucial role to play in the price risk management process especially in any agriculture dominated economy. India is among the top 5 producers of most of the commodities, in addition to being a major consumer of bullion and energy products. Agriculture contributes about 17 percentage to the Gross Domestic Product of the Indian Economy. It employees around 49 percentage of the labour force on a total of 163 million hectares of land. Agriculture sector is an important factor in achieving a GDP growth of 8-10 percentage. All this indicates that India can be promoted as a major center for trading of commodity derivatives.

Commodity derivatives were first created for farmers, to offer them protection against crop values falling below the cost of growing the crop. This protection comes in the form of derivative contracts, and these contracts cover commodities such as white pepper, wheat, rice, coffee, cotton, and many others. Commodity

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derivatives started out as the first risk management tool for commodities, but now they have become an important investment tool. Commodity derivatives are now commonly invested in by investors who have nothing to do with agriculture, or who do not need the actual commodity. Investors in commodity derivatives speculate on which direction commodity prices will take, making money if the price moves towards their favour. The commodity market and commodity derivatives allow investors to put their money in commodities without having actually to take position of the commodity. Those that want to take possession of a commodity can, but usually commodity derivatives are used to make money on the commodity without ever having it physically. These instruments allow investors to put money in the commodities, instead of companies.

Commodity prices are much simpler and more accurate than equity prices, because an equity price and value include many more factors than commodity prices, which depend on only supply and demand of the commodity. Commodity derivatives also offer the benefit of requiring a low minimum investment, unlike many other investment options. This means almost anyone can invest in commodity derivatives. This investment offers enormous potential return if the market is favourable, but also very large losses if the market turns in the opposite direction. A commodity derivatives exchange is the place where trades are settled and cleared, and these exchanges usually have a clearinghouse that deals with trade settlements\textsuperscript{16}.

1.9.5.1 Commodity Futures

The inherent nature of futures contract is that it has three ingredients which is absent in spot markets. Firstly, futures trading provide liquidity, enabling an easy match for a buyer with a seller, enabling traders to quickly transact their business at a fair price. Secondly, there is full transparency, especially in electronic exchanges, where all transactions can be viewed online in real time. Finally, for speculators, hedgers, and other traders a key benefit of trading in the future market is that it offers financial leverage. Participants in the exchange are able to

\footnote{www.binomicfuel.com, all you need to know about commodity derivatives.}
control large quantities amount of a commodity with a comparatively small amount of capital, because of the small margin, normally set at 4-6 percentage of the value of the commodity\textsuperscript{17}.

Commodity markets have existed for centuries around the world. Cash transactions were most common but sometimes forward agreements were also made, for example, forward agreements related to rice markets in seventeenth century in Japan, however most scholars has agreed that forward agreements date back much further in time. Forward agreements gradually gave way to futures contracts when the first organised grain trading in U.S began in places such as New York city and Buffalo city. Development of modern futures began in Chicago in 1840s. The city was a natural hub for trade, but the trading that took place was inefficient and unorganised until a group of Chicago based businessmen formed the Board decided that standardizing these contracts would streamline the trading and delivery processes. These standardized forward contracts are essentially the first modern futures contracts. The usefulness of futures trading began apparent and a number of futures exchanges came up in the country, the first one being Chicago Mercantile Exchange (CME) in 1898, led by the innovative thinking of CME, the futures industry has expanded phenomenally to meet the risk management of our complex society.

India was one of the first countries in the world to adopt exchanges, with an earliest exchanges dating back to the Bombay Cotton Trade Association in 1875. Following the launch of economic reforms in the early 1990s, and especially after India signed the General Agreement on Trade and Tariffs (GATT) to enter the world Trade Organisation (WTO), the World Bank and UNCTAD submitted a joint report to the Government of India recommending revival of futures trading in farm commodities and their products to render trade in such commodities competitive in the world markets after the envisaged removal of trade and non-trade barriers. Also, Government of India set up the Kabra Commitee in 1993 to review the futures trading for other commodities which were hitherto prohibited.

\textsuperscript{17} Sanjay Kaur(2004)
As a result, futures trading were reviewed, after a lapse of nearly three and a half decades, towards the close of the 20th century.

The year 2003 was a watershed year in the history of commodities with the establishment and recognition of three national exchanges with online trading and professional management. At present, there are three tier regulatory systems for commodities futures market namely, the Central Government, Forward Market Commission & Recognised exchanges. Futures trading in India are currently permitted in six national level multi – commodity exchanges and 22 regional level commodity specific exchanges. There is a substantial increase in the trading volume in the futures market from 2003 onwards.

1.9.5.1.1 Benefits of Commodity Futures

i) To Producers.

A producer of a commodity can sell the futures of the commodity, thereby ensuring that he can sell a particular quantity of his commodity at a particular price and at a particular date.

ii) To Investors

An investor has alternate investment opportunities in the spot and futures market. He is not interested in taking deliveries of the commodities. He takes benefits out of the price differences in the spot and futures market.

iii) To Commodity Trades

A commodity trader can use these to ensure that he is protected against any adverse changes in the prices. He can enter into a futures contract for purchase of a certain quantity of the underlying at a particular price on a particular date, or he can enter into a futures contract for sale of a particular quantity on a particular date at a particular price and be assured of the margins because both his purchase price as well as the sale price are fixed. Traders do a good arbitrage in gold and

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18 There is a merging of Forward Markets Commission with Securities Exchange Board of India in 29th September 2015.
silver. Whenever they find gold moving up, they short silver and similarly whenever they find silver moving up and gold likely to move down, they hedge.

iv) To Exporters
Future trading is very useful to the exporters as it provides an advance indication of the price likely to prevail and thereby help the exporter in quoting a realistic price and thereby secure export contract in a competitive market. Having entered into an export contract, it enables him to hedge his risk by operating in futures market\textsuperscript{19}.

v) To Industry

a) Hedging the price risk associated with futures contractual commitments.

b) Spaced out purchases possible rather than large cash purchase and its storage.

c) Efficient price discovery prevents seasonal price volatility.

d) Greater flexibility, certainty and transparency in procuring commodities would aid bank lending.

e) Facilitate informed lending.

f) Hedged positions of producers and processors would reduce the risk of default faced by banks.

g) Lending for agricultural sector would go up with greater transparency in pricing and storage.

h) Commodity exchanges to act as distribution network to retails agri-finance from bank to households.

i) Provide trading limit finance to traders in commodities exchanges.

\textsuperscript{19} Mathew (2010), p.199
vi) To Exchange member

a) Access to a huge potential market much greater than the securities and cash market in commodities.

b) Robust, Scalable, State-of-art technology deployment.

c) Member can trade in multiple commodities from a single point on real time basis.

d) Traders would be trained to be Rural Advisors and commodity specialists and through the multiple rural needs would be met, like bank credit, information dissemination, etc\textsuperscript{20}.

1.9.5.2 Commodity options

Commodity options trading is one form of investment, and this investment involves more risks than many other types, but the returns are also higher. Commodity options trading is the buying and selling of options concerning commodities.

No doubt there is an immediate need to bring about the necessary legal and regulatory changes to introduce commodity options trading in the country. The matter is said to be under the active consideration of the Government and the options trading may be introduced in the near future.

1.10 Natural Rubber

1.10.1 Introduction

Rubber is found in the fluid of some specific plants belongs to ‘Hevea family’. It is a tough but an elastic material and constitutes the basic raw material for a variety of products such as tires and tubes, footwear, belts and hoses, battery boxes, latex foam etc. Though different sources of rubber were found in North America and Mexico, the most popular and presently cultivated source of rubber ‘hevea brasillineus’ was found in 1751 by a Frenchman, Charles de la Condamine in the Amazon forests. In order to procure rubber seeds, Sir Henry

\textsuperscript{20} ‘Rajoria, (2006).
Wick Ham, conducted an expedition to the Amazon valley in 1876 with the financial support of India Office, London. The rubber seeds so collected were brought to Kew Gardens, London from where seedlings were sent to Sri Lanka, Malaysia and India. Now rubber is cultivated in India, Thailand, Malaysia, Indonesia, China, and Sri Lanka.

The first commercial plantation of rubber in India was started by European planters in 1902 at Thattekad near Alwaye in the erstwhile princely state of Travancore. The plantation was popularly known as Periyar Syndicate. In 1904, three plantations namely Yendayar, Elodorado and Mundakayam estates were formed in the central Travancore. In 1905, two Europeans K.E Nicoll and E.G Windle planted over 1100 acres of land at Palappilly and Pudukad near Trichur. Some enterprising native planters took the initiative to plant rubber in Goa by 1906 but the initiative was not so progressive in later years. By this time, two agencies, united planters Association of South India (UPASI) and Malayala Manorama came forward to give emphasis for planting rubber.

As a result of the joint efforts of these two agencies, local farmers also began to cultivate rubber by 1910. The first local joint stock company to plant rubber was started in 1910 under the name Malankara Rubber Produce Company Ltd. Two more companies, Travancore Rubber and produce company and Malayalam Rubber and produce company also started operations in 1910. By 1910, Mundakayam had become the leading center of rubber plantations in India with an area of about 10,000 hectares which constitute about 50 percentage of the then existing rubber cultivated area in India. In 1911, another local company, Vaniampara Rubber company came into existence for planting rubber.21

Naturally, rubber is produced by the process of tapping of the plant called ‘Hevea Brasiliensis’. The ideal rubber growing regions should be 8 degree North of Equator, 10 degree South of Equator, and high temperature, attitude not beyond 400 mm and high humidity. These plants generally have 32 years of economic life but they may live up to 100 years or even more than that. The plantation

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would start its yield from 6th year onwards. The natural rubber produced is processed to convert into storable and marketable foam.

In India, the peak season for harvesting rubber is from October to January, while the lean period is during monsoon. The basic property of rubber is that it comes back to its original shape if it is twisted or stretched but if heat is applied to the rubber, it won’t return to its original shape easily.22

It is also to be noted that the rubber plantations in India were concentrated in Kerala and the state can now claim near monopoly in the production of natural rubber by producing 93 percentage of its total production in India. India realised the strategic importance of natural rubber even before independence and hence it was brought under the Rubber Control and Production Order in 1942.

1.10.2 Types of Rubber

The two types of rubber in common use today are natural rubber and synthetic rubber. Natural rubber comes from the rubber tree (Hevea Brasiliensis). When a tree matures at the age of six to seven years, the latex is collected from a diagonal incision in the tree trunk. The tapping process does not affect the health of the tree and the tree wound later heals by itself. Synthetic rubber is produced through the process of polymerisation of various monomers. It is made by man from petrochemical feed stock crude oil is the principal raw material used for the purpose.23

1.10.3 World production

Thailand is the world’s largest producer of natural rubber. It produced around 30 percentage of the world’s total natural rubber production. Indonesia is the second largest producer contributing around 27 percentage. Malaysia occupies the third rank with around 9 percentage in terms of production. India is the fourth largest producer of natural rubber in the world. India contributes 8 percentage of the world natural rubber production. Other major producers include Vietnam and China contributing 6 percentage each to the world production.

1.10.4 World Consumption

Worldwide, the automobile industry is the single largest consumer of natural rubber in the form of auto tyres and tubes certain other parts and accessories. Therefore economic recession anywhere first hits rubber industry before any other industry. China being the fastest growing economy of the world is also the world’s largest natural rubber consuming country. It consumes 33 percentage of the total rubber consumed over the world. Other major consuming countries are USA, India, Japan, Thailand, Indonesia, Malaysia and Republic of Korea. 24

1.10.5 Domestic Scenario

India was the third largest producer and third largest consumer of natural rubber in the world. India produces about 9 lakh tons of rubber annually and over 90 percentage of the production is in the southern state of Kerala. Indian rubber industry comprises manufacturing of tires, automobile parts, auto tubes, foot wear, belts, cable and wires, battery boxes etc. Many large, medium and small scale units manufacturing large number of consumable rubber products namely toys, balloons, dolls, vehicles etc. These industries have a considerable amount of annual turnover 25.

1.10.6 Economic Significance

Rubber is a significant commodity for Kerala economy and any price falls follow political ramifications in the state. Price increases are also not received well by the tyre manufactures and other consuming industries. Moreover, large number of small growers, significant presence of grower’s co-operatives, state administered procurement programmes, inconsistent import and export policies and manufacturing facilities spread across the country are factors that has made rubber prices significantly volatile.

We expect rubber futures could help the rubber co-operatives who has commitment to provide remunerative prices to growers significantly because futures contracts will help them to decide the procurement price, will help to design forward contracts to suit the needs of growers; and also will help growers through price

24 Annual Reports of Rubber Board
discovery. Industries with natural rubber as the raw material too would be able to take advantage of rubber futures to manage the price risk in a better way.\footnote{Rubber report; (2002) http://www.mcxindia.com,2011.}

1.10.7 Production of Natural Rubber

The following table shows the area and production of Natural Rubber in India, from 1990-91 to 2013-14:

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (hectares)</th>
<th>Production (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-91</td>
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<tr>
<td>2013-14</td>
<td>778400</td>
<td>846000</td>
</tr>
</tbody>
</table>

\textit{Source: Annual reports of Rubber Board}
India’s natural rubber production has been increasing steadily over the past decade. The cultivated area of natural rubber is also increasing. The productivity per hectare of natural is increasing from year to year.

1.10.8 Consumption of Rubber

Consumption of natural rubber shows an increasing movement. The consumption of RSS grade is also the highest at 67 percentage, Latex concentrate at 20 percentage, solid block rubber at 9 percentage and others at 4 percentage. Consumption has been rising more or less steadily over the recent few years. The number of tires and tubes produced are the highest for motor cycles followed by Car, truck, bus, and scooter respectively.

1.10.9 State wise production and consumption of Natural Rubber

The rubber growing regions in India can be classified under two major zones, traditional and nontraditional, on the basis of agro-climatic conditions.

Rubber cultivation in India has been traditionally confined to hinterlands of southwest coast, mainly in Kanyakumari district of Tamil Nadu and Kerala. Kerala and Tamil Nadu together constitute the traditional rubber growing regions in the country. Kerala alone contributes 89 percentage of the total rubber produced in India. Tamil Nadu contributes another 3 percentage of the total natural rubber production. Nontraditional regions are hinterlands of coastal Goa, Konkan region of Maharashtra, hinterlands of coastal Andra Pradesh and Orissa, the Northeastern states, Andaman and Nicobar islands etc, contributes up to 5 percentage and Karnataka contributes 3 percentage27.

In recent years among non-traditional region, Tripura has become one of the most thrust areas for rubber growing because of its well acceptance worldwide. In fact, Tripura was declared the ‘Second Rubber Capital of India’ by the Rubber Board. India has succeeded in rubber cultivation due to research and extension work undertaken by the Rubber Board. The worldwide demand for natural rubber from Tripura is mainly because of its elasticity.

Main characteristics of Indian rubber consumption are the sectoral concentration, dominated by the tyre manufacturing sector, which accounts for as much as 45 percentage of the total consumption in the country.\textsuperscript{28}

1.10.10 Import and Export of Natural Rubber

The following table shows the import and export of natural rubber in India from 1990-91 to 2011-12.

<table>
<thead>
<tr>
<th>Year</th>
<th>Export(tons)</th>
<th>Import(tons)</th>
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</thead>
<tbody>
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<td>2012-13</td>
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</tr>
<tr>
<td>2013-14</td>
<td>5398</td>
<td>360263</td>
</tr>
</tbody>
</table>

Source: Annual reports of Rubber Board

\textsuperscript{28} Philip (2006), pp47-49
From the above table it is clear that the export of India is showing a substantial increase. The markets of Indian export are Sri Lanka, Malaysia, China, Vietnam, Belgium and Germany. The main factors behind the export are export promotional measures adopted by the Government of India and the natural rubber prices in the international market. India’s import remains almost steady over the years because of the demand in auto tyre manufacturing industry. India imports from Thailand, Indonesia, Sri Lanka, Malaysia, and Vietnam.

1.10.11 Natural Rubber Prices

After the opening of the Indian economy in 1990’s India’s domestic rubber market started showing links to the international market. Probable determinants of volatility in natural rubber prices in domestic market are state administered procurement programs, inconsistent import and export policies and global market trend.

The period from 1994 to 1988 was the most turbulent in domestic price trend of natural rubber. In June 1995 RSS -4 price shot up sharply to Rs.6,171 per quintal from Rs. 2,599 a quintal in March 1995. The probable reason of this sudden price hike was decline in world production of natural rubber in main producing countries. Immediately after May 1995 India’s import of natural rubber also increased. Simultaneously in global market natural rubber price rose in anticipation of future supply tightness and shortage of some graders, because Australia forecasted to decline natural rubber production due to serious drought.

After that in February 1999, Indian Government banned rubber imports through ALS (Advance License scheme), as a result of this rubber prices moved sideways. The removal of the quantitative restrictions from 1st April 2001 aggragated the declining price trends. The probable reason behind this firming up of natural rubber prices are up trend in global market, global natural rubber supply fails to catch up with growing demand – particularly from China. The prices have reached to Rs. 18.807 per quintal as on June, 2012. Demand for Rubber is most evenly distributed over the years but due to absence of production in monsoon, supply shrinkage occurs etc. By June to July the production
becomes normal, but lingering rains last for a couple of months. During rains tapping of rubber trees disrupted and production falls. Resultantly prices would rise at that time, unless there is an acute economic depression or similar negative factors.

1.10.12 Rubber Futures in India

Futures trading in Rubber flagged off on 15th March 2003 for the very first time in India via National Multi Commodity Exchange of India Ltd. Ahmedabad, and the product soon became a role model as a truly efficient and liquid market. If futures are meant for the price discovery and price risk management for real hedgers, rubber futures should be considered as a great success. NMCE has provided an unbiased credible online platform to all the participants giving equal opportunities of the fair and transparent trade. Rubber futures have been used by the rubber industry whose offices are largely located in the south. It includes the traders, exporters, user industry, manufacturers etc.

The NMCE has central warehouses at Kottayam, Aluva, Ernakulam, Kakkanad, Kakkanchery, Kozhikkode, Trichur, Palakkadu, where rubber is stored. Since rubber futures trading started in India, the volatility in its prices has now become unusual. This gives a very relevant example of market participation by the actual rubber growers who are now benefited by the futures trading mechanism and have consistently managed to gain a price that is approximately 94 percentage higher than the cost price of rubber. The rubber growers of Kerala have heaved a high relief, by getting consistently good prices due to the efficient price discovery and price dissemination contributed by futures trading on the NMCE.
c) Diffused consumption; concentrated production.

d) Numerous growers and growers co-operatives.

e) Consumption majors are tyre manufactures who are few in number; futures may provide a price level playing field for growers.

f) Volatile global production and consumption tendencies.

g) Storability is on the higher side\(^{30}\).

1.11. **Black Pepper**

1.11.1 **Introduction**

The word ‘Pepper’ is derived from the Sanskrit name ‘Pippali’ which is only one of the many names of pepper in Sanskrit language and that was transferred via Greek ‘peperi’ and Latin ‘piper’. India is the most important producer of Pepper accounting for about 50 percent of the world production. Black pepper is the most important spice of India and world due to its day – to-day use. Black Pepper (\textit{Pipernigrum linn}), known as the “King of Spices” had remained the most precious and valuable form of spice in the world. It is also called as “Black Gold” due its durability and value. Black Pepper is the 3\(^{rd}\) most added ingredient in food among the all range of spices. The history and destiny of our country, perhaps the whole world were influenced unbelievably by the spices. It was the taste of the ‘Black gold’ pepper and the flavor of the ‘Queen of spices’ Cardamom, which attracted the Arabs and Europeans to this country and ultimately led to the foreign domain.

It was the search for spices, which tempted the Mariners like Vasco de Gama of Portugal, Christopher Columbus of Spain and many others to undertake hazardous voyages to the East. The significance of the spices in the history of the world is evident from the fact that even the discovery of American continent by Columbus was accidental during the search for spices.

The history of the world would have been different had India not been the land of spices. It was a new turn in the history when General Diaz, first arrived at the Cape of Good Hope, in search of spices of Malabar Coast, through the sea route. It was this discovery, which eventually led to the arrival of Vasco de Gama at Calicut. The basic purpose of the expedition of Gama was to obtain a direct link with the South India for spices trade, eliminating the Arab and Italian spices traders who had monopoly at that time\textsuperscript{31}.

Black pepper is the world’s most traded spice. It is one of the most common spices added to European cuisine. The spiciness of black pepper is due to the chemical piperine. It may be found on nearly every dinner table in the industrialised world, often alongside table salts. Black pepper is native to Malabar a region in the western coast of South India in the Kerala state.

The richness of the culture and the fragrance of the spices were the major sources of glory of the ancient India. It is really amazing to see that India could maintain her supremacy in the production and trade of spices even from the vedic ages dating back to 6000 B.C, to the modern era of the third millennium. The vicissitudes of history made unbelievable changes everywhere but the Indian domination over the world spices market still remains unquestionable.

The geographical and climatic peculiarities of South India in general and Kerala in particular are the major gifts of nature still providing as an upper hand in the world of spices. Geographical advantages of the state coupled with the sterling efforts of the people, particularly of the high ranges of the western Ghats, help us to produce the best quality spices favored all over the world\textsuperscript{32}.

The Pepper plants thrive well under the following conditions.

i) A temperature between 10-40 centigrade

ii) An attitude of about 1500 meters above sea level and

iii) An annual rainfall of 125-250 centimeters.

\textsuperscript{31} Balaraman (1989).
\textsuperscript{32} Khan (1990)
Black Pepper (Piper nigrum), the true Pepper, is economically the most important species of the pantropical Pepper family (piperaceae). A perennial climbing shrub, it bears pea-sized berries, the peppercorns of commence. Pepper is planted mostly at the base of certain planted live standards and dead standards. After planting, pepper yields its first crop in three years. Pepper vines in India usually flower during May to June with the commencement of the monsoon. It takes about six to eight months from flowering to harvest. The main harvesting season is from November to December in the plains and January to March in the hills. Black Pepper should be kept in a tightly sealed glass container in a cool, dark and dry place.

### 1.11.2 Types of Pepper

There are basically two varieties of pepper, namely black pepper and white pepper. Black pepper is sold whole or ground, is the whole fruit. Removing the dark outer hull, on the other hand, makes white pepper, it has a milder, less pungent flavour.

There are different varieties of black pepper and their names are originated from the localities where they are grown or from ports through which they are being exported, that is, Malabar, Alleppey, Lampang, Saigon and Singapore. Majority of the cultivated varieties are monoecious that is, male and female flowers found in the same spite. Pepper differ slightly in their physical and chemical characteristics, Colour, size, shape, flavour and bite.

Black pepper is more aromatic than the other varieties of pepper. It is native to Malabar and has been grown here for more than 2000 years. The most popular varieties from India are Malabar Garbled and Tellichery Black. Tellichery and Alleppey peppers are large, attractive, dark reddish - brown to black, very aromatic and are among the best. Same in the case of the Malabar Garbeld (MGI), which alone accounts for nearly 90 percentage of the total exports from India.³³

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1.11.3 World Production

According to international Pepper community Vietnam, India, Brazil, Indonesia and Malaysia are the important producers and exporters of pepper production of pepper is around 3,38,380 metric tonnes per annum with 4,76,514 hectares under cultivation in 2010. There is a decline in output in recent years. The major reason for that, the crop in the major producing countries such as Vietnam and India has been affected by disease and poor maintenance due to decreased prices during past few years. Out of total pepper production, black pepper constitutes most of it and leaving least to white pepper.

The percentage shares of major pepper producing countries are, Vietnam holds the first position with 34.46 percentage, followed by Indonesia 18.81 percentage, India 11.20 percentage, Brazil 8.87 percentage, china 6.55 percentage and 20.11 percentage of Malaysia, Sri Lanka, Thailand, Madagascar and other countries respectively\(^{34}\).

1.11.4 World Consumption

Global consumption of pepper is growing at an average rate of 3 percentage with the main drives being Asia (Primarily India and China) and the Middle East. Growth from the America and Europe (including Russia) is fairly stable with slight increase. Global consumption per month corresponds to approximately 30,000 metric tonnes where Asia, including the producing countries, consumes about 12,000 metric tonnes per month.

1.11.5 Production of Black Pepper

The following table shows the area and production of black pepper in India from 1990-91 to 2013-14.

\(^{34}\) Yogesh (2013)pp. 36-44
<table>
<thead>
<tr>
<th>Year</th>
<th>Area (hectares)</th>
<th>Production (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-91</td>
<td>173430</td>
<td>47950</td>
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<tr>
<td>2013-14</td>
<td>122400</td>
<td>37000</td>
</tr>
</tbody>
</table>

Source: Annual reports of spices Board

Spices have a very important role in the domestic market too. Being a tropical country, majority of the people in India regularly use different types of spices for their daily cuisine. More than hundred crores of people in the country offer a very vast domestic market base for spices. It has been estimated that on an average 2.8 percent of the income of the rural people is being spent for spices and
the urban people spend 2.3 percent of their money for making their food spicy. This shows the significance of spices in Indian life.

The area under pepper cultivation has increased considerably from 1991 to 2014. Most of the Pepper creepers were suffering from diseases and had grown old. Thus, new creepers are being planted. This led to decline in the output of the country in some years. Yield varies widely in different areas and depends on several factors such as soil fertility, availability of irrigation facilities, type and quality of manure, climate, type of variety, age of vine, etc.

1.11.6 Consumption of Black Pepper

India is rated as the highest pepper consuming country in the world. Though demand for pepper exists throughout the year, a surge is notable during the winter months. The difference between production and exports (along with stocks at the beginning of a year) forms domestic consumption. The domestic consumption consists of pepper for culinary usage, grinding, extraction of oil and oleoresins, pharmaceutical companies etc. The domestic consumption is increasing in various sectors in India. Radical increase in domestic consumption is attributed by extensive use of pepper in drug and pharmaceutical industry, and in food processing industry.

1.11.7 State wise production

In India Pepper is cultivated mainly in the states of Kerala, Karnataka and Tamil Nadu. Kerala is the largest producer of pepper accounting for over 96 percent of the area and 97 percent of pepper production in India. Thus the state of Kerala has a remarkable share in the pepper production, with about 2,00,000 hectares of land under pepper cultivation accounting for the production of more than 50,000 tonnes annually. It is interesting to see that the lion’s share of Indian pepper comes from the Idukki and Wayanad district.

Pepper is also cultivated in Kerala in Kottayam, Kannur and Calicut districts. It is also cultivated in Karnataka, Tamil Nadu, Andaman & Nicobar Island and Pondichery in recent years. Other states like Andra Pradesh, Orissa, West

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Bengal, Assam, Tripura, Meghalaya etc. have also started showing interest in taking up the cultivation of pepper.

Kerala which was the major contributor in total production of pepper, declined since past few years. The two important districts namely Idukki and Wayanad are producing less Pepper because of the unseasonal rainfall in the pepper grown belt.

1.11.8 Export and Import of Black Pepper.

<table>
<thead>
<tr>
<th>Year</th>
<th>Export(tons)</th>
<th>Import(tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996-97</td>
<td>95946</td>
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<tr>
<td>1997-98</td>
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<td>1998-99</td>
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<td>2000-01</td>
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<td>2004-05</td>
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<td>2005-06</td>
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<td>19929</td>
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<td>2006-07</td>
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</tr>
<tr>
<td>2013-14</td>
<td>21250</td>
<td>15680</td>
</tr>
</tbody>
</table>

Source: DGCRS Calcutta.

From the table it is clear that the export and import is increasing over the years. The important market for Indian pepper is USA, UK, European countries and Arab countries. India imports from Vietnam, Indonesia, Malaysia and Thailand.
1.11.9 Price Analysis

Pepper prices are dependent significantly on international demand, mainly demand from USA and European Union. Whenever there was a price increase there was significant increase in planting of pepper in India. Dramatic increase in production in Vietnam is considered as a major factor behind the falling and low prices of black pepper. Indian prices have declined further because of increased imports of pepper into India from Vietnam and Sri Lanka.

1.11.10 Factors that favour futures trading

1. Significant price volatility.
2. High degree of storability.
3. Fairly standardised quality.
5. Numerous state holders in the supply chain including small growers, traders, exporters, importers and processors.

1.11.11 Indian Pepper and Spices Trade Association

The India Pepper and Spice Trade Association (IPSTA) is a futures trading exchange in pepper and other spices in Kochi. The exchange was established in 1957. The IPSTA has been functioning in futures trading in pepper without break since 1957. The trading was done through open outcry system and it transferred to electronic system. After the introduction of national exchanges majority of its brokers are shifted their trade to national level exchanges. Now there is not active trading in IPSTA.

1.12 Cardamom

1.12.1 Introduction

Cardamom is the dried ripe fruit referred as the “Queen of Spices” because of its very pleasant aroma and taste. Cardamom is the significant, exotic and most valuable spice in the world. It is the too more expensive spice after vanilla and saffron. Cardamom (Elettaria Cardamomum (L) Maton) is a perennial tropical herb plant belonging to the ginger family. It is considered as a versatile spice, as it is used in both sweet and salty foods. Oil from the seeds of Cardamom and the leftover resin have their usage in processed foods, tonics, liquors and perfumes. This fruit also has a great significance in medical properties, both Allopathy and Ayurveda, as it has healing effects in teeth and gum infections, digestive disorders etc.

The world doesn’t know the actual time period when Cardamom originated but it is considered that the Cardamom plants firstly came into existence in the monsoon forests of western ghats in South India as wild herbs. A medicinal literature summary written in between 2nd century BC to 2nd Century AD in India named Charak Samhita provides us with the first ever written inscriptions about Cardamom. It says that Cardamom is a significant constituent in many medicines and preparations. Some more books written in Sanskrit language of that time mentioned about Cardamom being used in some rituals and ceremonies.

Greeks when initiated their exploration at this time, started importing Cardamom as a digestive medicinal herb. It started to get used vastly in a number of recipes and drinks due to its heavenly flavor and fragrance. Most of the countries started to import this spice from India with the emergence of 16th century. Till 19th Century, Cardamom grew wild and was searched for in the monsoon forests. The British colonies suggested the establishment of plantations and domesticated the crop.

The Cardamom is a tropical herb, grows from a thick rootstalk up to around 6-10 feet. In India, the natural herb of small cardamom is indigenously grown in the evergreen forests of the Western Ghats on the Malabar Coast of South West
India. This area is commonly known as the Cardamom Hills. Cardamom is grown commercially in plantations under the shade of tall forest trees. It is very labour-intensive crop to produce. The Cardamom growing regions of South India lies within 8-30 degree N latitudes and 75-78 degree longitudes.

The Cardamom plants thrive well under the following conditions.

   i) A temperature between 10-35 centigrade

   ii) An attitudes ranging from 600-1500 meters above sea level

   iii) An annual rainfall of over 150 centimeters.

It requires a good amount of sunshine and appropriate rainfall. Its optimum growth and development is observed in warm and humid places under the canopy of lofty, evergreen forest trees. It is a very climate sensitive crop to rain and drought, and therefore areas liable to be affected by these conditions are unsuitable. Water logging or excessive moisture is equally injurious. The ideal site is a sloping land with good drainage.

The soil type needed by the plant to prosper is loamy soil enriched with organic matter. Moderate shade also plays a key factor in the high Cardamom yield. The propagation of Cardamom plant is done through either of the two ways that are planting a part of the roots talk or planting the seedling of the plant. The Cardamom plant is cultivated in the months of June to August. Cardamom plants normally start flowering two years after planting. Fruits mature in about 3-4 months. They are small trilocular capsules, each containing about 15-20 seeds. On maturity fruits turn into pale green under favourable conditions of the environment, a healthy adult plant would annually produce about 200 capsules, with a green weight of about 900 gram, which on processing yields about 200 gram of dry capsule. The cropping season of cardamom from August to March approximately 6 picking is done in each 45 days interval. In most of the areas the peak period of harvest is during October - November. Ripe capsules are harvested in order to get maximum green colour during curing.\textsuperscript{37}

\textsuperscript{37} Cardamom report,(2011)\texttt{www.mcxindia.com}
1.12.2 Type of Cardamom

India is considered as the home of Cardamom. Generously endowed with agriculturally important resource base, India offers ideal conditions for the cultivation of Cardamom. Indian Cardamom is one of the exotic and highly priced spices. Special cultivation and processing methods combine to make Indian Cardamom truly unique in aroma, flavour, size and colour – tempting parrot-green. There are two types of Cardamom grown in India, namely, small and large Cardamom.

1.12.2.1 small Cardamom

The small Cardamom (Elettaria Cardamomum Maton), also known as the ‘Queen of Spices’ is one of the most sought after spices in the international market. It is mainly grown in the Western Ghats, of Kerala, Karnataka and Tamil Nadu. It requires humid and moderately cool Climate, filtered sunlight obtained from tree Canopy, humus rich soil, well distributed rainfall, and protection from heavy winds for higher productivity. Majority of the small Cardamom growing landholdings belong to small and marginal category. It is mainly used for flavouring various food preparations, confectionary, perfumery, beverages and liquors. It is also used for medicinal purpose, both in allopathic and ayurvedic systems. In the middle East countries, It is mainly used for the preparation of ‘Gahwa’ (Cardamom flavoured Coffee) which is a symbol of Arab hospitality. The major commercial grades of small cardamom are bold, super bold, extra bold, bulk, small, open splits and seeds. Till recently, India was the main producer and exporter of small cardamom of late, Guatemala has emerged as a keen competitor in the international spice market.

There are essentially three major cultivation of small Cardamom, as under:

i) Malabar Type

It is medium in size and attains 2-3 meters height at maturity. The panicles are prostrate and the capsules are globose to oblong shaped. This type is better suited to 600-900 meter elevation and is mostly cultivated in Karnataka, Lower pulnies of Tamilnadu and Kannelam tract of Kerala.
ii) Mysore Type

It is robust and attains 3-4 meters height at maturity. The panicles are erect and the capsules are ovoid bold and dark green in colour. It is better adapted to attitudes ranging from 900-1200 meters. This type is mostly cultivated in Kerala and in certain pockets of Tamilnadu and Karnataka.

iii) Vazhukka Type

It is considered to be the natural hybrid of Malabar and Mysore types. The plants are robust and the capsules are bold globose or ovoid in shape. It is extensively cultivated in Kerala and Tamil Nadu at elevations ranging from 900-1200 meters above sea level.

1.12.2.2 Large Cardamom

Large Cardamom (Amomum subulatum Roxb) also known as ‘Black Cardamom’ is the dried fruit of a perennial herbaceous plant cultivated in the sub – Himalayan region of North Eastern India, Nepal and Bhutan. In India it is grown in the Sikkim and Darjeeling district of west Bengal. Its quality characteristics are different from that of small Cardamom. It is mostly valued for its acceptable taste, flavour and aroma. Fruit is round or oval shape, capsule with reddish brown colour.

India is the main producer and exporter of large Cardamom. There is a preference for scientifically proved curing quality of large cardamom. It is used as a flavourant in dishes like pulavu, Biriyani and meat preparations besides a wide range of beverages and sweets. It is an ingredient in curry powder and spice masala mixtures and is also used in Ayurvedic and Unani medicines. It has applications in flavouring cola, biscuits, liquors etc.

A member of zingiberaceae family, large Cardamom is generally used as a spice and in several medicinal preparations. The crop is grown under the shade of forest trees in the sub - Himalayan mountains. The large Cardamom plants thrive well under the following conditions.

i) A temperature between 6-30 degree centigrade.

ii) An altitude ranging from 800-2000 meters above the sea level
iii) An annual rainfall of 3000 to 3500 mm spread over about 200 days in a year.

Cultivators suited to higher altitudes can tolerate lower temperature also, while deep, well drained soils with loamy texture is the best suited. Presently there are five species of cultivators namely, Ramsey, Sawney, Golsey, Varlangey and Seremna that are grown in Sikkim. The major commercial grades of large Cardamom are *Badadana* and *Chottadana*.

Large Cardamom is as synonymous to Sikkim as Tea is to Darjeeling. It is the main cash crop of the state. Sikkim is one of the major producer and exporter of this crop. Till recent time, Sikkim was the only player in the global production and export of large Cardamom.

Official figures indicate that the production and export had surpassed a record of 5000 metric tonnes of which bulk was exported to Gulf and central Asian countries and Pakistan. However, the production has declined almost to half, though the areas under cultivation have increased substantially. The guiding factors underlining the decrease has been attributed to outbreak of viral diseases Chirkey and Furkey that destroy the plant.

Being the major cash crop of Sikkim, the Cardamom cultivation has been incorporated in the component of Technology Mission under the programme of the Government of India, which aims at ensuring adequate, appropriate, timely and current attention to all the links and achieves horizontal and vertical integration of these programmes. Presently there are approximately 16,000 growers of large Cardamom among which 30 percentage are totally dependent on this crop. It covers around 31,000 hectares of land under cultivation. The spices Board of India under the Ministry of Commerce which has been working closely with the Cardamom growers for past several decades has also been regulating the market and price factors.

**1.12.3 World Production**

Cardamom is a native to the tropical areas of the world but some species of the spice can also be cultivated in the cooler areas of the world. The world’s total
production of Cardamom is around 35,000 metric tonnes annually. The major countries indulged in the production of Cardamom are; Guatemala, India, Tanzania, Sri Lanka, El Salvador, Vietnam, Laos, Cambodia, Papua New Guinea, Thailand, Honduras, Nepal and Bhutan.

Guatemala’s production was around 800 tonnes in the early 1970s and the country’s share in global exports was less than 30 percentage. However, by early 1980’s the country was able to increase her production by around 5 times to 4300 tonnes and the country’s share in global exports rose to 60 percentage. Guatemalan cardamom competes with Indian cardamom on price front. The country was able to achieve this, through area expansion, yields improvement and reduction in cost of production. Earlier India leaded the production list with the highest production figures but Guatemala overtook India’s lead, as there was a sharp rise in the domestic production of the country in the year 2003 and 2004. The area covered in the cultivation of Cardamom has decreased since recent years but the productivity has increased significantly. The Guatemalan cardamom is also more similar to the Alleppey – green variety of India, than other varieties. Such advantages helped Guatemalan exporters to penetrate into the prime markets for Indian Cardamom. Now India has lost her once dominant position in the world market.

1.12.4 World consumption

The consumption of Cardamom has sharply increased throughout the world during the last two decades. The major consuming countries of Cardamom are Soudi Arabia, India, Pakistan, United Arab Emirates, Norway, Sweden, Denmark, Finland Iceland, Germany, Russia, England, United States of America and Japan. The countries in the western Asian region like Saudi Arabia, United Arab Emirates, India etc., have maximum consumption and these countries share around 60 percentage of the world’s consumption. The Scandinavian countries like Denmark, Finland, Sweden, Norway and Iceland have around 16 percentage share in the world consumption. Rest of the European countries have a 14

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38 Cardamom report,(2011), www.nmce.com
percentage share, Japan has a 3 percentage share, USA has a 3 percentage share and the other countries have a 4 percentage share in the world consumption.

Cardamom world market has seen many changes since it started to get traded, the most recent being the fall in the world exports. The average exports of Cardamom per year stand at around 23,000 metric tonnes. The major exporter countries of this famous spice are Guatemala, Indonesia, Costa Rica, Brazil, Nigeria, India, Thailand, Nicaragua and South Africa.

Saudi Arabia claims to be the single largest importer of cardamom. Kuwait follows Saudi Arabia in the importing list but is now here near the leader. The major importer countries are Saudi Arabia, Kuwait, United Arab Emirates, China, Japan, Hong kong, Netherlands, Singapore and USA.

1.12.5 Domestic Scenario
Cardamom cultivation is concentrated on the Western Ghats in the country, so the Western Ghats is also termed as “Cardamom hills”. India has been a dominant production of Cardamom and was the leader in its production until Guatemala overtook India. India is still the second largest producer of Cardamom in the world. It produces around 11,500 tonnes of Cardamom every year. Indian Cardamom is slightly smaller, but more aromatic.

1.12.6 Factors influencing the Cardamom Market

a) Fresh Cardamom is green and has a characteristic aroma. Freshness, colour, aroma and size are the major factors that influence cardamom prices.

b) Cardamom is usually stored in a cooler areas to preserve its inherent properties

c) Indian Cardamom specially Green is a premium grade against all other international grades.

d) Production in competing countries like Guatemala.

e) Annual production in India

f) Seasonal variation and time of arrival of new crop in the market

g) Weather conditions in India
h) Domestic consumption demand

i) Export orders from foreign countries

1.12.7 Production of Cardamom

The following table shows the area and production of Cardamom in India from 1990-91 to 2013-14

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (hectares)</th>
<th>Production (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-91</td>
<td>81554</td>
<td>4750</td>
</tr>
<tr>
<td>1991-92</td>
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<tr>
<td>2013-14</td>
<td>69970</td>
<td>16000</td>
</tr>
</tbody>
</table>

Source: spices Board

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Cardamom report (2011) www.mcx.india.com
The area under Cardamom cultivation was 81,554 hectares during 1990-91 and this has increased to 69,970 hectares in 2011-14. There is no considerable change in the area during the past 22 years. The changes in climatic factors, decline in price of Cardamom and simultaneously shifting to other economic crops are the major reasons attributed to the decline in Cardamom area. The output of Cardamom was 16,000 tonnes during 2011-14 when compared to 4,750 tonnes in 1990-91. The major reasons for the decline in output are, uneven rainfall uneven weather conditions and exhausted old plantations.

India has the largest area under cardamom in the world but the productivity is poor comparatively. Though the area under cultivation has decreased, the production has increased many folds because the productivity of Cardamom has improved a lot in the domestic front ie, from the low level of 46Kg/Hectare yield in 1970-71 to 215 Kg/Hectares in 2003-04. Though this data state specific average yield, some of the plantations produce 1000-1500 Kg per hectares regularly. The yield in the recent years however, has started increasing slowly with the increase in use of better planting materials by innovative cardamom growers and installation of drip irrigation systems.

1.12.8 Consumption of Cardamom

India consumes almost 90 percentage of the domestic cardamom production. At present, India is the second largest consumer of small cardamom in the world after Saudi Arabia. Global consumption of cardamom is estimated at 15,000 tonnes to 24,000 tonnes. On the other hand the current domestic demand for small cardamom has been estimated at 11,000 metric tonnes. The retail market size in South India is estimated at around 30 percentage for small cardamom. The share is the highest in west India (45 percentage) followed by the North India (35 percentage) and lowest in East.

Industrial consumption of cardamom particularly by the pharmaceutical, Ayurveda, Unani and cosmetics is the highest and accounts for over 45 percentage of the total consumption. A clear regional disparity is visualised in

40 Cardamom report (2011) www.nmce.com
41 Cardamom report (2011)www.mcxindia.com
cardamom consumption pattern. Though the urban areas contribute large share of its consumption, in recent years rural market is also gaining importance and growing at a very high rate than the urban market. Household use of Cardamom is very limited mainly due to the high price, but seasonal buying has been increased.

1.12.9 State wise Production.

In India two types of Cardamom are grown, namely, small and large. Production of small Cardamom confined to Southern states whereas large one is grown mainly in North Eastern states. Among the major small Cardamom growing states, Kerala has taken the largest piece of 76 percentage to the total production followed by Karnataka ie 15 percentage and Tamil Nadu with 9 percentage. Kerala occupies first position in both area (57 percentage) and production 76 percentage of Cardamom followed by Karnataka with 36 percentage share in area and 15 percentage share in production. Although area under Cardamom in Karnataka has increased significantly but production is very less compared to Kerala. Idukki in Kerala is the main Cardamom production district and places like Udumbanchola taluk, Peeremedu taluk and Devikulam taluk are important centres in Idukki district.42

A cardamom plant starts yielding from the 3rd year of planting and it continues for 8-10 years. The total life span of Cardamom plant is about 15-20 years. The harvesting period of small Cardamom extends from September to January, with the peak arrival from October to November. In Guatemala, the harvesting is in almost the same period. The harvesting in India begins from September and is repeated in intervals of 30-45 days, 5-6 times. Irrigation or rains after a plucking ensures the development of flowers again, from which seeds again develop. Thus the cardamom plant requires a continuous spell of rain interspersed with periods of good sunshine. The plant is also very susceptible to pests and disease. As a result the output fluctuates from year to year.

42 www.karvycom trade Ltd.
1.12.10 Export and Import of Cardamom

India was the world’s largest exporter of Cardamom till 1985. Now the country exports less than 10 percentage of the total production. The increased competition from low cost competition and improvement in domestic consumption has been the reason for low exports from India. The following table shows the export and import of India from 1990-91 to 2011-12.

**Table 1.7 Export and Import of Cardamom**

<table>
<thead>
<tr>
<th>Year</th>
<th>Export(tons)</th>
<th>Import(tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-91</td>
<td>400</td>
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<td>1991-92</td>
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<tr>
<td>2013-14</td>
<td>3600</td>
<td>1110</td>
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</table>

Source: DGCRS Calcutta.
Alleppey Green cardamom is the major grade exported from India. This is considered to be the best grade in the world and is the most preferred and priced in the world. The exports of value added products are displaying an improvement. Cardamom oil and cardamom oleoresins are the major value added products obtained from cardamom. European union countries like Germany, Netherlands and UK are the major importers of these value-added products from the sub continent.

As India’s production is capable of satisfying the domestic consumption demand, it does not import any Cardamom from outside countries when India dominated the production of Cardamom in the international market. However cheaper Guatemalan Cardamom finds its way into the country and are preferred in low value uses like pan masala, etc. The left over Cardamom produced in the country is exported every year that makes India a net exporter in the world market43.

**CARDAMOM FUTURES**

The cardamom *futures* trading was firstly started at Multi Commodity Exchange in India. Now there is active trading in 7 mm cardamom.

**1.13 Chapterisation**

The first chapter gives the introduction to derivatives, commodity derivatives and information regarding to the three commodities namely cardamom, pepper and rubber, their area, production, import and export.

The second chapter contains the review of literature.

The third chapter covers the research design of the study.

The fourth chapter includes the theoretical aspects of the growth and structure of commodity derivatives market in India, the working of the national level multi commodity exchanges, mechanism and volume of trade.

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43 Cardamom report (2011) www.mcxindia.com
The fifth chapter describes the analysis of price discovery of cardamom, pepper and rubber.

The sixth chapter focuses the hedging performance of three commodities.

The seventh chapter discusses the conclusion, suggestions and recommendations based on the study.