FUTURES TRADING OF CRUDE OIL- A STUDY ON PRICE RISK MANAGEMENT OF CRUDE OIL FUTURES

By

PRUDHA MOHAN
(2003-05-14)

PROJECT REPORT

Submitted in partial fulfillment of the requirement for the degree of

Bachelor of Science in Co-operation and Banking
Faculty of Agriculture

COLLEGE OF CO-OPERATION BANKING AND MANAGEMENT
KERALA AGRICULTURAL UNIVERSITY
VELLANIKKARA, THRISSUR- 680 656
KERALA, INDIA
2008

Declaration

DECLARATION

I here by declare that this project report entitled **"FUTURES TRADING OF CRUDE OIL- A STUDY ON PRICE RISK MANAGEMENT OF CRUDE OIL FUTURES"** is a bona fide record of work done by me during the course of project work that it has not previously formed the basis for the award to me for any degree/ diploma, associateship, fellowship or other similar title of any other University or Society.

Vellanikkara
08-04-2008

PRUDHA MOHAN
(2003-05-14)

Certificate

CERTIFICATE

Certified that this project report entitled **"FUTURES TRADING OF CRUDE OIL- A STUDY ON PRICE RISK MANAGEMENT OF CRUDE OIL FUTURES"** is a record of project work done independently by Ms. PRUDHA MOHAN (2003-05-14) under my guidance and supervision and that it has not previously formed the basis for award of any degree, fellowship or associateship to her.

Mr. Jacob Thomas M.
Assistant Professor
College of Co-operation Banking and Management
Kerala Agricultural University
Vellanikkara

Vellanikkara
08-04-2003

CERTIFICATE

We, undersigned members of the Viva-voce Board of **Ms. PRUDHA MOHAN**, a candidate for the degree of B.Sc. (Co-operation and Banking) agree that the project report entitled **"FUTURES TRADING OF CRUDE OIL- A STUDY ON PRICE RISK MANAGEMENT OF CRUDE OIL FUTURES"** is submitted in partial fulfillment of the requirement for the degree.

Dr. M. A. Lizy
Associate Professor
Department of Rural Banking and Finance Management
College of Co-operation, Banking & Management
KAU, Vellanikkara
(Chairperson)

Mr. Jacob Thomas M.
Assistant Professor
College of Co-operation, Banking & Management
KAU, Vellanikkara
(Guide)

Mrs. Misha Davis
Assistant Lecturer
Department of Co-operative Management
College of Co-operation, Banking & Management
KAU, Vellanikkara
(Examiner)

College of Co-operation Banking and Management • Kerala Agricultural University •
Vellanikkara
Thrissur-680656
Date.....

Acknowledgement

ACKNOWLEDGEMENT

This project had been carried out with the timely advice, guidance and cooperation of innumerable persons and institutions. I would like to mention a few whom I have been very fortunate enough to interact and who had always remained with me as a constant source of inspiration throughout the course of my academic career.

Any value of work will not suffice to express my deepest sense of gratitude to my guide ***Mr. Jacob Thomas M.*** *whose meticulous guidance, wise counsel and technical criticism enabled me to complete this piece of work.*

I reckon from the inner heart my deep sense of gratitude and solemn indebtedness to my advisors ***Dr.K.P.Mani,*** *for constant encouragement and parental affection rendered upon me and* ***Mr. M. Mohanan*** *for his timely advices, through out my academic pursuit.*

I am highly obliged to ***Dr.M.A.Lizy,*** *Chairperson and* ***Mrs. Misha Davis,*** *Examiner, of the viva board whose constructive criticism and perceptive comments made my work more logical.*

My profound gratitude to the officials of Peninsular Multi Commodities Services Limited, specially to ***Mr. and Mrs. T. S. Anantharaman,*** *for the support and generous cooperation extended by them inspite of their busy Schedule and to* ***Mr. Sreelal*** *whom I have been fortunate enough to meet and interact for the valuable help and extreme cooperation.*

I will rank infidelity on my part if I fail to express my heartfelt gratitude to ***Dr.Molly Joseph*** *whose courtesy and encouragement inspired and boosted me through out my college life.*

*I am indebted to **Shri. Philip Sabu** for extending his kind help and criticism views in the course and context of my project work.*

*I wish to express my gratefulness to Associate Dean **Mr. U. Ramachandhran** for his timely help and encouragement.*

*I extend my heartfelt thanks to **Mr.P.J.Boniface** for his kind support and cooperation which helped me to complete this work successfully.*

*I express my deep love and thankfulness to my sister **Prima Mohanan** for helping me in converting my written manuscript into the present typed version.*

*I thank Almighty for blessing me with great friends and making me part of the most wonderful batch DAZZLES' 03. I would like to specially thank my friends **Julin, Fazi, Ruby** and **Boby** for being always with me, in all my sorrows and happiness*

*I owe my thanks to librarian **Mr.K.P. Sathian** for his support and cooperation*

I am very grateful to my beloved parents for their love, selfless sacrifice and unfailing inspiration.

I am greatly indebted to all the faculty members of college for their constant support during my college life in CCBM.

I would like to pay my respect to God, for his blessings and grace conferred on me.

I alone am responsible for any errors which may remain.

PRUDHA MOHAN

Contents

CONTENTS

List of Tables

LIST OF TABLES

List of Figures

LIST OF FIGURES

Design of the study

CHAPTER 1
DESIGN OF THE STUDY

1.1 Introduction

Commodity Futures Trading is 125 age old trading technique which is considered as the most popular, most effective, most economic, and widely used technique in every corner of the world. The first Commodity Future operation was initiated by a farmer, and that the first Commodity Exchange in the world was also invented and introduced by a group of farmers. It is equally beneficial to traders and investors too. Apart from agricultural commodities various other commodities like base metals, bullion, energy etc are traded across the globe.

Online Commodity Futures is the latest introduction into the Indian Economy, which has opened a new avenue for retail investors and traders to participate. It is the best available option for those who want to diversify their portfolios beyond equities, interest bearing securities or investments and real estate. To those business class and manufactures, commodity futures are one best available forum for procuring their required raw materials, judging the market movements, and to plan their operations suitably. Commodities offer immense potential to become a separate asset class for market-savvy investors, arbitrageurs and speculators too in addition to those already involved in the physical trade.

The invention of the Internet has brought about many changes in the way that we conduct our lives and our personal business. The internet is changing the way the traders trade commodities enabling them to conduct online trading from nearly anywhere in the world, at any location, and now independent of a brokerage firm's fees and limitations. Online futures trading in commodities is a recent concept introduced in commodity market. Trading commodities online allows those who are involved with a

particular commodity to lock in the price to avoid devastating changes later. A drilling company may sell oil futures, if it believes that crude oil prices are going to fall in the future; in turn a refinery might buy futures if prices appear ready to rise. No matter which direction the prices move after that, both the drilling company and the refinery are guaranteed their price.

1.2 Statement of the problem

The economy is facing a dicey situation with major sections of the society complaining over rising commodity prices, which leads to an inflationary situation in the economy. The price of the crude oil plays a significant role in determining the price of other essential commodities. Both modern industrial economy and agriculture depends upon crude oil in way or other. It is a key variable in global financial market and also largest traded commodity in the world. Because of its excellent liquidity and price transparency, the crude price is used as a principal international pricing benchmark. Thus an efficient market system for crude oil is essential to reduce the high fluctuation in the prices of other commodities. Various measures have been adopted, some were direct and others indirect in nature. The existence of commodity future exchanges will reduce the risk and strengthen the prices. The online trading on the exchanges also helps in continuous monitoring of dynamic external environment and emanating the price signal from the market and disseminating the same to the traders, producers and consumers.

1.3. Objective of the study

1. to analyze the movements in future prices of crude oil
2. to identify best model for predicting future price
3. to study the price risk management in oil futures

plotted on a graph against the time period (date) for each month and depending on the shape of the curve the trend line is fitted.

a) Linear trend

The linear trend is also called the line of best fit. This helps in forecasting and predicting. The straight line trend is represented by the mathematical equation,

$$Y_t=a+bt$$

Where, Y_t is the required trend value of crude oil future prices

t is the unit of time in days

'a' and 'b' are constants

In the above equation, the values of the unknowns or constants can be calculated by the following normal equations:

$$\sum Y=Na+b\sum t$$
$$\sum tY=a\sum t+b\sum t^2$$

$\sum$Y is the monthly sum of daily future prices of crude oil

N is the number of days for which data are given

Here 'a' gives the mean value of Y values and 'b' measures the rate of change.

b) Parabolic trend

Parabolas are non linear, they form into smooth curves. The shape of these curves depends up on the values of the constants a, b, c .The trend equation in this type is

$$Y_t=a+bt+ct^2$$

Where, a is the trend value at the time origin,

b is the slope at the origin and

c establishes whether the curve is up or down and how much

1.4. Methodology of study

Data collection:

The study is based on secondary data. The daily three-month future prices of Crude Oil from 1 Jan 2007 to 31 Dec 2007 in Rupees per Barrel were collected from the website of Multi Commodity Exchange of India (www.mcxindia.com) and the daily spot prices of Crude Oil from 1 Jan 2007 to 31 Dec 2007 were obtained from the website of National Multi Commodity Exchange of India (www.nmce.com). The information and data regarding the top world Crude Oil Producers, Consumers, Exporters and Importers were compiled from website of Energy Information Administration (EIA) (www.eia.doe.gov). The information related to the working of the organization, the online trading of commodities, clearing and settlement mechanism were gathered through observation and by discussing with the authorities and officers of Peninsular Multi Commodities Services Ltd

Data analysis:

The secondary data collected were analyzed using different mathematical models and statistical tools. The trends in the price movement were interpreted by plotting graphs and from the results obtained by using statistical models. The method of least squares was used to find the trend line for the given data. Co-efficient of correlation and standard deviation were used to study movement in spot and future prices of crude oil. Hedging and Hedge ratio were given importance for managing risk associated with crude oil trading. The different statistical tools used for this study are as follows-

Method of Least Squares

The movement in the future prices of crude oil is analysed by fitting trend line obtained through the method of least squares. The daily future prices of crude oil are

The values of a, b and c can be determined by solving the following three normal equations simultaneously:

$$\sum Y = Na + b\sum t + c\sum t^2$$
$$\sum tY = a\sum t + b\sum t^2 + c\sum t^3$$
$$\sum t^2 Y = a\sum t^2 + b\sum t^3 + c\sum t^4$$

c) Logarithmic trend

The logarithmic trend line is used as an expression of the secular movement when the series is increasing or decreasing by a constant percentage rather than a constant absolute amount. The equation of this curve is

$$Y_t = ab^t \text{ or } Log\ Y = Log\ a + t\ Log\ b$$

Normal equations are:

$$\sum(Log\ Y) = N\ Log\ a + \sum t\ Log\ b$$
$$\sum(t\ Log\ Y) = Log a\sum t + \sum t^2\ Log\ b$$

With the help of these normal equation the value of *log a* and *log b* can be found out and antilog of *log a* and *log b* gives the value of *'a'* and *'b'*

Test of adequacy of the fit using "S" and "I"

a) Root Mean Square Residual (S):

Root Mean Square Residual (S) is used to measure the adequacy of the fit. It explains whether the trend line is a line of good fit or not. It is the square root of the means of the squared deviations. The smaller the value of "S" the better is the fit.

It is given by the equation:

$$S = \sqrt{\frac{\Sigma(y - y_t)^2}{(n-k)}}$$

Where, y is the daily crude oil future prices

y_t is the trend value of crude oil future prices

t is the time period (1,2,3,.....n)

$\sum(y- y_t)^2$ is the sum of squares of deviation

n denotes the number of days in a particular month

k is the number of constants in the trend equation.

b) Furnival Index (I):

Furnival (1961) opined that, while making use of method of least squares for fitting the models, the scale of the dependent variable will be different for linear and non linear models. Hence the usual index of fit, S (the root mean square residual) cannot be directly used in such situation. Thus the index suggested by Furnival, known as Furnival Index (I) is used. It is a test of adequacy of the fit and is calculated by dividing the Root Mean Square Residual (S) by the product of the all the differentials of the values of trend equation, whole rise to the inverse of the time period. The smaller the value of "I" the better is the fit. It is given by the equation:

$$I = \frac{S}{[\Pi f'(y)]^{1/n}}$$

Where, I is the Furnival Index

S is the Root Mean Square Deviation

$\prod f'(y)$ is the product of all the differentials of the trend equation values.

n is the number of days

Hedge ratio *(h)*

Hedge ratio is defined as the relationship between the price of the spot instrument and that of the hedging instrument. It is the proportion of the position taken in futures to the size of the exposure, and is denoted by ***h***. This is the ratio that will minimize the risk of the position; the risk is measured as the volatility. Therefore, if an investor is long one unit of the asset, he has to short ***h*** units of the futures. The hedge ratio is calculated as the product of the co-efficient of correlation between the change in spot prices and the change in future prices and the ratio between the standard deviation of the change in spot price and the standard deviation of the change in future prices of the commodity.

The hedge ratio (***h***) is given by the formula:

$$h = \rho_{\Delta S,\Delta F}\frac{\sigma_{\Delta S}}{\sigma_{\Delta F}}$$

The hedge ratio can also be rewritten as

$$h = \frac{cov(\Delta S,\Delta F)}{var(\Delta F)}$$

Where,

h = Hedge ratio (the number of futures necessary to balance or hedge the underlying position)

ΔS = change in spot prices of crude oil

ΔF = change in future prices of crude oil

ρ = Correlation coefficient between the spot and futures prices of crude oil

$\sigma_{\Delta S}$ = Standard deviation of the spot price of crude oil

$\sigma_{\Delta F}$ = Standard deviation of the future price of crude oil

The correlation co-efficient tells how the movements of the spot and futures prices are related. This can be either a positive or negative number. A positive number suggests that the prices have a positive correlation. For example, when one price

increases, the other also increases. The standard deviations for the futures and spot prices are the calculated standard deviations across different maturities. The basic purpose behind using the hedge ratio is to reduce the basis risk.

Correlation

Correlation is the statistical analysis which measures and analyses the degree or extent to which two variables fluctuate with reference to each other. If two variables tend to move together in the same direction then the correlation is called positive correlation. If it moves in opposite direction then the variables are negatively correlated.

The formula for calculating the co-efficient of correlation is

$$\rho = \frac{COV\,(\Delta S, \Delta F)}{\sigma_{\Delta S} \times \sigma_{\Delta F}}$$

where, ρ is the co-efficient of correlation

ΔS denotes the change in spot prices

ΔF denotes the change in future prices

$\sigma_{\Delta S}$ is the standard deviation of series ΔS

$\sigma_{\Delta F}$ is the standard deviation of series ΔF

1.5. Main items under observation

The daily three-month future price of crude oil in rupees per barrel (1 barrel = 158.98 litres) , daily spot prices, volume traded in barrels, value in rupees were taken into consideration for studying the price movements. The data showing the top producers, consumers, exporters and importers of crude oil were also taken into consideration to study their percentage share among top ten countries.

1.6. Scope of the study

The scope of the study was confined to the future price movements of crude oil as quoted by Multi Commodity Exchange of India.

1.7. Practical utility of the study

The study on the movement of future prices of crude oil helps to avoid the risk associated with crude oil trading. The producers and consumers of other commodities can also determine the future prices of their commodity and avoid the risk associated with it since all other commodity prices are based on the crude oil prices. It also helps the large exporters and importers to take right decision while trading huge lots.

1.8. Limitation of the study

The crude oil is a global commodity and the prices are fixed internationally. The various international factors, which influence the prices of crude oil, shall not be taken into consideration.

1.9. Chaptering

The whole study is divided into six chapters. The first chapter outlines the design of the study. An over view of Indian Commodity Futures is presented in the second chapter. The third chapter delineates the Organisational Profile of Multi Commodity Exchange and Peninsular Multi Commodities Services Ltd. The fourth chapter portrays the various concepts of Futures Trading. The fifth chapter deals with Analysis. The final chapter depicts the summary of findings and conclusion of the study.

Review of literature

Various committees were appointed to examine the need for futures market. These committees had recommended various measures to revive futures trading in commodities. Various studies have also proved that the existence of futures market have been beneficial for price discovery and price risk management.

Shroff Committee (1950) scrutinized the comments of stake holders and revised the draft Futures Market (Regulation) Bill.

Dantwala Committee (1966) reviewed the functioning of the Forward Markets Commission and the extent to which the commission has been able to carry out the objective. The Committee also assessed the role that the forward markets can play in future in the light of the changed economic conditions in the country and to suggest amendments to the existing Act in order to effect improvement.

Pavaskar (1970) argued that the critics erroneously believed that the speculators aggravated price rises by accumulating long commitments in the futures markets. Infact he argued that in the absence of a market mechanism such as futures, uncertainties regarding futures price levels may induce spot traders and large producers to hoard, leading to greater price volatility than any possible impact of the legitimate futures trading.

Dusak (1973) analysed the longstanding controversy over, whether speculators in a futures market earn a risk premium, within the context of the capital asse4t pricing model developed by Sharpe, Lintner and others. Under this approach, the risk premium required on a futures contract should depend, not on the variability of price but on the extent to which the variation in prices are systematically related to variations in the return on total wealth.

Khusro committee (1980) studied the feasibility of introducing futures trading in selected commodities and recommended re-introduction of futures trading in major commodities. It assessed the role that forward trading can play in the prevailing economic conditions and marketing/distribution system in the commodities in which forward trading is possible, particularly in commodities in which resumption of forward trading is generally demanded and to examine the extent to which forward trading has special role to play in promoting exports. The Committee suggested measures for strengthening the Forward Markets Commission to achieve the objective of making futures trading socially purposeful and to ensure that forward trading in the commodities remain constructive and helps in maintaining prices within reasonable limits.

Kolb (1985) described a futures contract is a form of legal commitment between a buyer and a seller in which they agree to exchange something at a specified price at the end of a designated period of time.

According to Marshall (1989) any enterprise that normally buys or sells the commodity (or product closely related to them) or is engaged in borrowing or lending operation can make use of futures contract, to eliminate or to at least offset the risk of future price fluctuation.

The study conducted by UNCTAD secretariat (1993) observed that the electronic system of trading enables any exchanges to have a much wider reach beyond the confines of physical trading floor. The electronic system in European commodity exchange have enabled them to deliver them products to all parts of the world by linking their technology to end users

The Kabra Committee (1994) examined the role of futures trading amidst changing economic scenario. It recommended allowing futures trading in seventeen commodity group and also recommended strengthening of forward market commission and amendments to Forward Contracts (Regulation) Act, 1952 to allow options trading in

goods and registration of brokers with Forward Markets Commission. The major amendment include allowing options in goods, increase in outer limit for delivery and payment from 11 days to 30 days for the contract to remain ready delivery contract.

The Standing Committee on Commodities (1994) agreed that government and those operating in commodity markets, especially in developing countries in transition, needed to become more aware of the potential uses of the market based risk management instrument and of the risk associated with their use.

Rutten (1996) found that the relation between commodity exchange and the government need not be of adversaries. Insufficient understanding of the role and usefulness of commodity exchanges can indeed lead to policies that hurt the exchanges and their users. But exchanges cannot do without the government m, without a framework, which can only be created by the government. government need to police the exchanges so that direct and indirect users can rest assured , that indeed the exchanges serve the public rather than a particular private interest and they need to facilitate or rather , enable the functioning of exchanges through the provision of an appropriates legal and regulatory framework.

Clubley (1998) mentioned that the oil futures market were set up to enable traders to offset some of the risks they take, by hedging their positions or taking a futures position equal and opposite to that which they hold on the physical market. Thus a trader who has bought a cargo of gas oil at a fixed price would sell futures to protect himself against a fall in price before he can sell his cargo.

Mishra (1998) argued that the price discovery first takes place in the futures market and then it is transmitted to the spot market

Harris and Moyer (1999) have described hedge as a transaction that limits the risk associated with market price fluctuation for a particular investment position. A hedge is accomplished by taking offsetting positions in the ownership of an asset or security

through the use of derivative security such as buying or selling a futures contract to offset risk exposure in the cash market.

According to Jain (1999) moving from today's heavy dependence on public management schemes essential commodities to tomorrow's system of commodity futures and forward trading is likely to be a long and painful process. The move towards a more open and transparent system of commodity futures and forward trading implies greater scrutiny and the need for more resources to co-ordinate many diverse interests. In return it offers the promise of greater accountability, reliability and cost effectiveness.

Erresa and Brown (2002) mentioned that in today's changing political and economic environment, it is increasingly important that company learn to properly use the various trading instruments to protect themselves against price volatility. Since the first successful energy futures contract was introduced almost a quarter century ago, trading in energy futures and options has played an important role in hedging against fluctuations in the price of petroleum product, crude oil, natural gas, propane, electricity and most recently coal.

Naik and Jain (2002) evaluated the performance of Indian futures markets in terms of risk management and price discovery functions. The usefulness of futures market is risk management was evaluated by anaysing the risk involved in the spot, futures and basis of commodity, while their role in price discovery was evaluated by examining forward pricing ability through test of co-integrate between cash & future prices & tests for efficiency and lack of bias.

Gallati (2003) suggested that to lock in the profits and protect against the risk of rising prices, a great many short term derivatives contract such as Swaps and futures on Crude Oil, heating oil and gasoline on several exchanges and markets in an attempt to hedge its forward positions with retailers. This led to a timing mismatch between the short term hedgers and the long-term liability and also resulted in over hedging

In the opinion of Sunilkumar (2003) integration of spot and futures market is a vital factor for growth of commodity futures in India. The spot market in agricultural commodities is controlled to a large extent by the state governments and this fragments the commodity spot market and prevents the reach of commodity futures market outside the boundaries of the states. He says that a coordinated approach is necessary for developing nationwide commodity market.

National Multi Commodity Exchange of India (2005) in its website (www.nmce.com) explained that there are two basic categories of futures participants, hedges & speculator. In general, hedges & are futures for protection against adverse future price movements in the underlying cash commodity. The rational of hedging is based upon the demonstrated tendency of cask prices & futures values to move in tandem. Speculators are the second major group of future players. These participants include independent flow traders & investors

Neill (2006) studied on the impact of speculative investments on commodity markets, especially oil. In modern times, where so much capital is being managed amongst hedge funds and in many other forms, trending markets attract speculators. In this regard, there are of course speculative investors, attracted to oil. In addition because of the fundamentals, there are other strategic financial investors who have allocated capital to resources including oil.

Vishwanathan (2006) argued that the world is coming to realize that there is a need for fair price for oil too, like anything else for it could be significantly higher than the current price and futures help in determining the fair price.

Mahajan (2007) said that the price rise, especially in essential product, has been there in this country, but futures trading in commodities have made the problem of inflation even more acute. If we have a look at the data of futures commodity market its worth noting that due to the futures market the price of essential commodities have increased significantly and the same has effected the consumer badly.

Kuassi (2008) argued that the sky rocketing oil prices definitely pose challenges to monetary authorities in their bid to preserve monetary stability. A big uncertainty surrounds the consequences of a shift from the US dollar to a new currency basket in oil trading and commodity trading by and large.

CHAPTER 2
INDIAN COMMODITY FUTURES

Forward contracts were the earliest form of commodity derivatives that existed since human beings started producing more than their needs. Futures contracts have existed for centuries in one form or another. The earliest reference to 'futures' was in Kautilya's Arthashastra. The origin of modern futures can also be traced to Holland in the 16th century. Among the first recorded evidence of futures trading was in Japan – in rice. Futures came into prominence when, trading in agricultural commodity futures in the United States was organized during the mid-nineteenth century.

The major organized step in futures trading was taken during the middle of the 19th century, when futures trading in grain contracts was started in the United States. The "Chicago Board of Trade" (CBOT) was established in 1848 and introduced the first traded derivatives contract in agricultural products. In 1874 the Chicago Produce Exchange which is now known as Chicago Mercantile Exchange was formed. Metals followed grains in the queue with the start of trading in futures contracts at the London Metal Exchange (LME) in 1878, and over the next few decades a number of other commodity exchanges sprang up. Presently, trading in commodity futures is prevalent in more than 20 countries, including the US, Canada, UK, France, China, Singapore, Japan, Australia, New Zealand & India. Development of many emerging markets has recently given rise to the establishment of new exchanges, which have allowed market participants to access local markets for their price risk management.

Apart from the US and the UK, India is the only other country, which has had an active futures market over a long period. After the cotton exchanges were established in the UK & the US (1880), the cotton merchants in Bombay followed suit. A large portion of the Indian cotton crop found its way to Bombay, which emerged as the largest cotton port in the Eastern part of the world. In addition to this spot trade, a good deal of futures business was also conducted.

2.1 Pre Independence Period

The history of organized commodity derivatives in India goes back to the nineteenth century when the Cotton Trade Association started futures trading in 1875, barely about a decade after the Commodity derivatives started in Chicago. In 1918, the Government set up Cotton Contracts Committee to regulate trading in futures. The futures trading in oil seeds were organized in India for the first time with the setting up of "Gujarati Vyapuri Mandali" in 1900 in Mumbai. Later, several other exchanges were created in the country to trade in a diversified basket of commodities such as jute wheat, bullion pepper, turmeric, potato, sugar and jaggery.

2.2 Post Independence Period

At the end time of independence, the Indian economy was predominantly agrarian. Most of the population was employed in agriculture, with the majority of them living below the poverty level. The Planning Commission, which was set up following independence, adopted a mixed model for the Indian economy focusing on balanced development of various sectors and regions. The Parliament passed Forward Contracts (Regulation) Act, 1952 (FCRA) which currently regulates forward contracts in commodities all over India. The act applies to goods, which are defined as any movable property other than security, currency and actionable claims. Under the Act, only those associations/exchanges, which are granted recognition by the government, are allowed to organize forward trading in regulated commodities. The Act envisages three-tier regulation.

1. The Exchange which organizes forward trading in commodities can regulate trading on a day to day basis.
2. the Forward Markets Commission provides regulatory oversight under the powers delegated to it by the Control Government, and

3. The Central Government – department of consumer Affairs, Ministry of Consumer Affairs, Food & Public Distribution is the ultimate regulatory authority.

The Forward Contracts (Regulation) Rules were notified by the Government in July 1954 The Forward Markets Commission (FMC), headquartered at Mumbai, was entrusted with the job to regulate the commodity markets. It is overseen by the Ministry of Consumer Affairs, Food and Public Distribution, Government of India. With the introduction of economic reforms during the early 1990's, followed by the gradual withdrawal of administered pricing system in many commodities, the need to set up a market mechanism that performs the role of economic functions of price discovery and risk management was necessitated. Later the government had accepted most of the recommendations of the Kabra Committee, which was set up in 1994 and futures trading was permitted in all the recommended commodities.

It is only in the last decade that commodity derivatives exchanges have been actively encouraged. But the markets have suffered from poor liquidity and have both grown to any significant level, till recently. However, in the year 2003, three national commodity exchanges became operational National Multi Commodity Exchange of India National Commodity and Derivatives Exchange and Multi Commodity Exchange. The onset of these exchanges and the introduction of futures contracts on new commodities by the Forwards Market Commission have triggered significant levels of trade. Now the commodities futures trading in India is all set to match the volumes in the capital markets. These exchanges were required to be online and be de-mutualised.

2.3 National Commodity Exchanges functioning in India

National Multi Commodity Exchange of India ltd. (NMCE)

In May 1990, first state –of- the –art demutualised multi commodity exchange, NMCE. was promoted by commodity relevant public institutions, viz., Central

Warehousing Corporation(CWC) National Agricultural Cooperative Marketing Federation of India (NAFED), Gujarat Agro-Industries Corporation Ltd(GAICL), Gujarat state Agricultural Marketing Board (GSAMB), National Institute of Agricultural Marketing (NIAM) and Neptune Overseas Ltd. while various integral aspects of commodity economy, viz, warehousing, cooperatives , private and public sector marketing of agricultural commodity , research and training were adequately addressed in structuring the Exchange ,finance was still a vital missing link. Punjab National Bank took equity of the exchange to establish that linkage. Even today, NMCE is the only Exchange in India to have such investment and technical support from the commodity relevant institutions. The day to day operation of the Exchange is managed by the experienced and qualified professionals. NMCE commenced futures trading in 24 commodities on 26th commodities on 26th November, 2002 on a national scale and the basket of commodities has grown substantially, since then to include cash crops, food grains, plantations, spices, oilseeds, metals and bullion among others.

Multi Commodity Exchange (MCX)

MCX is an independent and de-mutulised multi commodity exchange. It was inaugurated on November 10, 2003 by Mr. Mukesh Ambani, Chairman and Managing Director, Reliance Industries Ltd. and has permanent recognition from the Government on India for facilitating online trading, clearing and settlement operations for commodities futures market across the country. Today, MCX features amongst the world's top three bullion exchange and top four energy exchanges. MCX offers a wide spectrum of opportunities to a large cross section of participants including producers / processors, traders, corporate, regional trading centre, importers, exporters, cooperatives and industries associations amongst others. Headquartered in the financial capital of India, Mumbai, MCX is led by an expert management team with deep domain knowledge of the commodities futures market. The exchange has also affected large deliveries in domestic commodities, signifying the efficiency of price discovery.

National Commodity and Derivatives Exchange (NCDEX)

NCDEX is a public limited company incorporated on April 23, 2003 under the Companies Act, 1956. It obtained its certificate for commencement of business on May 9, 2003. It commenced its operation on December 15, 2003. NCDEX is a national level technology driven de-mutualised online commodity exchange with an independent Board of Directors and professional management – both not having any vested interest in commodity markets. It is a professionally managed on line multi commodity exchange promoted by ICICI Bank Ltd , Life Insurance Corporation of India , National Bank for agriculture and Rural development and Nations Stock Exchange of India ltd. , Canara Bank ,Credit Rating Information Services of India ltd. Goldman Sachs, Indian Farmers Fertilizer Cooperative Ltd and Punjab National Bank by subscribing to the equity shares have joined the initial promoters as shareholders of the exchange. NCDEX is the only commodity exchange in the country promoted by national level institutions. The institutional promoters and shareholders of NCDEX are prominent players in theirs respective fields and bring with them institutional building experience trust nationwide reach, technology and risk management skills. NCDEX currently facilities trading of 57 commodities in agricultural goods, metals, energy, Brent crude oil and furnace oil.

While NMCE & NCDEX have focused their business on domestically traded commodities, MCX focused its business on globally traded commodities. The section of commodities, combined with the strength of the strategic tie up with respective global benchmark exchanges, have made MCX a market leader in the domestic market in these commodities and have brought in global recognition for MCX and India. The new exchanges are creating a near perfect market situation, with a wider participation from the trading community during domestic and global market timings. These recognized on line national commodity exchanges and 22 regional exchanges are assisting the producers as well as the consumers in affair price discovery and enabling them to hedge their price risk. The introduction of national commodity futures market was well received by market

players as trading increased manifold after the national exchanges were allowed. The three new exchanges viz, MCX, NCDEX &NMCE have the lions share in the industry due to the inherent strengths of electronic trading platform and professional management.

India is one of the top producers of a large number of commodities, and also has a long history of trading in commodities and related derivatives. The commodities derivatives market has seen ups and downs, but seem to have finally arrived now. The market has made enormous progress in terms of technology, transparency and the trading activity. Interestingly, this has happened only after the Government protection was removed form a number of commodities & market forces were allowed to play their role. This should act as a major lesson for the policy makers in developing countries, that pricing and price risk management should be left to the market forces rather than trying to achieve these through administered price mechanisms. The management of price risk is going to assume even greater importance in future with the promotion of free trade and removal of trade barriers in the world. All this augurs well for the commodity derivatives markets.

Time line of Indian Commodity Futures

1875 – Bombay Cotton Trade Association (cotton futures started)
1900 – Gujarat Vyapuri Mandali (now BCE) (oilseed futures started)
1919 – Calcutta Hessian Exchange
1920 – Gold futures trading in B.B.A
1921 – East India Cotton Association
1927 – East India Jute Trade Association
1939 – Cotton Options prohibited
1943 – Oilseed, Food grains, spices, sugar forwards prohibited
1952 – Forward Contracts Regulation Act – Prohibits all commodity options and cash Settlement of forward contracts
1960 – Forwards in primary and essential commodities prohibited
1966 – Complete ban of commodity futures

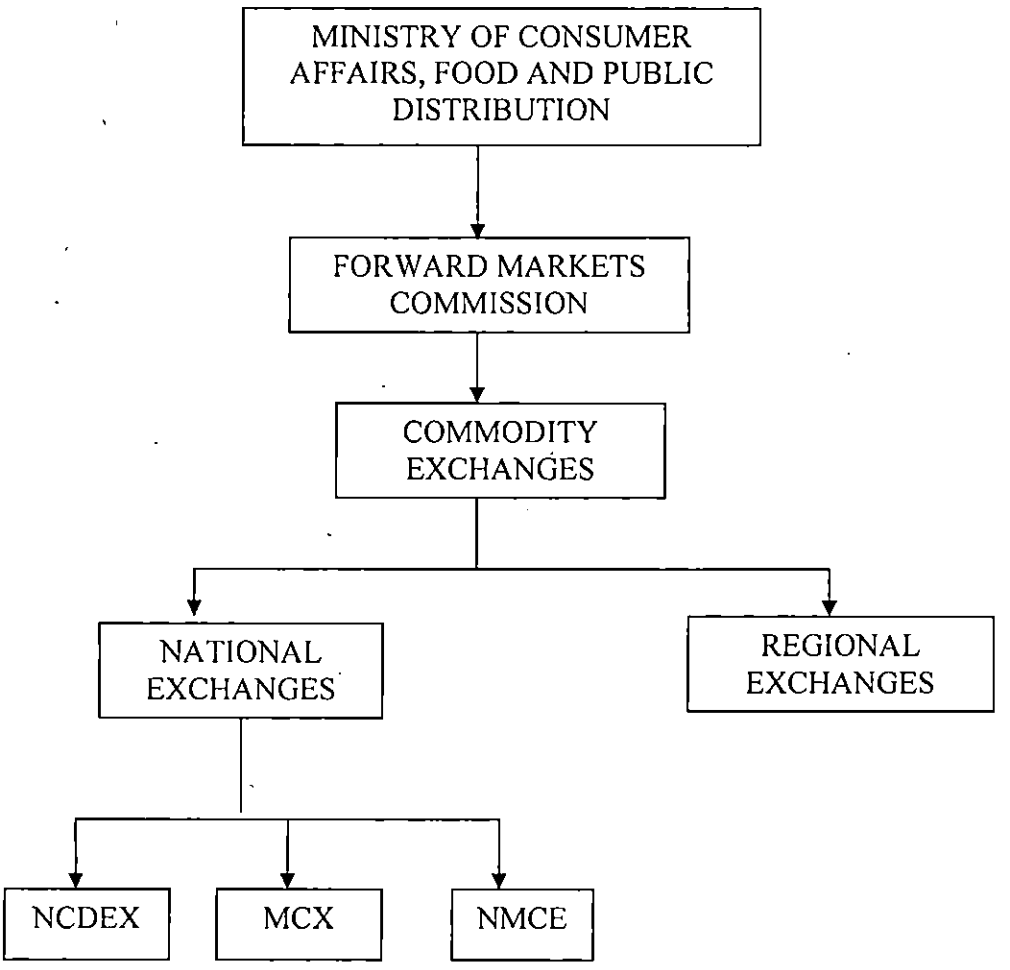
1980 – Khusro Committee

1994 – Kabra Committee

2000 – National Agriculture Policy

2003 – Establishment of three national levels Commodity exchanges (NMCE, MCX, and NCDEX)

FIG (2.1) - STRUCTURE OF INDIAN COMMODITY MARKET



2.4 Crude oil futures

Crude oil is a mixture of hydrocarbons that exists in a liquid phase in natural underground reservoirs. There are literally hundreds of different crude produced in the world, with there price differences not simply reflecting transportation costs to principle oil-consuming centers, but quality differences as well. In general, the two characteristics that are used to classify crude types are sulfur content and specific gravity. Higher gravity crude oils inherently produce more "light" products, such as gasoline, jet fuel, and kerosene, while lower gravity oils will tend to produce more of the "middle" and "heavy" products, such as heating oil, diesel, and residual fuel. The other general defining characteristic of crude oil, sulfur content, is considered a barometer of foreign materials contained in a given crude stream. Crude oils that have sulfur content of 0.5 percent, or higher, by weight are referred to as "sour", while oils with content under 0.5 percent by weight are termed "sweet". In many cases, light crude oils tend to be sweet. Conversely, heavy crude tend to be sour. In general, light/sweet oils almost always command a higher price to heavy/sour crude.

Factors Influencing Demand & Supply of Crude Oil Prices

- OPEC output and supply
- Terrorism, Weather/storms, War and any other unforeseen geopolitical factors that causes supply disruptions
- Global demand particularly from emerging nations
- Refinery fires & funds buying
- Production of the major oil producing countries
- Fluctuations in the value of dollar
- Imports from various world oil organizations like API, DOE

Important Exchanges dealing in Crude Futures globally are

The New York Mercantile Exchange (NYMEX)
The International Petroleum Exchange of London (IPE)
The Tokyo Commodity Exchange (TOCOM)

2.5 Indian crude oil market

India was not known to the world in the context of crude oil and its by-product production. As late as in 1889, the presence of oil in India was discovered in Digboi in Assam. First crude oil refinery in India was set up in Digboi in1901. In 1958 and 1974, two more places for crude oil production were identified namely Cambay onshore basin and Bombay offshore basin. India is not among the major producers of crude oil, as it doesn't have much oil reserves. That is why it generally depends on imports of crude oil from other countries. India currently has an estimated quantity of 5.7 billion barrels of oil reserves out of which it produces around 0.8 million barrels per day. The country has much depended on coal to satisfy its energy needs in the earlier times but the use of crude oil and gas is taking over the dominance of coal with the change in time. Oil and gas contribute to around 45% of the country's total energy consumption.

The Indian oil-refining sector has been regulated by the government historically and is still dominated. A new private sector has emerged after the loosening of control by the government. The major units pertaining to the oil sector in India are

- Indian Oil Corporation (Public sector)
- Oil and Natural Gas Corporation (Public sector)
- Reliance India Ltd (Private sector)
- Essar Oil Refinery (Private sector)
- Bharat Petroleum Corporation Ltd (Public sector)
- Hindustan Petroleum Corporation Ltd (Public sector)
- Mangalore Refineries and Petrochemicals Ltd (Public sector)

India has more than 1,000 companies directly or indirectly affected by crude oil price risk of which only few can hedge outside as actual users. It has more than 5,000 commodity and stock brokers, who would trade in crude, which is one single commodity representing energy cost, inflation, geopolitical situation, etc. India's importance in world markets as one of the largest importers of crude oil and responsiveness to world events has made MCX to emerge as an important risk management platform for commercial interests as well as an exciting potential opportunity for those investors who seek to profit by correctly anticipating price changes. Three types of contract are being traded in MCX which includes Light sweet crude oil, Brent crude oil and Dubai Oman crude oil. The light sweet crude oil launched during Feb. 2005 is the top performing contract in MCX and it is the world's most liquid forum for crude oil trading, as well as the world's largest-volume futures contract trading on a physical commodity.

Crude oil Prices are highly sensitive to global political and economic developments. Oil prices surged ahead during the past three years from less than $30 per barrel to over $90 per barrel. Crude oil is the world's most actively traded and most widely used energy material in the world and thus makes it a key variable in global financial markets. Almost all industries- oil & lubricants, transportation (including road, rail, sea and air), petrochemicals (some of the end products of petrochemicals include plastics, synthetic fibres, detergents and chemical fertilizers etc.), pesticides and insecticides, paints, perfumes, etc. are largely and directly affected by the oil prices as several products derived from crude oil are basic inputs in the production in these industries. The impact on these industries would result in spiraling effect on other industries and people. Thus crude oil prices would play a crucial role in shaping the fortunes of global economic developments as well as financial markets for a long time to come.

Organisational Profile

CHAPTER 3
ORGANISATIONAL PROFILE

3.1 MULTI COMMODITY EXCHANGE (MCX)

Multi Commodity Exchange of India Ltd is an independent and de-mutualised multi commodity exchange that has set up a state-of –the-art, online nation-wide digital exchange for commodity futures trading in the country. It was inaugurated on November 10, 2003 by Mr. Mukesh Ambani, Chairman and Managing Director, Reliance Industries Ltd and has permanent recognition form the Government of India and Forward Markets Commission for facilitating on line trading, clearing and settlement operations for commodities futures market across the country today, MCX features amongst the worlds top three bullion exchanges and top four energy exchanges.

MCX was launched worth the vision that in an emerging economy, exchange operation would undergo a paradigm shift in their activities and would be increasingly driven by providing integrated processes and services to the commodity markets ecosystem. MCX has always been at the forefront to bring about this change to introduce a new exchange order providing unparalleled efficiencies, unlimited growth & infinite opportunities. MCX offers a wide spectrum of opportunities to a large cross section of participants including producers/processors, traders, corporate, regional trading centre, importers, exporters, co-operative and industry associations amongst others.

Management

MCX has a strong management team comprising the best industry professionals with deep domain knowledge of the commodities futures market. Professionalism of its Board of Directors, Promoters, Management team and Associates have made MCX to put the Indian commodities derivatives market on the global map within a short span of two years since its inception.

The MCX is administered and managed by a Management team, Board of Directors, Key Management team and Advisory Team. The management team of MCX was set up in March 2003 and the Advisory Board in July 2003, which propelled the growth of the exchange forward. Members began to be enrolled at MCX from July 2003. As on June 2006, MCX had more than 1527 members, empowered to trade on the MCX platform and take its efficiency to the masses of India.

MCX started its operations on November 10, 2003 with a total trade of just Rs.0.83 crores. The subsequent growth has been phenomenal. It has an Average Daily Turnover of Rs.7000 crores and it locked a peak daily turn of Rs.17987.65 crores on April 20, 2006. Initially gold, silver and castor seed were available for trading. Currently 72 commodities are traded on the MCX platform. The commodities traded include billion, agricultural products, base metals and energy.

Table 3.1 Top traded commodities in MCX

Commodities	Share traded
Gold	34%
Silver	29%
Crude oil	20%
Soy oil	3%
Mentha oil	4%
Urad	2%
Chana	1%
Copper	1%
Others	6%

Source- www.mcxindia.com

Fig (3.1) shows the share of top commodities traded in MCX.

MCX's share in Indian Commodities Market

MCX accounted for around 45% of the total commodity derivatives trading volume in the country in 2005-06. The other national exchanges accounted for 50%, where as the Cumulative turnover of the regional exchange was 5%. However during 2006 MCX accounted for around 54%, the other national exchanges accounted for 42% whereas the Cumulative turnover of regional exchange was 4%.

Table 3.2 Share of exchanges in Indian commodity Market

Exchanges	2005	2006	2007
MCX	45%	54%	59%
Other national exchanges	50%	42%	38%
Regional exchanges	5%	4%	3%

Source- www.mcxindia.com

Fig (3.2) Share of exchanges in Indian commodity Market.

MCX launched the crude oil futures on Feb 9, 2005. Within a period of one year from the launch of crude oil contracts at the MCX platform, the exchange captured around one percent of the Global Crude Oil Trading volume. Currently, three types of contract are being traded in MCX which include Light Sweet Crude Oil, Brent Crude Oil and Dubai Oman Crude Oil. MCX was promoted by a software technology company, which gives it the advantage of providing optimally priced state of art solutions. MCX has strategic alliances with seven benchmark international exchanges, which allow MCX to launch Indian version of various international contracts as well as assimilating international best practices of exchange governance. MCX has strategic alliance with various Indian trade and industry associations too for developing futures trading in various key sectors and commodities.

International Strategic Alliance

New York Mercantile Exchange

London Metal Exchange

Tokyo Commodity Exchange

Dubai Metals & Commodities Centre

New York Board of trade

Bursa Malaysia Derivatives Berhad Baltic Exchange
Chicago Climate Exchange

Domestic Strategic Alliances
Solvent Extractors Association of India
Bombay Bullion Associations
Bombay Metals Exchange
Pulses Importers Association

Financial technologies were the sole promoters of MCX at the time of its launch. Later many banks joined as shareholders such as-

1. State Bank of India & its associate banks
2. SBI Life Insurance
3. National Stock Exchange
4. National Bank of Agriculture and Rural Development
5. HDFC Bank
6. Canara Bank
7. Bank of Baroda
8. Bank of India
9. Union Bank of India
10. Corporation Bank
11. Fidelity International

The light Sweet Crude Oil, launched during February 2005, is the top, performing contract in MCX, currently doing an average monthly volume of 42 BBL.

Table 3.3 MCX's share in Global Crude Oil volume

Exchanges	Share in %
NYMEX	66%
IPE	32%
TOCOM	1%
MCX	1%

Source- www.mcxindia.com

Fig (3.3) shows the share of Exchanges in World Crude oil market

Table 3.4 Volume of Crude Oil traded from the year of launch till 2006 Feb.

Exchanges	Year of launch	Volume (in million BBL)
NYMEX	1983	63478
IPE	1988	30412
TOCOM	2001	1239
MCX	2005	521

Source- www.mcxindia.com

Fig (3.1) Share of commodities traded in MCX

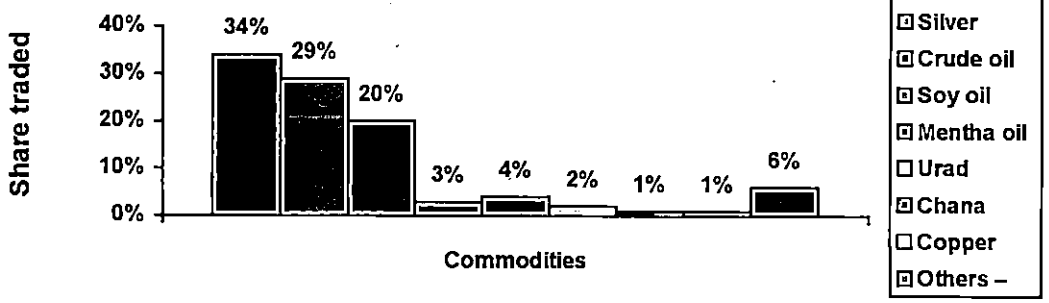


Fig (3.2) Share of exchanges in Indian Commodity Market

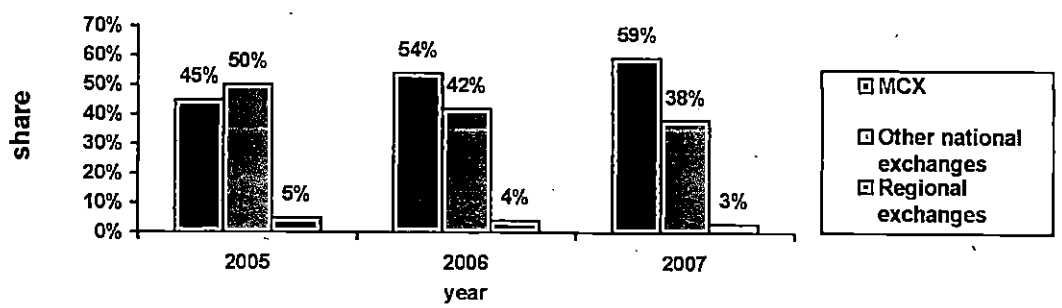
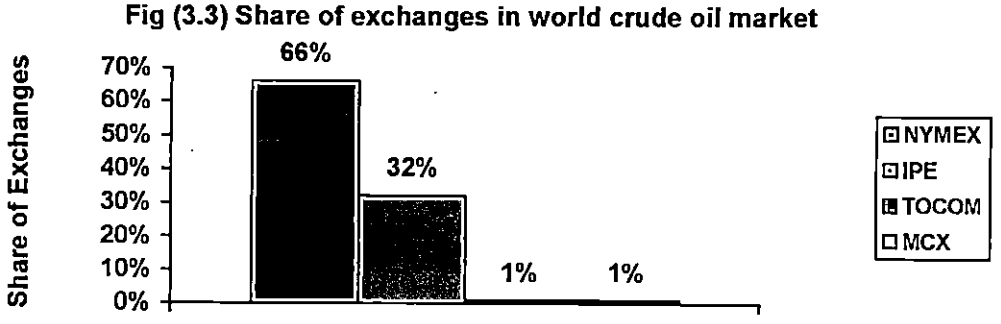


Fig (3.3) Share of exchanges in world crude oil market



MCX Comdex launched in June 2005 has been designed to reflect the prices of futures contract traded in metals, energy and agricultural sectors with equal weight age provided to the three sectors. A comparison of the performance of four global benchmark commodity indices- Goldman Sachs Commodity Index (GSCI), Dow Jones AIG Commodity Index (DJCI), Roger International Commodity Index (RICI) and Reuters/ Jefferies CRB Index (R/J CRB) with that of MCX Comdex showed that MCX has been a consistent out- performer in terms of its returns and the risk inherent in it. This makes it another suitable instrument for players to hedge their risk of exposure in any of the commodities included in it or as a pure trading instrument. Besides seeing a suitable trading instrument, it could also serve as a price barometer for the economy.

Different types of orders submitted to the MCX Trader Work Station

One can submit price related orders, time related orders or both the orders to the MCX Trader Work Station (TWS). Price related orders can further be classified as limit orders, market orders and stop orders. Whereas time related orders are day orders, good till date orders, good till cancelled orders and immediate or cancel orders.

Limit order-a limit order enables one to specify the price below or above which a buy or sell trade is executed.

Market order – a market order is executed at a prevailing market price on the submission of such an order. If no trade takes place at the time of submission of an order, the trading system takes the last traded price as the market order and the order remains in the system.

Stop loss order- a stop loss order is placed to restrict losses, which may happen due to an adverse movement of commodity futures prices. A stop order is kept by the system in a suspended or an abeyance mode and is activated only on the trigger of a price, as defined in the order. It can enable closing out of existing positions.

Day order- a day order is available for execution during the trading day. If not executed all day orders automatically get canceled at the trading day on which such orders are submitted.

Good till date order- a good till date order is available for execution till the end of the date indicated in the order or till the last trading day of the contract, whichever earlier.

Good till canceled order (GTC) - a good till cancelled order lasts until the order is executed or cancelled, regardless of how many days or weeks it takes. Investors often use GTC orders to set a limit price that is far away from the current market price. A GTC order is available for execution until the maturity of the contract or until cancelled, whichever is earlier.

Orders executed by a trading system-

The best buy orders (the highest bid price) is matched with the best sell order (lowest offer price) on a TWS of MCX on a price – time basis.

Contract specification of crude oil by MCX

A contract specification is a document that contains guidelines and parameters of a commodity traded on a commodity exchange. The contract specification ensures the standard of commodity futures through various parameters such as trading details, contract duration or expiry date, quality parameters, delivery mode and its details. It includes all important details of a commodity – trading lot, price quote, order size, tick size, limit of daily price, margin and open positions, delivery centers, settlement price and procedure, tender/delivery period, taxation and legal obligations- for a successful execution of the trade conducted on the exchange.

CONTRACT SPECIFICATION FOR CRUDE OIL

Symbol	CRUDEOIL
Description	CRUDEOILMMMYY
Trading	
Trading period	Mondays to Saturdays
Trading session	Monday to Friday: 10.00 a.m. to 11.30 p.m. Saturday: 10.00 a.m. to 2.00 p.m.
Trading unit	100 barrels
Quotation/Base Value	Rs. per barrel
Maximum order size	10,000 barrels
Tick size (minimum price movement)	Re. 1
Price Quote	Ex – Mumbai excluding all taxes, levies and other expenses
Daily price limits	4 %
Initial margin	5%
Special Margin	In case of additional volatility, a special margin at such percentage, as deemed fit, will be imposed immediately on both buy and sale side in respect of all outstanding position, which will remain in force for next 2 days, after which the special margin will be relaxed.
Maximum Allowable Open Position	For individual clients: 4,00,000 barrels For a member collectively for all clients: 12,00,000 barrels or 15% of the market-wide open position, whichever is higher. (As per FMC letter no. 6/3/2006/MKT-II (VOL II) dated August 18, 2006)

Delivery	
Delivery Unit	50,000 barrels with +/- 2% tolerance limit
Delivery margin	25%
Delivery center	Port installation at Mumbai / JNPT port
Quality Specification	Light Sweet Crude Oil confirming to the following quality specification is deliverable: Sulfur 0.42% by weight or less, API Gravity: Between 37 degree - 42 degree All volumes are defined at 60 degree Fahrenheit

Delivery and Settlement Procedure of Crude Oil

Delivery logic	Both Option
Tender day	1st working day after expiry of contract by 6.00 p.m.
Tender and delivery period	1st to 3rd working days after expiry of the contract.
Buyer's and Seller's Intention	On the contract expiry day by 6.00 p.m. Seller will submit copies of relevant documents as evidence that he is holding stock at the time of giving his intention.
Mode of communication	Fax / Courier
Matching of Buyer's and Seller's intention	On the basis of intention received from the buyers and sellers, the Exchange will match the total quantity offered by the buyers and sellers and with respect to the matched quantity, the allocation of delivery between the buyers and sellers will be done. The unmatched quantity of open position will be closed out as per DDR and actual delivery will be effected only to the extent of matched quantity.
Dissemination of the information on delivery intention on TWS	On the contract expiry day by 7.00 p.m.
Delivery period margin	25% margin will be imposed during tender and delivery period on both buyers and sellers on matched quantity.

Exemption from delivery period margin	Delivery period margin is exempted if the Seller provides with documentary evidence of the delivery at the Exchange's designated delivery center.
Delivery allocation **- Date -Rate**	On expiry date of the Contract At due date rate (DDR)
Delivery pay-in	On tender days
Delivery pay-out	E+3 working day by 11.00 a.m.
Pay-in of funds	E+2 working day by 11.00 a.m.
Pay-out of funds	E+3 working day by 11.00 a.m. In case the buyer opts for second sampling, he has to inform the Exchange on E+2 working day by 6.00p.m and in such case the pay-out of funds will be released only after completion of sampling procedure.
Penal provisions	After getting intentions from the buyer and seller to take or give delivery, if any of the party fails to honour his obligations, a penalty of 1% of the DDR will be imposed on him, out on which 90% will be passed on to the other party and 10% will be appropriated by the Exchange.
Taxes, Duties, Cess and Levies	All other charges, levies or Cess, import or export duties and taxes applicable at the delivery center will be on account of buyer. In case of Inter-State movement, the buyer has to submit requisite forms or pay CST as applicable. Post lifting delivery all charges are borne by the buyer.
Close out of open positions	All outstanding positions on the expiry of contract where expression of interest for tendering delivery or receiving delivery has not been received and such positions where expression of intentions have been received but have not found the counter party for honoring the intentions, shall be closed out at due date rate and respective pay-in and pay-out of funds of such close out positions shall be effected on the following day of last day of trading by 11.00 a.m.
Due Date Rate (DDR)	Due date rate is calculated on the last trading day of the contract on the basis of the spot market price of crude, ex-Mumbai, excluding all taxes, levies and freight, as available for this variety from various market sources and converted at the Rupee – US Dollar rate prevailing on expiry.

Odd lot treatment	Delivery will be effected only on delivery lot basis. In case there is any mismatch in the position of seller and buyer then delivery will not be matched and accordingly the position will be closed out at DDR and penalty to such buyer / seller will be levied a minimum penalty @5% of DDR. 90% of the penalty collected shall be passed on to the counter party while 10% will be appropriated by the Exchange.
Storage, Insurance and Freight charges	The freight, duty and all other expenses will be on account of the buyer
Delivery center	Mumbai
Delivery order	Along with tender notice, Crude Oil delivery order will be submitted in specified format giving details of Members / Registered Non-Members who shall perform delivery. Each delivery order issued shall be in multiples of minimum delivery lots and shall be designated for only one delivery center and one location in such center. It will be accompanied with Storage / Shipping / import / export documents, invoice and valid Quality Certificate as per Contract Specifications from Exchange designated Certifier Delivery order once submitted cannot be withdrawn or cancelled or changed unless so agreed by MCX in writing. Members tendering the delivery order shall clearly specify the grade and shall be in conformity with the surveyor's certificate accompanied with the delivery document and cannot be changed subsequently
Delivery grades	The selling members tendering delivery will have the option of delivering such grades as per the contract specifications. The buyer has no option to select a particular grade and the delivery offered by the seller and allocation by the Exchange shall be binding on buyer.
Evidence of stock in possession	At the time of issuing the delivery order, the Member must satisfy MCX that he holds stocks of the quantity and quality specified in the Delivery Order at the declared delivery center by producing bank documents/ LC/ appropriate receipt.
Endorsement of delivery order	The buyer member can endorse delivery order to a client or any third party with full disclosure given to MCX. Responsibility for contractual liability would be with the original assignee.
Legal obligation	The member will provide appropriate tax forms wherever required as per law and as customary and neither of the parties will unreasonable refuse to do so.

Physical deliveries in exchanges

The exchanges, in order to maintain the futures prices in line with the spot market. have made available provisions of settlement of contracts by physical delivery. They also make sure that the futures and spot prices coincide during the settlement so that the fair price discovery mechanism is in place. Delivery is not mandatory. However there is always a provision for delivery in commodity futures trading to ensure that the future prices are in conformity with the underlying. Those who want to take delivery of the cargo can do so; and those who want to give delivery have the option to do so also. The right for delivery is normally with the seller; the buyer/seller has to express his intention for delivery about five to seven days before the expiry. Alternatively, one can square off his positions to take the benefit of price difference in the market. Delivery of stocks has to be at the specified warehouses. Revalidation of warehouse receipts is also possible for further transactions. Delivery of stocks in commodity futures is subject to all sales tax /VAT regulations of the state concerned. However provisions vary from exchange to exchange and commodity tó commodity. The market lot for delivery is different for few commodities (higher than the trading lot). The contracts that are not assigned for delivery will be settled in cash.

Profits and loss- clearing and settlements

The profit and losses of futures depend on the daily movements of the market for that contract and are calculated on a daily basis. As the accounts of the parties in futures contracts are adjusted every day, most transactions in the futures market are settled in cash. . Prices in the cash and futures market tend to move parallel to one another, and when a futures contract expires, the prices merge into one price. So on the date either party decides to close out their futures position, the contract will be settled. Mark to Market will be cash-settled by exchange on T+1 basis i.e., next working day after the trading day. . The clearing banks are Canara Bank, HDFC, ICICI and AXIS Bank. MCX has tied up with HDFC Bank, Bank of India, UTI Bank, Union Bank India and Indusind Bank for providing clearing and settlement facilities.

Recent initiatives of MCX

- MCX launched two major infrastructure projects National Spot Exchange and National Bulk Handling Corporation Ltd. (NBHC).
- It initiated the establishment of "Commodity Suchana Kendra" Hub at Pune.
- Launched "Gramin Suvidha Kendra" in villages taking advantage of the rural reach and trust of rural India on India Posts.
- Launched SMS- based price dissemination services in association with Bharat Sanchar Nigam Limited (BSNL) and Mahanagar Telephone Nigam Limited (MTNL)

Trading on MCX provides number of advantages; the contracts are standardized by quality and quantity, widely accepted and therefore are liquid financial instruments. MCX offers cost efficient trading and risk management opportunities. Contracts are traded online on a real time trading platform of MCX, representing a confluence of opinions on future values and resulting in price transparency and best price discovery. MCX crude oil futures prices are widely and instantaneously disseminated, serving as a ready reference price for different sections in the industry. MCX allow hedgers and investors to trade anonymously through futures brokers, who act as independent agents for traders. The depth of the market allows the contracts to be easily liquidated prior to required receipt or delivery of the underlying commodity. While futures contracts are seldom used for delivery, if delivery is required, performance is guaranteed. Counterparty risk is absent from transactions executed on the Exchange. Contract performance in the crude oil futures is supported by a strong financial system, backed by MCX clearing members. MCX offers safe, fair and orderly markets protected by its rigorous financial standards and surveillance procedures.

MCX is committed towards revolutionizing the Indian Commodity Markets. It aims to empower the market participants through innovative product offerings and business rules, so that the benefits of futures market can be fully realized. MCX will focus its efforts towards meeting the requirements of all the stake holders in the commodity ecosystem without any bias. It shall focus its efforts towards establishing globally acceptable industry norms. India is a dominant player in the world commodities market and has the potential for becoming global price settler for several important commodities. MCX is well poised to leverage its leading position among the Indian exchange to capture this opportunity with state of art trading technology, robust risk management systems, continuous product innovation, landmark global alliances and unquestionable credibility.

MCX's Milestones

Sep 2003 – got permanent recognitions from Ministry of Consumer affairs.

Oct 2003 – First to formulate alliances with key Indian trade associations

Nov 2003 – Commenced trading

Dec 2003 – First Indian Commodity exchange to initiate evening trading sessions.

May 2004 – Three nationalized banks take equity stake of 2.14% each

June 2004 – Tie up with Telequote, Bloomberg, Moneyfire Telerate & Reuters

July 2004 – Strategic equity partnership with SBI 10.4% stake.

Nov 2004 – The Tokyo Commodity Exchange (TOCOM) and the Multi Commodity Exchange of India Ltd. (MCX) signs a Memorandum of Understanding

Nov 2004 – Joint Venture with Dubai Metal and Commodities Centre to set up Dubai Gold and Commodities Exchange (DGCX)

Nov 2004 – enters into strategic collaboration with the Baltic Exchange, London to start Freight Futures in India.

Feb 2005 – Trading in Crude Oil launched.

May 2005 – NSE & NABARD take equity stake.

Sep 2005 – signs a licensing Agreement with the Chicago Climate Exchange to launch mini sized carbon financial instrument

Oct 2005 – signs memorandum of Understanding with New York Mercantile Exchange.

Oct 2005 – licensing Agreement with London Metal Exchange

Nov 2005 – Dubai Gold and Commodities Exchange set up.

Mar 2006 – signs Memorandum of Understanding with the Bursa Malaysia Derivatives Berhad (BMD)

Sep 2006 – signs a Memorandum of Understanding with Zhen Zhou Commodity Exchange.

3.2 PENINSULAR MULTI COMMODITIES SERVICES LTD.

Peninsular promoted by a group of professional and expert stock brokers, led by Mr.T.S.Anatharama, Chartered Accountant eminent financial columnist & investment consultant has changed faces to keep abreast of the times, aiming to widen its horizons offering all financial services under one roof. Peninsular commenced its business operations in 1996. It launched its stock broking operations as a member of the national stock exchange in March 1996. It started the depository operation in the year 1998 and became a member of the Bombay stock exchange in the year 2000.Realizing the economic importance and accelerating trends of commodity futures in the year ahead in 2003 peninsular capital market limited formed a fully owned subsidiary company in the year 2003 to become member of all the commodity exchanges in India and spread its wings to the horizon of commodity futures trade.

PENISULAR MULTI COMMODITIES SERVICES LIMITED was registered in 2003, and marked its presence in the Indian commodity futures trade in 2004 by taking membership in the National Multi Commodity Exchange of India limited (NMCE), Multi Commodity Exchange of India (MCX), National Commodity &

Derivative Exchange Limited (NCDEX) and Indian Pepper and Spices Trade Association (IPSTA)

Thus by 2003, Peninsular widened its network in both capital market and commodity market. In order to face the competition in the capital market, Peninsular Capital Market merged with Motilal Oswal Securities Limited in the year 2006. With the objective of providing a national presence, peninsular rapidly expanded across the length and breadth of the country. Peninsular is now a network comprising of over 35000 customers served by a network of over 225 trading work stations spread across 11 states in the country, there by achieving the distinction of having one of the highest numbers of trading terminals in the country amongst all the professional stock broking firms.

Trading with Peninsular

Trading in commodity futures starts with opening a trading account with peninsular. The client has to deposit a minimum amount of money, which is called the "initial margin". This is the deposit of "good faith" because it is this money that is used to debit any day-to-day losses. The minimum-level margin is determined by the futures exchange and is usually 5% to 10% of the futures contract value. These pre-determined initial margin amounts are continuously under review: at times of high market volatility, initial margin requirement might be increased. When the contract is liquidated, this initial margin deposit will be refunded to the client plus or minus any gains or losses that occur over the span of the futures contract. . Peninsular is a clearing member of the four commodity exchanges of India. So one can trade in four exchanges and do arbitrage by opening a trading account with Peninsular. A client pays margins up front to the exchanges through his clearing member. Peninsular is also required to deposit margin money with NCDEX, MCX, NMCE, and IPSTA.

When a client places his order in the computer (trading work station) the server of the exchange scans through the order posted on it from all its trading terminals.

It then locates and matches the best counter offers / bids by maintaining anonymity of the counter parties. Anonymity helps in eliminating formation of cartels and other unfair practices, there by protecting the efficiency of price discovery at the exchange. All the four commodity exchanges follow best international risk management practices. The contracts are marked to market on daily basis. The system of upfront margining based on value at risk is followed to ensure financial security of the market and also to safeguard the interest of all participants

Peninsular Multi Commodities Services Ltd. has been offering all sorts of commodity trading facilities like market commentary, market information, online research and commodity research. Regular trading seminars are provided to investors and staff to ensure that they are abreast with the latest information in the financial market. Multiple Depository Services like voice interactive DP, internet DP, offline, DP branch facilities are also provided to customer. It is one of the first stock broking houses to test and implement successful many pioneering technology advancement like ODIN, CTCL, private Vsat network etc.

FIG (3.4) TRADING NETWORK

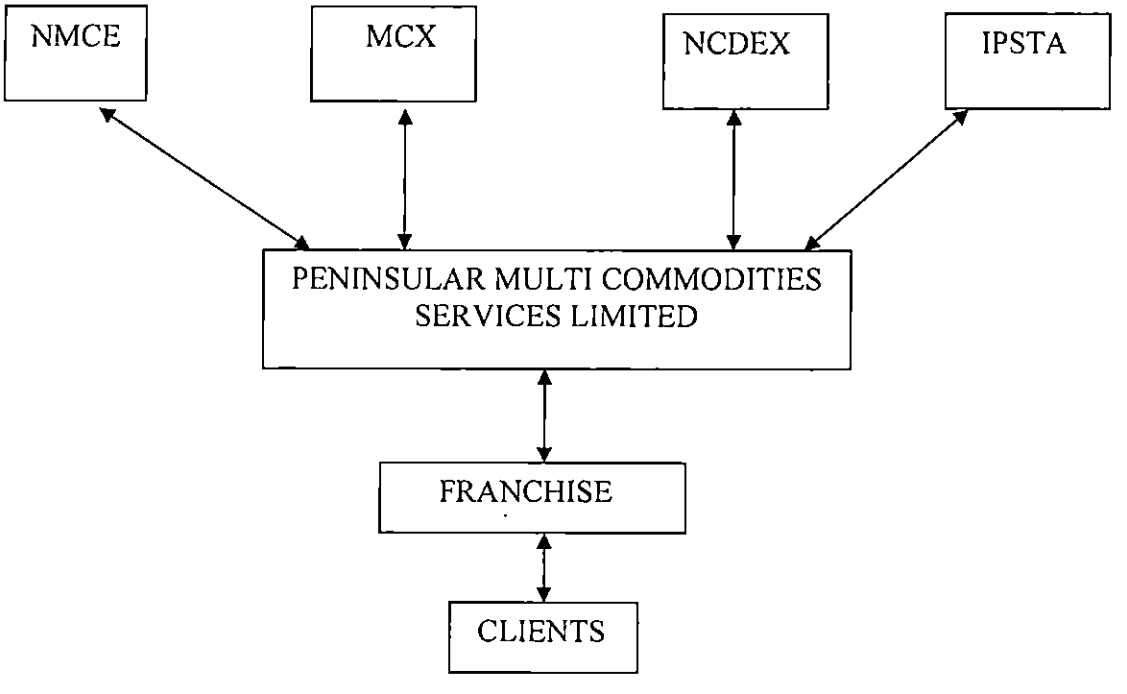


TABLE 3.5 SUMMARY OF THE FOUR EXCHANGES IN WHICH PENINSULAR IS A CLEARING MEMBER

Exchanges	NMCE	MCX	NCDEX	IPSTA
Location of Head Office	Ahmedabad	Mumbai	Mumbai	Kochi
Contract period	3-6 months	1-4 months	1-6 months	6 months
Expiry date	15th of every month	Varies from commodity to commodity	Varies from commodity to commodity	15th of every month
Trading session	10a.m to 5p.m (week days) 10am to 2pm(sat)	10a.m to 5p.m (agro product) 10amto11.30pm (gold,crude,metals	10a.m to 5p.m (agro product) 10amto11.30pm (gold,crude,metals	10 a.m to 5 p.m
Popular commodities	Jute, Pepper, Rubber, Coffee,Cardamam	Silver, Gold, Crude oil, Soy oil	Gold, Silver, Steel, Urad, Sugar	Pepper
Connectivity options	Exchange Vsat, Dial up Vsat, internet	Exchange Vsat, Private Vsat, VPN internet	Exchange Vsat, CTCL & Vsat, internet	VPN
User ID charge	Rs 1000 / month	Rs 1000 / month	Rs 1000 / month	Rs 5000 one time
Trading software	DTSS from CMC (BOLT of BSC)	MCX- TWS from FT (ODIN)	NCDEX OP from NSE. IT (NEAT_OP)	Trader Work Association
Margining	Value at Risk +Mark to Market	Flat Percentage+ Mark to Market	PC-SPAN +Mark to Market	Mark to Market

CHAPTER 4
CONCEPTS OF FUTURES TRADING

The consensus in the investment world is that the futures market is a major financial hub, providing an outlet for intense competition among buyers and sellers and more importantly, providing a centre to manage price risks. The futures market is extremely liquid, risky and complex by nature, but it can be understood if we break down how it functions. This section explains the various concepts associated with futures and online trading.

4.1 Types of contracts

Ready contracts

A ready contract is also referred to as a "cash" or "spot" contract, is a contract where both the delivery and the payment are made either immediately or within a short period after the contract is entered into between the contracting practices. Most of the sale and purchase transactions, with which ordinary people are accustomed to and which they perform every now and then by paying for the goods almost immediately and taking the delivery of such goods soon thereafter, are ready delivery contracts. Under the Forward Contracts (Regulation) ct,1952, (F.C.(R) Act)a ready delivery contract has been defined as a contract where delivery and full payment thereof is made within 11 days from the date of entering into the contract.

Futures contract

A future contract is standardized agreement between a buyer and a seller to exchange a predetermined quantity and standardized grade of an asset, at a specific price and at a pre-specified future date. The item or underlying asset may be an agricultural

commodity, a metal, mineral, energy, a financial instrument or a foreign currency – essentially any instrument which can be traded and through which market participant can be exposed to market risk. So, a futures contract is an agreement between two parties: a short position, the party who agrees to deliver [sell] a commodity, and a long position [buy], the party who agrees to receive a commodity.

The F.C. (R) Act has left the future contract undefined. The Dantwala Committee observed that by implication a futures contract may be defined as a forward contract which is not a specific delivery contract. Though giving or taking delivery is not generally a feature of a futures contract, sellers has the option to give the delivery of goods during the delivery month and the buyers are required to accept such deliveries when offered. All contracts for sale, not previously settled, have to be settled during the delivery month, either by a corresponding buying contract or through the actual delivery of goods. On the due date, all outstanding contracts are settled at the due date rate fixed by the market authorities and the sellers with unfulfilled sales have to pay a penalty for non-delivery.

Unlike in a merchandising contract in which both buyers and sellers have a clear intention of taking and giving delivery of actual goods and making and receiving payment therefore, the over-riding purpose of futures contract is not to take or give delivery of goods and make or receive payment therefore, but to square up the transactions and make the settlement on the basis of change in the prices. These provisions are made with a view to preventing the business from developing into wagering contracts, but more importantly to maintain a close link between the prices in the spot and the futures market. Apart from the foregoing important distinctions in the matter of delivery of goods and the manner of performance of the contract, there are other distinguishing features of the futures contract. All such contracts are invariably entered into for a standard variety - known as the basis - though other varieties within a stipulated range are permitted to be delivered with appropriate premium or discounts for their quality difference from the 'basis'. The contract is always entered into under the rules and regulations of an association or exchange, organising trading in such contracts.

In every futures contract, everything is specified: the quantity and quality of the commodity, the specific price per unit, and the date and method of delivery. The "price" of a futures contract is represented by the agreed-upon price of the underlying commodity that will be delivered in the future.

"A commodity futures contract is an agreement between two parties, to buy or sell a specified quantity and defined quality of a commodity, at a certain time in future, at a price agreed upon at the time of entering into the contract on a commodity exchange." Thus commodities futures contracts will always have a fixed period, like one month, three month etc. as the life of the contract. The life of the contract may be different in different commodity exchanges. At the end of contract period, the futures contract would expire and the concerned parties will have to give and receive delivery of the commodity mentioned in the contract. Both the time and the places of delivery are prescribed by the exchange

Objectives of futures contract:

- Hedging with a view to transfer the price risk;
- Price discovery through a large number of transactions and players;
- Maintenance of buffer stock and better allocation of resources;
- Reduction in inventory requirement and thereby reduction in cost of carry;
- Price stabilization through balanced demand and supply positions;
- Helps raise ban finance through transparency and flexibility coming with futures contracts;

Forward contracts

The forward contract is a contract for the delivery of goods at a future date and which is not a ready delivery contract. It differs from the ready delivery contract in the sense that the length of time between entering into the contract and giving/taking delivery

and making/receiving payment is more than 11 days.The main differences between forward contract and a futures contract is the way in which they are negotiated. For forward contracts, terms like amount, quality, delivery date and price are discussed in person between the buyer and the seller. In futures contracts however, all terms are standardized except price, which is discovered through the interaction of supply and demand in a centralized marketplace or exchange. In short futures contracts is standardized and exchange traded.

Different types of forward contract

(i) The Non-transferable Specific Delivery (NTSD) contracts;

In NTSD contracts, the terms of delivery and payment are specified before hand and delivery, and full payment must occur between the original buyer and the seller. They are like ready delivery contracts used for merchandising, except that the duration is longer than 11 days. Thus, in a NTSD contract neither the buyer nor the seller, whose names are mentioned in the contract, can transfer their rights and liability to any third person.

(ii) The Transferable Specific Delivery (TSD) Contracts.

In TSD contracts, the term of delivery and payment are specified but the original parties can transfer their commitments and liabilities so that the actual delivery and payment is affected between the last parties. The TSD contract has all the features of a NTSD contract, except that it permits the parties to the contract to transfer their rights and liabilities under the contract to any third party. Such a third party, in turn, can transfer his rights or liabilities to someone else. This process of subsequent transfers can continue until the seller gives the delivery in terms of the contract.

A forward contract is usually traded in over the counter (OTC) mode. The forward contract can be between a manufacturer of a product (who want to hedge his risk

lest the price rises in future) and a producer/supplier of raw material (who wants to hedge his risk by ensuring minimum price lest the price declines in future) used by it.

4.2 Commodity market:

Market is a place where buyers and sellers meet to transact a business i.e. for exchange of goods or services for a consideration, which is usually money. Commodity market is therefore logically a market where commodities or commodity derivatives are bought or sold for a consideration.A commodity market facilitates trading in various commodities. It may be a spot or a derivatives market.

Over the counter\spot market:

In spot markets direct purchases and sales are achieved normally for immediate consumption. Buyers and sellers meet "face-to-face" and deals are struck. This is akin to "over the counter (OTC)" market where there is no need for organization like a commodity exchange.

Futures markets: -

Futures market is market where commodities can be bought or sold irrespective of the physical possession of underlying commodity. The futures market trades in standardised contractual agreement of the underlying asset with specific quality, quantity, and mode of delivery whose settlement is guaranteed by regulated commodity exchanges.

Forward market

Forward markets are markets where delivery takes place some time in the future, unlike spot markets that call for immediate delivery.

Although futures contracts are part of the commodity markets, they are not part of the cash market. It is because, that though the underlying in the futures contract is the cash commodity, the asset traded on the futures exchanges are futures contracts and not the physical commodity. Thus, the cash market is the physical goods or commodity market in which everybody normally trades. The term 'Cash', accordingly refers neither to the method of payment nor to the time of payment. The cash market therefore refers to the actual commodity like gold, copper, sugar, oil etc.

Futures trading

A futures trading is a derivative instrument or financial contract in which two parties agree to transact a set of financial instruments or physical commodities for future delivery at particular price. The buyer of the futures contract, basically agree to buy something, for a set price, that a seller may not have yet produced. But participating in the futures market does not necessarily mean that one has to be responsible for receiving or delivering large inventories of physical commodities – it is only that the buyers and sellers in the futures market primarily enter into futures contract to hedge risk or speculate rather than exchange physical goods (which is the primary activity of the cash /spot market).

Online trading

Online commodity trading offers a way for an open, many to many system, where every user has equal access to price quoted and trading functionality. It provides a level playing field for all, without favoritism or control by a chosen few, where any user can view all quotes posted by other users in real time, act or trade on quotes posted by others, post their own prices and quantities for others to trade.

Online futures trading are different from actual trading of commodities since there is no actual possession of goods. In online futures trading, you are speculating on the future direction of a commodity's price that you are trading on the Internet. It is kind

of like placing a bet on which way a price will move. "Buy" and "sell" are terms that indicate the direction in which future prices are expected to move. Online futures trading offer a form of price protection for those who are trading and investing.

4.3 Participants of futures market:

There are mainly three participants

a) Hedgers

b) Speculators

c) Arbitrages

Hedging:

Hedging means taking a position in the futures market that is opposite to a position in the physical market with a view to reducing or limiting risk associated with unpredictable changes in prices. Hedging is a strategy usually adopted by companies who would be using tradable commodities as the raw materials for their products / processes. Hedging strategies could be different for buyers and sellers.

Buying Hedge Or Long Hedge: -

Buying hedge means buying futures contracts to hedge cash Position. Buying hedge is also known as Long Hedge. Strategy of buying hedge is normally used by the Consumers, Dealers, Manufacturers, etc. who have taken or would be taking exposure for that commodity in the physical market.

Buying Hedge is used in following cases:

- To protect against possible rise in the prices of raw materials.
- To replace inventory at a lower prevailing cost and
- To protect uncovered sale of finished products.

Buying Hedge is necessary for the purpose of protecting against increase in prices on the spot market of a commodity~ which has been already sold but not purchased yet. This is a very common practice among the exporters and importers. They would sell commodities at an agreed price for delivery in future. If the commodity is not still in possession and a commitment has been given for sales, the forward delivery is considered as uncovered.

Selling Hedge or Short Hedge: -

Selling Hedge is also known as short hedge. Selling hedge means selling futures contract to hedge a cash position. This strategy is usually adopted by users(manufacturers fabricators, who need the commodity as raw material), dealers, consumers, etc. who have taken or would be taking an exposure to the commodity in the physical market since they need it for their own consumption or rely on it for their business.

Following are the uses of selling hedge strategy:

- To protect the price of products for which sales commitment has been made.
- To protect the inventory not covered by forward sales.
- To protect prices of estimated production of finished product

Rolling over the hedge positions: -

If the time required for a hedge position is later than the expiry date of the Futures contracts, the hedger can decide to roll over the position i.e. he can close out the current position in futures contract and simultaneously take a new position in a futures contract with a later date of expiry.

If a person wants to reduce or limit the risks due to fall in prices of the material to be sold after say six moths and if the futures contracts have 'expiry of two months, then

he can roll over his short hedge position three times i.e. till the date of physical sale. Every time the hedge position is rolled over, there is a possibility of basis risk but at the same time it limits or reduces the price risk considerably.

For instance if the Hedger is going to buy a commodity in cash market (because he needs it as a raw material) at a future date, he buys the future contract now and when he actually buys the commodity in the physical market, he squares off the futures contract to reduce or limit the risk of the purchase price. Similarly if the hedger is planning to sell a commodity in the cash market in future, he instead sells the futures contract for that commodity now and when he actually sells the commodity in the physical market in future, he squares off his futures contract to reduce or limit the risk of the selling price.

Speculation: -

Speculation means anticipating price movement of a commodity and accordingly making profits by selling and buying a commodity at appropriate / opportune times. Main objective of speculation in commodity futures market is to take risks and profit from anticipated price changes in the futures of that asset / commodity. A speculator will buy futures contracts of a commodity (long position) only if he is anticipating the prices of that commodity and hence its futures to rise in the future. On the other hand a speculator will sell futures contracts (Short position) if he is anticipating that the commodity prices are likely to decline in future.

Long Position in Futures: -

Long position in commodity futures contract for speculative purposes implies that the buyer of the contract is bullish on the commodity i.e. he is expecting that the price of the said commodity would continue to rise before the expiry of the contract so that he/she can profit by squaring off his/her position before the expiry date. If the price of, the

commodity futures contract increases before the expiry the holder of the contract (speculator) would make profit by squaring off the contract before its expiry. If the prices of the futures contract decline, the speculator stands to incur loss on squaring off the contract.

Short Position in Futures: -

Short position in commodity futures contract for speculative purposes implies that the buyer of the contract is bearish on the commodity i.e. he is expecting that the price of the said commodity would continue to decline before the expiry of -the contract so that he / she can profit by squaring off his/her position before the expiry date.

It the price of the commodity futures contract declines before the expiry date, the holder of the contract (speculator) would make profit by squaring off the contract before its expiry. If the prices of the futures contract increase, the speculator stands to incur loss on squaring off the contract.

Arbitrage

Arbitrage means locking in a profit by simultaneously entering into transactions in two or more markets. If the relationship between spot prices and futures prices in terms of basis or between prices of two futures contracts in terms of spread changes, it gives rise to arbitrage opportunities. Difference in the equilibrium prices determined by the demand and supply at two different markets also gives opportunities to arbitrage. The futures price must be equal to the spot price plus cost of carrying the commodity to the futures delivery date else arbitrage opportunity arises.

Mathematically it can be expressed as

$F(o, n) = So(1 + C)$.

$F(o, n)$ = Futures price of the commodity at $t = o$ for expiry at $t = n$

So = Spot price of the commodity at $t = o$

C = Cost of carry from $t = o$ (present) to $t = n$ (expiry date of futures) expressed as a percentage of the spot price

4.4 Options

An option is the right to buy or sell a particular commodity or a currency or an asset for a limited period at a predetermined price. An option contract gives the buyer (holder) of the option the right to perform under the contract or do nothing as it pleases him. It means that the buyer of the option contract has a right or privilege of one-way bet. Thus, the basic fact about an option is that it is a one-way bet. However this privilege of one-way bet comes with a cost to the buyer of the option. That cost is termed as premium. Pay a price (premium) and buy an option. The premium has to be paid to the seller (writer) of the option, up-front i.e. at the time of entering into option contract. Commodity options are options with a commodity as the underlying.

There are two basic types of options known as call options and put options.

- **Call option:** A call option gives the buyer (holder) the right but not the obligation to buy an asset by a certain date for a certain price.

- **Put option:** A put option gives the holder the right but not the obligation to sell an asset by a certain date for a certain price.

Value of Call and Put Options: -

The value of a call option generally increases as the current spot price of the commodity, the time to expiration of the contract and the volatility increases. Conversely, the value of a call option decreases as the strike price increases and time to expiration and volatility of market price decreases.

The value of a put option generally increases as the strike price, time to expiration and the volatility of the commodity price increases. The value of a put option decreases as the current market price increases and the time to expiration and volatility of the commodity price decreases.

Option contracts are a useful technique when the buyer or holder of option desires to limit his downside risk (loss) while keeping the upside gain open to unlimited level. Under all cases, the maximum loss for option holders will be limited to the extent of option premium. This happens when the holder does not deal at the strike price with the option writer since he may find the ruling spot price in the market is more favorable or advantageous to him. However at the same time his upside gains may be enormous depending upon the price movements. Of course, this price movement makes his strike price more favorable as compared to market price. The option buyer's opportunity to make profit under the circumstances is limited to the extent of contracts bought. Thus unlike forward contracts, option contracts provide opportunity to limit losses or make gains.

Option strategies

Various option strategies used in order to make profit are as follows

Spreads-As you can see , going long and going short are position that basically involve the buying or selling of a contract now in order to take advantage of rising or declining

prices in the future. Another common strategy used by futures trader is called spread. Spread involves taking advantage of the price difference between two different contracts of the same commodity. Spreading is considered to be one of the most conservative forms of trading in the futures market because it is much safer than the trading of long and short futures contract.

Calendar spread-this involves the simultaneous purchase and sale of two futures of the same type having the same price but different delivery dates

Inter market spread- here the investor with contract of the same month goes long in one market and short in another market.

Inter exchange spread- this is any type of spreads in which each position is created in different futures exchanges

Bull spread- when the market is expected to go up (bullish outlook) a bull spread can be created to make profit in rising market with minimum amount of risk. Bull spread is created by buying a call/put of lower strike price and selling another call/put of higher strike price.

Bear spread-when the market is expected to go down (bearish outlook) a bear spread can be created to ensure profit in a falling market with minimum amount of risk. Bear spread is created by buying a call/put of higher strike price and selling another call/put of lower strike price.

Bottom straddle or straddle purchase- when the market is expected to be volatile and the direction of it is not clear bottom straddle strategy can be created. Bottom straddle can be created by buying a Call and a Put together of the same strike price and same expiry date.

Top straddle or straddle sell- when the market is expected to move in a sideways zone a top straddle can be created. Top straddle can be created by selling a call and a Put together of the same strike price and same expiry date.

Butterfly spread- when the market is expected to move in a sideways zone a Butterfly spread can be created. Butterfly spread can be created by buying two Call option, one with low strike price and the other with comparatively high strike price and selling two Call options having the strike price which is in the middle of above two strike prices and which is close to the current prevailing market price.

Strangles- when the market is expected to be volatile and the direction of it is not clear Strangle strategy can be created by buying a Call of higher level and buying a Put of lower level. Both of these price levels of buying Call and buying Put forms the basis of ranges of remain. If the prices remain outside the price ranges he makes profit otherwise loss. It is just like the straddle but it uses out of the money strike prices

Strips-when the market is expected to be volatile and the direction of it is not clear bottom strips strategy can be created by buying a Call and two Puts of same strike price. Investors make profit if the exercise price closes far from the strike price of Call and Put taken.

Straps- when the market is expected to be volatile and the direction of it is not clear bottom straps strategy can be created by selling two calls and a put of same strike price. Investor makes profit if the exercise price closes far from the strike price of Call and Put taken.

4.5 Holding positions in futures contract-

Going long-When an investor goes long that is enters a contract by agreeing to buy receive delivery of the commodity at a set price it means that he or she is trying to profit from an anticipated future price increase. Means that when the price increases in the

future, he or she intends to sell what he purchased and take the price difference as his / her profit.

Going short -A speculator who goes short, that is, enters into a futures contract by agreeing to sell and delivers the underlying at a set price – is looking to make a profit from declining price levels. By selling high now, the contract can be repurchased in the futures at a lower price, thus generating a profit for the speculator.

Open interest

A contract has both a buyer and a seller, so the two market players combine to make one contract. The open-interest position that is reported each day represents the increase or decrease in the number of contracts for that day, and it is shown as a positive or negative number. An increase in open interest along with an increase in price is said to confirm an upward trend. Similarly, an increase in open interest along with a decrease in price confirms a downward trend. An increase or decrease in prices while open interest remains flat or declining may indicate a possible trend reversal.

Volume

Volume represents the total number of shares or contracts that have changed hands in a one-day trading session in the commodities or options market. The greater the amount of trading during a market session, the higher is the trading volume. The greater the volume the more we can expect the existing trend to continue rather than reverse.

Rules for Volume and Open Interest

Price	Volume	Open Interest	Market
Rising	Up	Up	Strong
Rising	Down	Down	Weak
Declining	Up	Up	Weak
Declining	Down	Down	Strong

So, price action increasing in an uptrend and open interest on the rise are interpreted as new money coming into the market (reflecting new buyers) and is considered bullish.

Now, if the price action is rising and the open interest is on the decline, short sellers covering their positions are causing the rally. Money is therefore leaving the marketplace and is considered bearish.

If prices are in a downtrend and open interest is on the rise, it indicates that new money is coming into the market, showing aggressive new short selling. Short sellers assume that they will be able to buy the stock at a lower amount than the price at which they sold short. This scenario will prove out a continuation of a downtrend and a bearish condition. Lastly, if the total open interest is falling off and prices are declining, the price decline is being caused by disgruntled long position holders being forced to liquidate their positions. Technicians view this scenario as a strong position technically because the downtrend will end as all the sellers have sold their positions.

Impact of open interest on markets

Bullish	-	an increasing Open Interest in a rising market.
Bearish	-	a declining Open Interest in a rising market.
Bearish	-	an increasing Open Interest in a falling market.
Bullish	-	a declining Open Interest in a falling market.

When open interest is high at a market top and the price falls off dramatically, this scenario should be considered bearish. In other terms, this means that all of the long position holders that bought near the top of the market are now in a loss position, and their panic to sell keeps the price action under pressure

4.6 Importance of the Futures Market

A future trading performs two important functions of price discovery and price risk management with reference to the given commodity. It is therefore useful to all the segments of the economy and particularly to all the constituents of the Commodity Market System.

Price Discovery –

Due to its highly competitive nature, the futures market has become an important economic tool to determine prices, based on today's and tomorrows estimated amount of supply and demand. Futures market prices depend on a continuous flow of information from around the world and thus require a high amount of transparency. Factors such as weather, war, debt default, refugee displacement, land reclamation, and deforestation can all have a major effect on supply and demand, and hence the present and future price of a commodity. This kind of information and the way people absorb it constantly changes the price of a commodity. This process is known as price discovery.

Analysis

Risk Reduction –

Futures markets are also a place for people to reduce risk when making purchases. Risks are reduced because the price is pre-set, therefore letting participants know how much they will need to buy or sell. This helps reduce the ultimate cost to the retail buyer, because with less risk there is less chance of manufacturers jacking up prices to make up for profit losses in the cash market. Price volatility creates financial risks for users and suppliers of any given commodity, which affects their profitability and the process of managing the inherent price risks of an asset through various financial instruments is called price risk management. It helps in protecting profit margins from adverse price movements in raw materials as well as finished products. Commodity exchanges ensures risk management by specifying members minimum net worth, margin limits, price circuit filters, limiting single order size, online mark to market loss monitoring etc.

Trading commodities enables one to participate in broad market moves or within specialized sectors. Commodity market offers a cushion from abrupt changes in value of stocks that hedgers hold. Commodities markets are needed for the most important economic function of price discovery and price risk management. Futures contract try to predict what the value of a commodity will be at some date in the future. Participants in the futures market can use different strategies to tackle advantage of rising and declining prices. A Futures Exchange provides price signals to producers and consumers based on which they meet their long terms requirements. These price signals are not available to the user unless there is a commodity futures exchange and in its absence, the markets have large price fluctuations. A trader before starting the futures trading should have proper knowledge of various concepts of futures trading and have a solid understanding of how the market and contracts function.

CHAPTER 5
ANALYSIS

The amazing diverse world of commodity futures trading offers many exciting new opportunities for trading. Futures contract try to predict what the value of a commodity will be at some date in the future. A future trading performs two important functions of price discovery and price risk management with reference to the given commodity. It is therefore useful to all the segments of the economy and particularly to all the constituents of the Commodity Market System. To understand the usefulness of futures trading it is necessary to study various aspects of futures trading. This chapter explains the analysis of data adopted from various sources for conducting the study using different mathematical and statistical tools and also describes how the futures contract helps in price risk management.

Sources of data

The study is based on secondary data. The daily three-month future prices of Crude Oil from 1 Jan 2007 to 31 Dec 2007 in Rupees per Barrel are collected from the official website of Multi Commodity Exchange of India (www.mcxindia.com) and the daily spot prices of Crude Oil from 1 Jan 2007 to 31 Dec 2007 are obtained from the website of National Multi Commodity Exchange of India (www.nmce.com). The information and data regarding the top world Crude Oil Producers, Consumers, Exporters and Importers are compiled from website of Energy Information Administration (EIA) (www.eia.doe.gov).

5.1 Global crude oil market

Oil is the single most important commodity that holds the position of a key factor in each and every economy of the world. Crude oil reserves on earth are estimated to be more than 1 trillion barrels that are mostly found in the Middle East, Eastern Europe, Africa and Central America, Middle East being the top reserve holder. Crude oil alone bears 40 per cent share to meet the global energy needs in the current scenario and thus, the importance of oil has reached such a level at which there is no country in the world, which doesn't need oil and its by-products, and if somehow it doesn't have much reserves of oil to meet their domestic demand, these nations are ready to import the product at any cost.

Major crude oil producing countries

The total produce of crude oil in the world is 75 million barrels per day with the total reserves of crude oil estimated to be 1 trillion tons. The OPEC (Organization of Petroleum Exporting Countries) nations provide around 30 million barrels per day that accounts to approximately 40 per cent of world production. The table 5.1 below shows the top ten largest producers of crude oil in the world.

Table 5.1 Production of crude oil (in million barrels per day) by world's top 10 producers in the year 2006

Producers	Total oil production	% production
1. Saudi Arabia	10.72	20.54
2. Russia	9.67	18.52
3. United States	8.37	16.03
4. Iran	4.12	7.89
5. Mexico	3.71	7.11
6. China	3.84	7.36
7. Canada	3.23	6.19
8. United Arab Emirates	2.94	5.63
9. Venezuela	2.81	5.38
10. Norway	2.79	5.34

Source: Energy Information Administration (EIA).
http://www.eia.doe.gov/emeu/cabs/topworldtables1

The table shows that Saudi Arabia is the leading producer of crude oil with the production figures of 10.72 million barrels per day. The country is followed by Russia with 9.67 million barrels and United States with 8.37 million barrels of production per day. Saudi Arabia holds 20.54 per cent of the total production by top 10 countries in the world.

Major crude oil consuming countries

The consumption of crude oil in the world has been rising with the change in time and the technological improvements that are accompanying it. Oil is consumed all over the globe and United States of America consumes the maximum level of oil in the world. The top 10 major consumer countries of crude oil along with their consumption figures are given in the table below

Table 5.2 The top 10 consumers of crude oil in the year 2006 with figures in million barrels per day

Consumers	Total oil consumption	% consumption
1. United States	20.59	41.29
2. China	7.27	14.58
3. Japan	5.22	10.47
4. Russia	3.10	6.22
5. Germany	2.63	5.27
6. India	2.53	5.07
7. Canada	2.22	4.45
8. Brazil	2.12	4.25
9. South Korea	2.12	4.25
10. Saudi Arabia	2.07	4.15

Source: Energy Information Administration (EIA).
http://www.eia.doe.gov/emeu/cabs/topworldtables1

The global oil market is still dominated by traditional consumers, particularly the United States, which uses nearly a quarter of the world's oil. Table (5.2) shows that United States consumes around 20.59 million barrels per day which is 41.2 per cent of the total consumption of worlds top 10 consuming countries. It is followed by China and Japan with 7.27and 5.22 million barrels per day respectively. India ranks the sixth position with a consumption of 2.53 million barrels per day which is 5.07 per cent of the total consumption of world's top 10 consuming countries.

Global exports of crude oil

Regarding the world trade situation, one important aspect is the presence of an organization namely OPEC that controls and regulates the exports and imports of crude oil by most of the countries of the world. OPEC member countries also dominate the world exports of crude oil contributing to 55 per cent of the total world exports. The top 10 major crude oil exporting countries with their exporting figures are given in the table below.

Table 5.3 The export of crude oil in million barrels per day by top 10 exporters in the year 2006

Exporters	Net oil exports	% exports
1. Saudi Arabia	8.65	26.35
2. Russia	6.57	20.01
3. Norway	2.54	7.74
4. Iran	2.52	7.68
5. United Arab Emirates	2.52	7.68
6. Venezuela	2.20	6.70
7. Kuwait	2.15	6.55
8. Nigeria	2.15	6.55
9. Algeria	1.85	5.64
10. Mexico	1.68	5.12

Source: Energy Information Administration (EIA).
http://www.eia.doe.gov/emeu/cabs/topworldtables1

The table (5.3) shows that Saudi Arabia is the leading exporter of crude oil with an exporting figure of 8.65 million barrels per day and it exports 26.35 per cent of the top 10 crude oil exports. It is followed by Russia, Norway, Iran, and United Arab Emirates with an export of 6.57, 2.54, 2.52, 2.52 million barrels per day respectively.

Global imports of crude oil

The imports of crude oil are generally done by the countries, which do not have appropriate reserves of oil and are incapable of satisfying the domestic consumption demand. The following is list of the countries with their net import figures that are the major importers of crude oil in the world

Table 5.4 Top 10 importers of crude oil in the year 2006 with their importing figures in million barrels per day

Importers	Net oil imports	% import
1. United States	12.22	37.00
2. Japan	5.10	15.44
3. China	3.44	10.41
4. Germany	2.48	7.51
5. South Korea	2.15	6.51
6. France	1.89	5.72
7. India	1.69	5.12
8. Italy	1.56	4.72
9. Spain	1.56	4.72
10. Taiwan	0.94	2.85

Source: Energy Information Administration (EIA).
http://www.eia.doe.gov/emeu/cabs/topworldtables1

The table (5.4) shows that United States is the largest importer of crude oil, though it ranks third in the production. The net oil imports of United States are 12.22 million barrels per day with a share of 37 per cent of import among the top 10 importers. It is followed by Japan and China with 5.10 and 3.44 respectively. India ranks the seventh position in the net imports with a figure of 1.69 million barrels per day.

5.2 Trends in future prices of crude oil

The Monthly Graphs are obtained by plotting daily future prices of crude oil for the year 2007. Trends in future prices are analysed by fitting linear, parabolic and logarithmic trend line.

Linear Trend

The linear trend or straight line trend is fitted using the equation $Y_t=a+bt$. The linear trend is useful when there is a straight line movement in the prices i.e. when the prices are found to be increasing or decreasing by equal absolute amounts in each time period. In a linear trend the sum of deviations of the actual values and the trend value is 0 and the sum of squares of deviations of the actual and the trend value is the least.

Table 5.5 The mean value 'a', the rate of change 'b', and the root mean square residual 's' used for fitting a linear trend for each month of the year 2007.

Months	a	b	s
Jan	2670.1692	-10.7162	100.9547
Feb	1944.4011	46.0052	352.4702
Mar	2769.3292	0.8844	64.9105
Apr	2167.6390	39.3013	390.6432
May	3265.1757	-30.6047	261.8456
Jun	2751.4954	4.5901	24.0132
Jul	2875.5292	7.9750	21.8795
Aug	2981.6831	-3.2728	56.0785
Sep	2186.9519	58.1642	394.7172
Oct	3010.1354	22.3262	48.6059
Nov	3100.6325	32.9494	279.9517
Dec	2915.0769	43.1538	255.2855

The table 5.5 shows that the average price of crude oil was high in the month November and low in February. The rate of change in prices 'b' was negative in January, May and August and positive in rest of the months. The linear trend method shows a high value for 's'.

Parabolic Trend

A parabolic trend is best suitable when the movement in prices form into smooth curve. It need not be strictly parabolic but forms a curve. The trend equation in this case is $Y_t=a+bt+ct^2$

Table 5.6 The trend value 'a', slope 'b', 'c', root mean square residual 's' and Furnival Index 'I' required to fit a parabolic trend for each month of the year 2007.

Month	a	b	c	s	I
Jan	2901.7846	-60.3481	1.8382	31.7664	1.7180
Feb	2698.3567	-10.9303	0.5866	39.7862	0.0000
Mar	2892.0908	-25.4216	0.9743	41.1391	0.0000
Apr	2981.5726	-18.0362	0.4086	24.4911	4.8778
May	2747.2479	-1.3957	-0.0465	42.4850	-16.3725
Jun	2743.7377	6.2524	-0.0616	24.3086	5.4084
Jul	2891.7408	4.5011	0.1287	21.2690	2.7518
Aug	3088.3946	-26.1396	0.8469	46.2924	0.0000
Sep	2924.9704	19.5082	-0.3555	34.9456	3.7789
Oct	3061.3008	11.3621	0.4061	43.7306	2.0387
Nov	3612.7791	5.2677	-0.1279	87.2113	-59.2992
Dec	3453.6226	4.4514	0.3674	46.2492	3.5897

According to parabolic trend method the average value of crude oil prices were high in November and low in May. The rate of change 'b' was negative in January, February, March, April, May and August. The value of 'c' was negative in May, June,

September and November, which shows that the trend curve is slightly concave downwards.

Logarithmic Trend

A logarithmic trend is used when the prices are increasing or decreasing by a constant percentage rather than a constant absolute amount. The equation $Y_t=ab^t$ represents a logarithmic trend.

Table 5.7 The value of constants 'a', 'b', root mean square deviation 's' and Furnival Index 'I' used in fitting a logarithmic trend for months of the year 2007.

Months	a	b	s	I
Jan	2666.3449	0.9959	99.9514	22.2611
Feb	2635.1954	1.0014	46.8107	29.1487
Mar	2769.6115	1.0003	64.9124	183.8202
Apr	2937.8887	0.9973	30.2585	8.9568
May	2753.3547	0.9990	41.7145	-35.7261
Jun	2751.7831	1.0016	24.0406	12.0363
Jul	2877.0704	1.0027	21.7160	6.2876
Aug	2980.8343	0.9989	56.0086	39.7304
Sep	2964.8571	1.0034	38.0044	8.2186
Oct	3020.2678	1.0067	47.0539	4.8761
Nov	3627.8901	1.0005	85.5272	105.4904
Dec	3414.1857	1.0039	48.1380	7.9462

The logarithmic trend values also show that the average price was high in November and low in February. The value of 's' and 'I' were low but not as low as the values in parabolic trend method.

The Tables (5.5, 5.6 and 5.7) and Graphs in Appendix I, II and III show that the best suited monthly trend line for the daily futures prices of crude oil is the parabolic trend and more over the movements in future prices appear more likely to be parabolic in nature and thus the non linear parabolic trend is the best suited trend line. The root mean square deviation's' is also comparatively less in case of parabolic trend. The movements in the future prices in months January, March, April and August follows a curved path, where as in July, September, October and December the prices are increasing upwards. In the months February, May, June and November the prices are varying highly, there is an irregular movement through out.

5.3 Movement in future and spot prices of crude oil

Both the future and spot prices are plotted against the time period to analyse the price movements and reduce the basis risk which is the risk arising due to difference in the spot and future prices. In Appendix IV the graphs for the months January, February, March, April, May and June show that there is high difference in the spot and future prices. The future prices are very much higher than the spot prices. In the months July, August, September, October, November and December the difference in the spot and future is comparatively less. In some dates the spot prices are higher than the future price and the deviation is also very less. Thus the graphs show that the future and spot prices are inter-related. The movement of future price also effects the movement of spot prices. In a true sense at the expiry of the contract the spot and future prices must converge.

5.4 Price Risk Management

The two major economic functions of a commodity futures market are price risk management and price discovery. Among these, the price risk management is by far the most important, in a commodity futures market. The need for price risk management, through what is commonly called "hedging", arises from price risks in most commodities. The larger, the more frequent and the more unforeseen is the price variability in a commodity, the greater is the price risk in it .The greater the exposure to commodity

price risks, the greater is the share of the commodity in the total earnings. Hence, the need for price risks management or hedging through the use of futures contracts is essential. Hedging involves buying or selling of a standardized futures contract against the corresponding sale or purchase respectively of the equivalent physical commodity. The benefits of hedging flow from the relationship between the prices of contracts (ready) for physical delivery and those of futures contracts. So long as these two sets of prices move in close unison and display a parallel (or closely parallel) relationship, losses in the physical market are offset, either fully or substantially, by the gains in the futures market. Hedging thus performs the economic function of helping to reduce significantly, if not eliminate altogether, the losses emanating from the price risks in commodities. For example : The hedger having a long position in the crude oil futures contract reduces the risk by holding a short position in the spot market. The analysis is equally applicable if the hedger has a short position in the crude oil futures contract and wishes to hedge the exposure to this contract by holding a long position in spot market

There are many inherent risks in the world of finance. Several techniques may be employed to reduce the risk exposure. A difficulty using futures to hedge risk arises due to the volatility of the futures contracts coupled with the volatility of the position that is to be hedged. Hedging risk is essential to anyone who is faced with an open financial position. The fear is that this position could appear to be favorable at present, but become just the opposite by the time the position matures or is closed. The traditional notion of effective hedging is that hedgers manage risk by taking an opposite-to-cash position in the futures market.

This study examines the use of crude oil futures in hedging and thus reducing the basis risk. The basis risk is the difference in spot and future price. The use of hedge ratio helps in reducing the basis risk. Hedge ratio is defined as the ratio of number of futures contract to be purchased or sold to the quantity of cash asset. The hedge ratio assumes constant volatility of both the underlying position and the futures contract. The hedge ratio represents a specific proportion of the position to hedge that maximizes the effectiveness of the hedge.

There are different hedging strategies: The traditional one to one hedge and the minimum variance hedge. Both strategies require determining the hedge ratio 'h' but the traditional strategy emphasizes the potential for futures contract to be used to reduce risk. The strategy is very simple and involves the adoption of a fixed hedge, which consists of taking a futures position that is equal in magnitude, but opposite in sign (i.e. going short when having a long position and vice versa) , to the spot position. If price changes in the futures market exactly match those in the future markets the adoption of a one to one strategy will be enough to eliminate the price risk. However, in practice the prices on the spot and futures markets do not move exactly together and a hedge ratio derived from the traditional hedge strategy would not minimize the risk. Thus in this case it is necessary to find the correlation between, and the standard deviation of spot and futures to determine the hedge ratio.

Table 5.8 The correlation, standard deviation and hedge ratio determined for each month of the year 2007.

Months	correlation	SD of future prices	SD of spot prices	Hedge Ratio
Jan	0.2300	43.9003	62.2969	0.3263
Feb	0.3728	45.9149	39.1536	0.31790
Mar	0.4146	29.9080	42.1884	0.5848
Apr	0.1503	25.0828	46.3484	0.2778
May	0.2483	31.0808	40.9173	0.3269
Jun	0.41636	24.9232	30.1135	0.5030
Jul	0.1612	20.0110	33.9631	0.2737
Aug	0.4093	30.8072	52.6674	0.6997
Sep	0.7419	38.4796	43.3484	0.8358
Oct	0.5030	40.9018	39.1385	0.4813
Nov	0.5329	60.5853	85.7184	0.7539
Dec	-0.0008	43.8165	72.9589	-0.0013

The table 5.8 shows the co-efficient of correlation between the daily future and spot prices, standard deviation of daily future price, standard deviation of daily spot price and the hedge ratios for each month. Correlation co-efficient tells the relation between the spot and future i.e. whether it is negatively or positively correlated. Except for the month December, the correlation co-efficient is positive for all months. In December, the spot and future prices are negatively related. The hedge ratio can be either positive or negative depending upon the relationship between the future prices and the spot prices. Thus the hedge ratio for December is -0.0013. The hedge ratio determines how much to hedge in order to reduce risk. If a hedger has a short position in crude oil futures contract in January, he can then reduce risk by holding a long position of at least 32.63 per cent of the underlying position in the spot market. Same way in February by holding 31.79 percent, in March 58.48 per cent and so on

The results of many studies indicate that neither a 0 per cent nor 100 per cent hedge is efficient. As a rule of thumb a 50 per cent hedge ratio is recommended

- One can use a fully hedged benchmark. In this case the hedger will hedge fully his current position and thus go for a 100 per cent hedge ratio.
- Another one is going for non-hedged benchmark that is employing 0 per cent hedging ratio.
- Using a 50 per cent hedge ratio allows deviation on both sides leaving the hedger with great flexibility and increasing the chances of adding value over time

The theory of hedging is now well established and is commonly used by practitioners, either to offset the risk of a position in the cash or spot market by taking a position in the futures market, or as part of an overall investment strategy. In both cases, the primary objective is to estimate the size of the short position that must be held, as a proportion of the long position that maximises the agent's expected utility, which is defined over the risk and expected return of the hedged commodity.

Summary of findings and Conclusion

CHAPTER 5

SUMMARY OF FINDINGS AND CONCLUSION

India has a long history of commodity futures trading, extending over 125 years. As the country embarked on economic liberalization policies in the early nineties, the government realized the need for futures trading to strengthen the competitiveness of Indian agriculture and the commodity trade and industry. Commodity exchanges have first hand knowledge about the products, their sources of demand and supply etc. Trading in commodity exchanges offer equal opportunity and benefit for investors and traders, it also provides various financial advantages to commodity producers, processors, market functionaries, financial organizations and broking agencies at large through easy operational techniques and economic utility. As market mechanism tool futures trading also performs the economic function of price discovery and price risk management.

This project tried to use various statistical tools for studying the movements of crude oil future prices. Quantitative models have been very successful in the financial derivatives and commodity market. At the beginning of the analysis report, the basics of crude oil market and its global scenario are introduced; later on emphasis was given to the price risk management in crude oil. Altogether the project concentrates on the movements in spot and future prices of crude oil and thus arriving at a conclusion where management of risk in crude oil prices is possible. With the help of two main data sources: Energy Information and Administration and Multi Commodity Exchange analysis are subsequently conducted.

The findings can be summarized into following heads,

1.Global crude oil market
2.Trends in future prices
3.Movements in future and spot prices
4.Price risk management in crude oil

5.1 Global crude oil market

The total reserves of crude oil are estimated to be 1 trillion tons and the world produces 75 million barrels per day. Around 40 per cent of the global energy needs is met by Crude Oil.

The production figure of Saudi Arabia is 10.72 million barrels per day and it is the leading producer of crude oil in the world, which is followed by Russia and United States.

The consumption figures show that the global oil market is still dominated by United States, which uses nearly a quarter of the world's crude oil. The United States consumes around 20.59 million barrels and is followed by China and Japan.

Saudi Arabia is the leading exporter of crude oil with an exporting figure of 8.65 million barrels per day. It is followed by Russia, Norway, Iran and United Arab Emirates.

United States is the largest importer of crude oil, though it ranks third in the production. It is followed by Japan and China.

The total production of crude oil by the top 10 countries for the year 2006 was 52.2 million barrels per day; where as the total consumption by the top 10 consuming countries was 49.87 million barrels per day. This shows that the quantity consumed is almost close to the volume of crude oil produced.

India ranks sixth position in the crude oil consumption, with a figure of 2.53 million barrels per day and seventh position in the net imports with a figure of 1.69 million barrels per day.

5.2 Trends in future price

The parabolic trend is the best suited monthly trend line for the daily future prices of crude oil for the year 2007.

The movements in the future prices in months January, March, April and August followed a curved path, where as in July, September, October and December the prices were increasing upwards.

In the months February, May, June and November the prices were varying highly, there was an irregular movement through out.

The highest future price of crude oil in the year 2007 was on 23rd November with a price of Rs.3822 per barrel and the lowest price was seen on 18th January with a price of Rs.2360 per barrel. Thus the highest price per litre was Rs.24.04 and the lowest price was Rs.14.84 per litre.

5.3 Movement in spot and future prices

The months January, February, March, April, May and June shows that there was high difference in the spot and future prices. The future prices were very much higher than the spot prices.

In the months July, August, September, October, November and December the difference in the spot and future was comparatively less.

In some months the spot prices were higher than the future price and the deviation was also very less.

There was a positive correlation between future and spot prices in all months, except in December, the prices were negatively correlated. Futures market was expected to follow closely the spot market trend

5.4 Price risk management

The hedge ratio is an effective tool for price risk management in crude oil. The basis risk can be covered using hedge ratio.

The hedge ratio can be either positive or negative depending upon the relationship between the future prices and the spot prices.

In December, the hedge ratio was -0.0013 since the spot and future prices were negatively related.

If a hedger has a short position in crude oil futures contract in January, he can then reduce risk by holding a long position of at least 32.63 per cent of the underlying position in the spot market. Same way in February by holding 31.79 per cent, in March 58.48 per cent and so on

Conclusion

The Oil sector in India is relatively underdeveloped. Oil needs of India are expected to grow by 4 to 7 percent a year. Thus the issues faced by the Oil sector in India are complex. India is vulnerable to international price volatility of crude. The futures contract offers steps in helping market participant's deal with price volatility. This is a very important step since hedging of price risks will be very important. A well developed and effective commodity futures market, unlike physical market, facilitates offsetting the

transactions without impacting on physical goods until the expiry of a contract. Futures market, as observed from the cross- country experience of active commodity futures markets, helps in efficient price discovery and price risk management of the respective commodity. It has also helped policy makers by providing effective solution to the problems faced by commodity markets and thus helping the government to effectively allocate its resources to improve competitiveness of the economy. Futures trading in commodities in the country had clearly shown that it had brought in much needed market reforms in the country leading to increased efficiency and competitiveness in the commodity markets.

Bibliography

BIBLIOGRAPHY

Clubley, S. 1998. Trading on Oil futures and Options. Woodhead Publishing, 502p

Dantwala Committee. 1966. Forward Markets Review Committee (Chairman, Dantwala, M. L.) Government of India

Dusak, K. 1973. Futures trading and investor's returns: An investigation of commodity market risk premium. *Political Economy*, **81**: 1387-1406

Erresa, S. and Brown, L. S. 2002. Fundamentals of trading Energy Futures and options. Penu Well Books, 247p

Furnival, G.M. 1961. An index for comparing equations used in Constructing volume Tables. *Forest Science*, 7: 337-341

Gallati, R.R. 2003. Risk Management & Capital Adequacy. Mc Graw Hill Professional, 550p

Harris and Moyer, R. 1999. Managerial Economics: Applications strategy and tactics. South Western College Publishers, 780p

Jain, R.K. 1999. Commodity futures market in India – challenges head. *Economic Development in India,* **22**: 29-67

Kabra Committee.1994. Committee on Forward Markets (Chairman, Kabra) Ministry of Consumer Affairs, Food and Public Distribution, Government of India

Khusro Committee. 1979. Committee on Forward Markets (Chairman, Khusro, A.M.) Ministry of Commerce, Civil Supplies and Co-operation, Government of India

Kolb, W.R. 1985. Understanding Futures Market. Glenview Scott Publishers, 275p

Kuassi, K. 2008. OPEC, will they abandon the US Dollar. *The Analyst,* **14** (1): 14-17

Mahajan, A. 2007. Cover-story perfect futures. *Commodity Market,* **1**(1): 18-27

Marshall, J.F. 1989. Futures and Options contracting. South Western College Publishers, 210p

Mishra, G.S. 1998. Market Structure and Price Discovery of commodity futures in India. *National Multi Commodity Exchange of India* Ltd: 5

Naik, G and Jain, R.K. 2002. Indian agricultural commodity futures markets: A performance Survey. *Economic & Political weekly,* **37**: 3161-3173.

Neill, O.J. 2006. Galloping Oil prices – Oil shock in the offing. *The Analyst,* **12**(06): 7-9

Pavaskar, M. 1970. Hedging Efficiency of the Cotton Futures. University of Bombay, 77p

Rutten, L.1996. Commodity Exchange Development and the role of the Government: Policeman and Facilitator, *Assocham Souvenir*: 5

Shroff Committee. 1950. Expert Committee on the Futures Markets Regulation Bill (Chairman, Shroff, A.D.) Ministry of Commerce, Government of India

Sunilkumar. 2003. Role of Futures Market in Stabilizing of Agro Commodity Prices. *Yojana*, **4**(1): 38

UNCTAD. 1993. Feasibility study on a world wide pepper futures contract. (Report by UNCTAD Secretariat, Jakarta): 51

UNCTAD. 1996. Standing Committee on Commodities (1994), National Conference on Commodities Futures Market. *Assocham Souvenir*, 67.B: 2

Vishwanathan, R. 2006. Oil prices- they don't make News Anymore. *The Analyst.* **6**(26): 35-36

Websites:

www.eia.doe.gov
www.mcxindia.com
www.nmce.com
www.peninsularcomex.com

FUTURES TRADING OF CRUDE OIL- A STUDY ON PRICE RISK MANAGEMENT OF CRUDE OIL FUTURES

BY

PRUDHA MOHAN
(2003-05-14)

ABSTRACT OF THE PROJECT

Submitted in partial fulfillment of the requirement for the degree of

Bachelor of Science in Co-operation and Banking
Faculty of Agriculture

COLLEGE OF CO-OPERATION BANKING AND MANAGEMENT
KERALA AGRICULTURAL UNIVERSITY
VELLANIKKARA, THRISSUR- 680 656
KERALA, INDIA

2008

ABSTRACT OF THE PROJECT

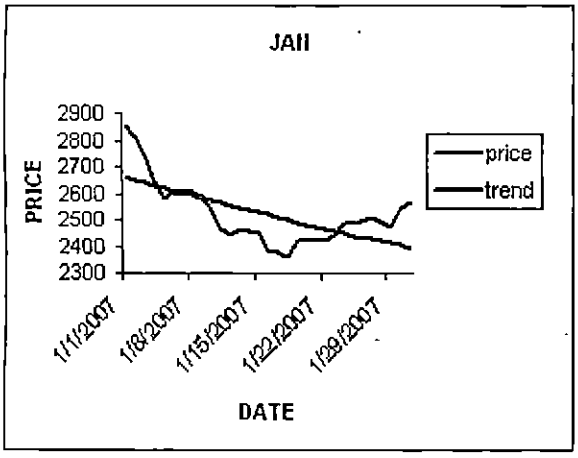
The study entitled **"FUTURES TRADING OF CRUDE OIL- A STUDY ON PRICE RISK MANAGEMENT OF CRUDE OIL FUTURES"** was undertaken to study the price movements in future prices of crude oil and price risk management in crude prices. The report first presents a summarization of the Indian commodity and crude futures and later it includes the description of Organization. The various concepts of futures trading are introduced later which gives a basic outline of different contracts undertaken, participants in futures market and various strategies followed.

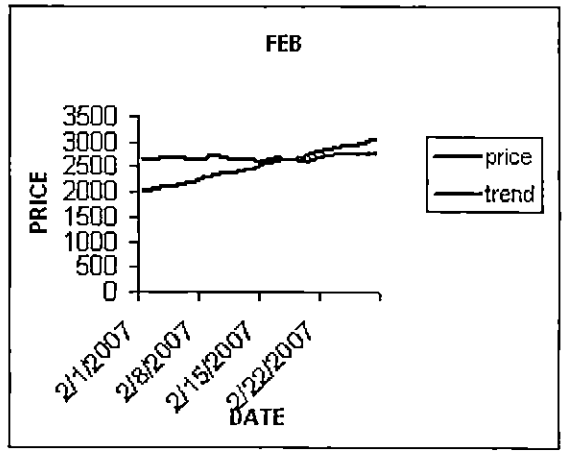
The study was based on secondary data. The information about the production, consumption, export and import of crude oil were collected from the website of Energy Information and Administration. This helped in studying the top producer, consumer, exporter and importer and their percentage share among top ten countries. The Multi Commodity Exchange traded crude oil futures data from 1 Jan to 31 Dec 2007 was used to undertake the study. The study analyses the trends in future prices by using least square method such as linear, parabolic and logarithmic trend. It revealed that the future prices showed more or less a parabolic trend. The movements in spot and future prices of crude oil were also analysed by finding the co-efficient of correlation and standard deviation. This study also examined the use of crude futures in hedging and risk reduction. It showed a positive correlation between the spot and future prices i.e. as the future prices increases the spot prices also increases. The project investigated methods involved in reducing the basis risk and the subsequent calculation of hedge ratio. The study brought out that the use of hedge ratios can reduce the basis risk to a considerable level. The hedging and the use of hedge ratio are an effective tool in price risk management. Thus futures trading play a very important role of performing economic function of price risk management.

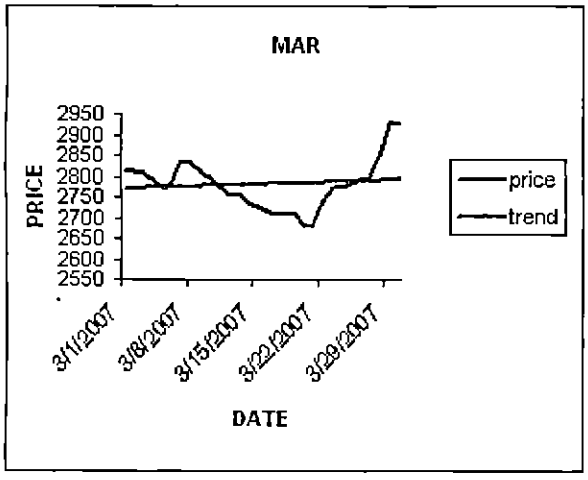
Annexure

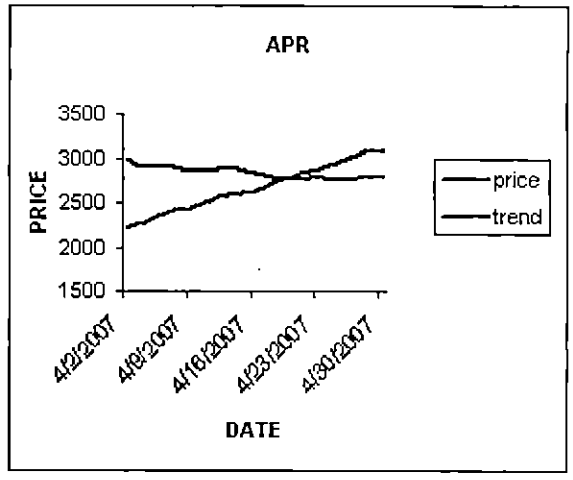
ANNEXURE

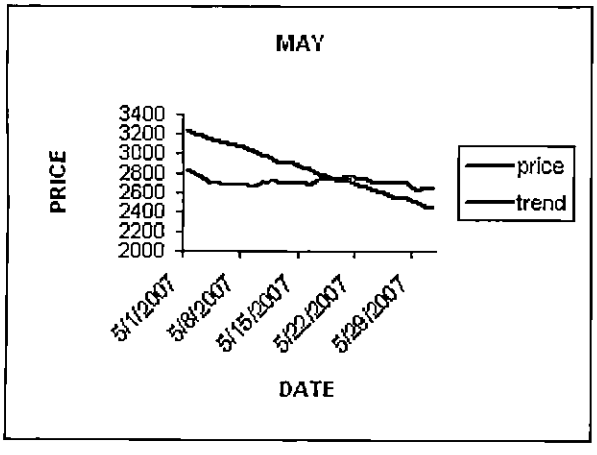
Appendix I
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -LINEAR TREND METHOD

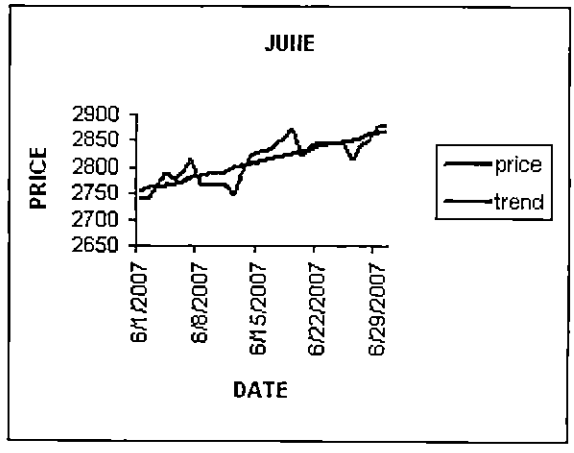




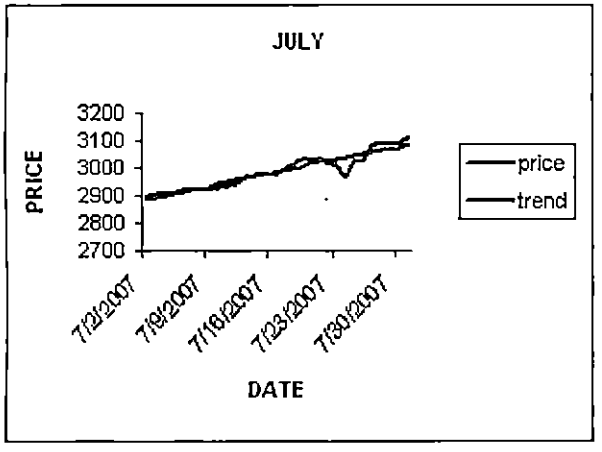


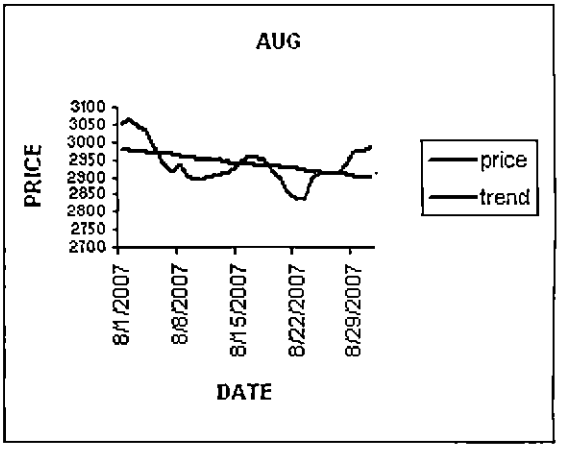


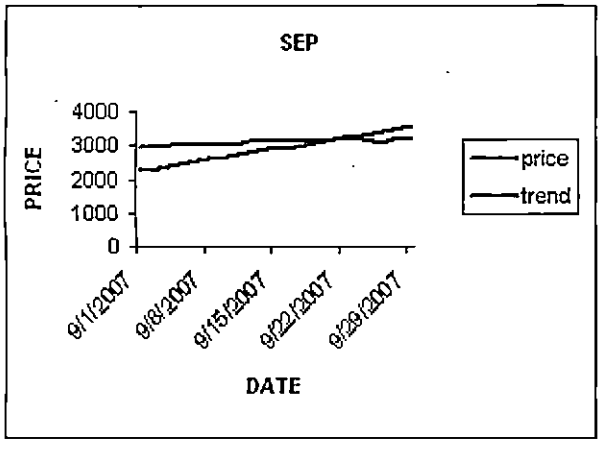


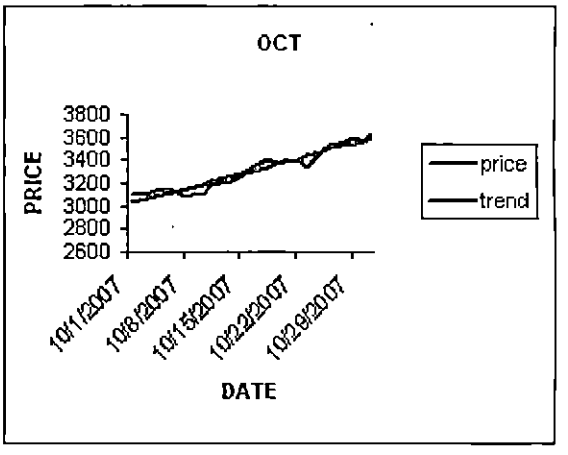


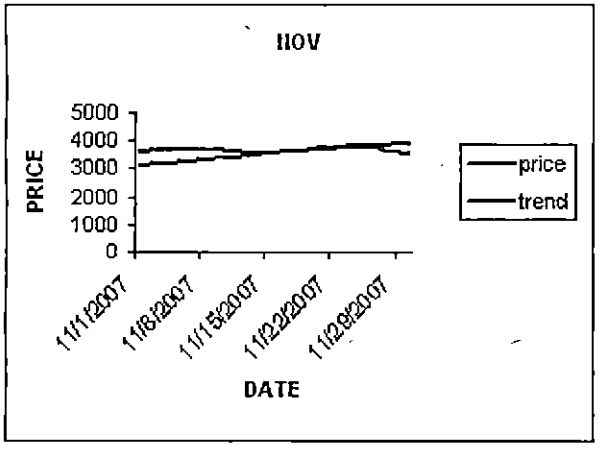
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -LINEAR TREND METHOD

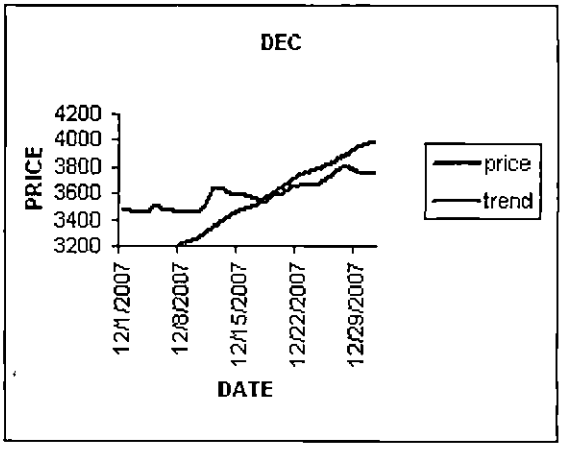




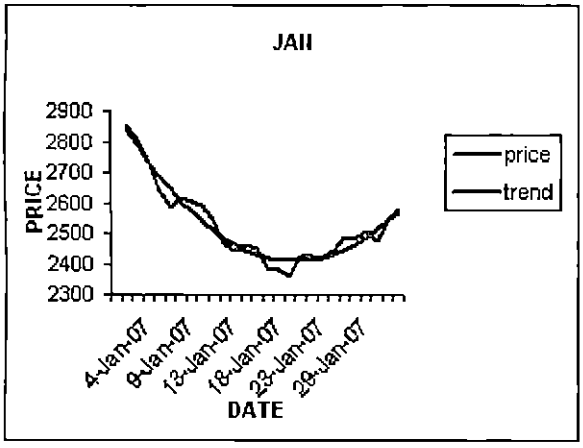


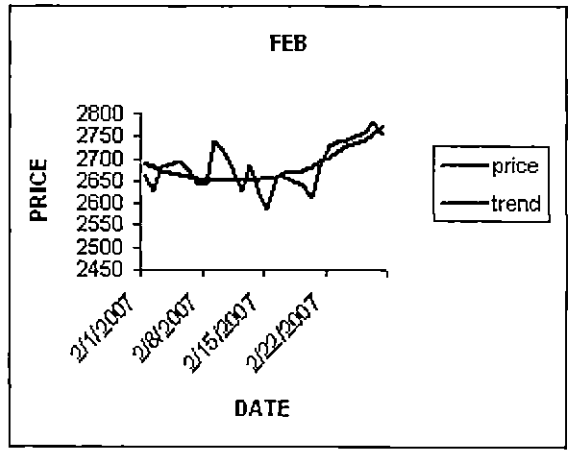


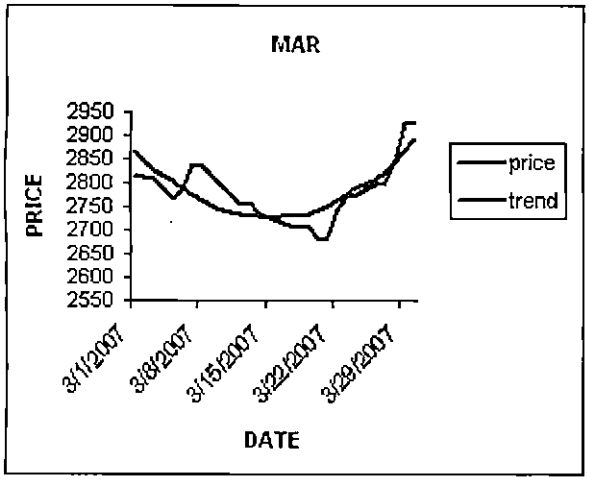


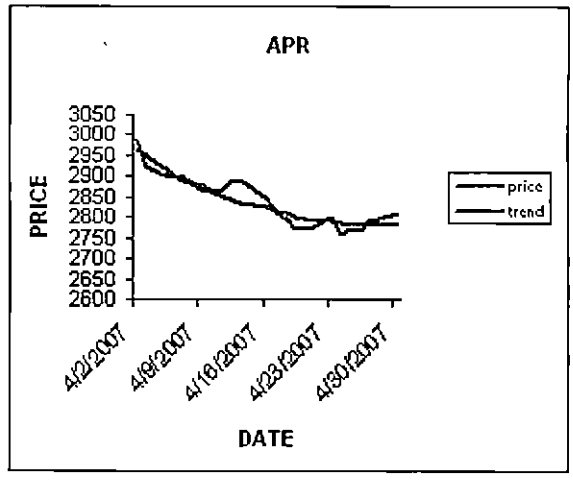


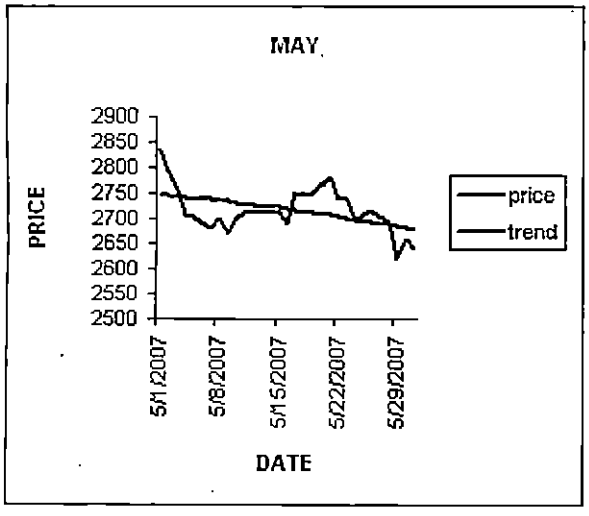
Appendix II
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -PARABOLIC TREND METHOD

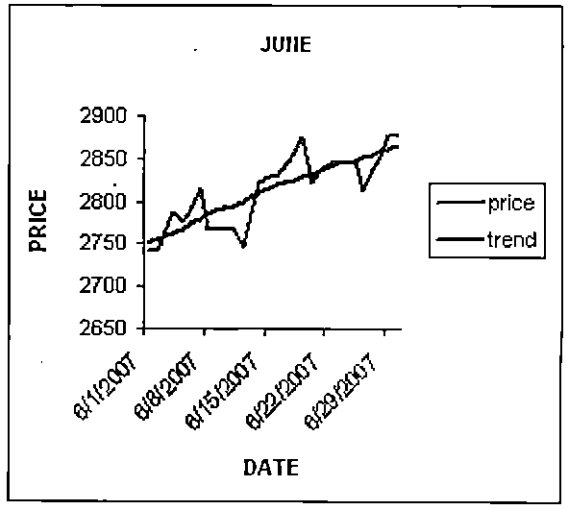




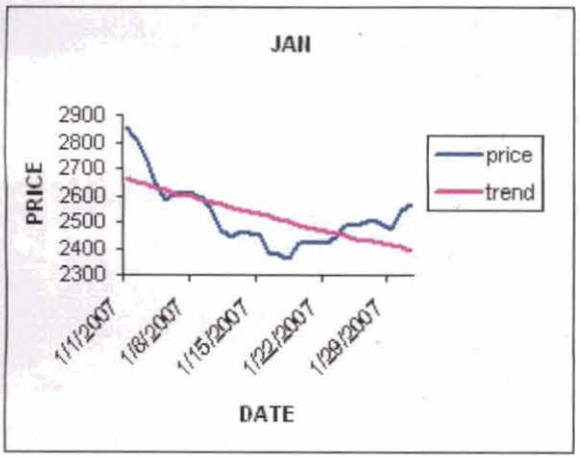


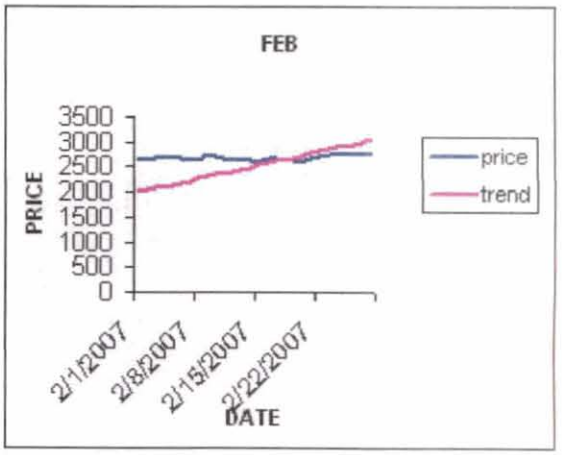


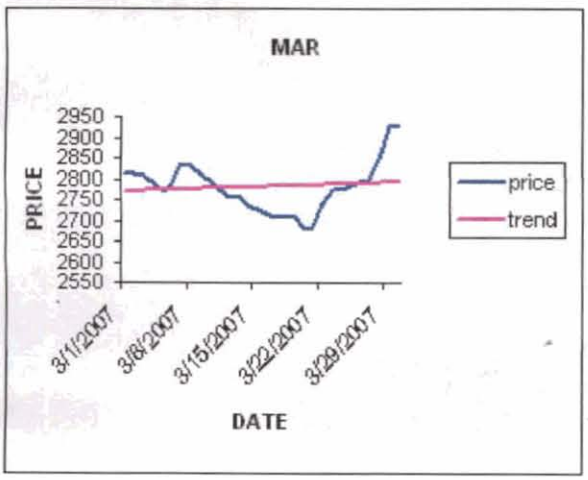


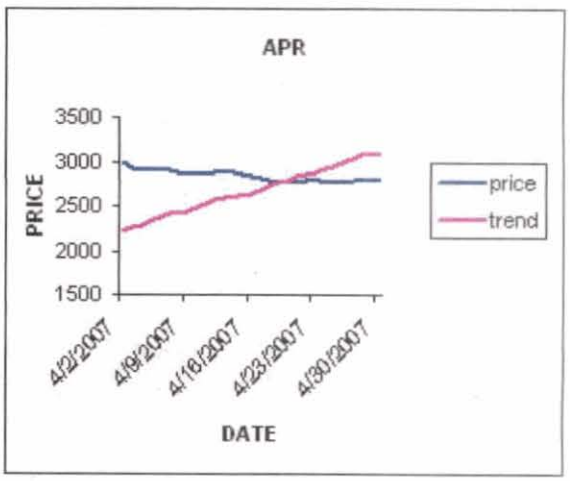


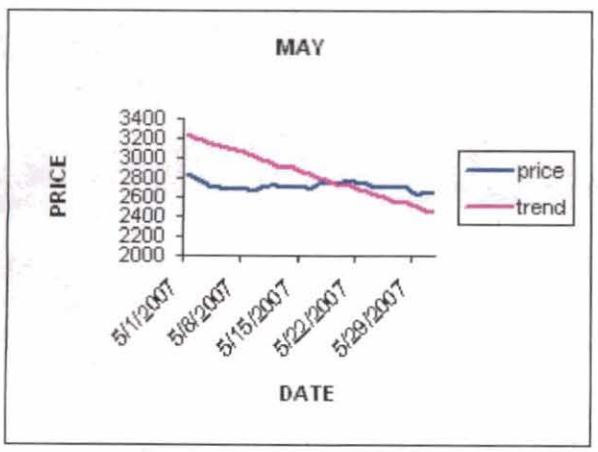
Appendix I
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -LINEAR TREND METHOD

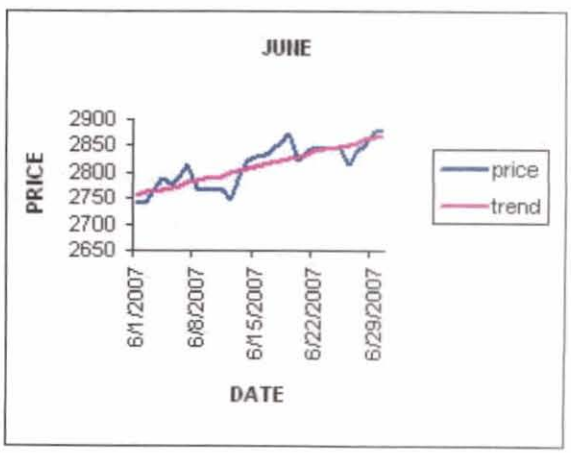




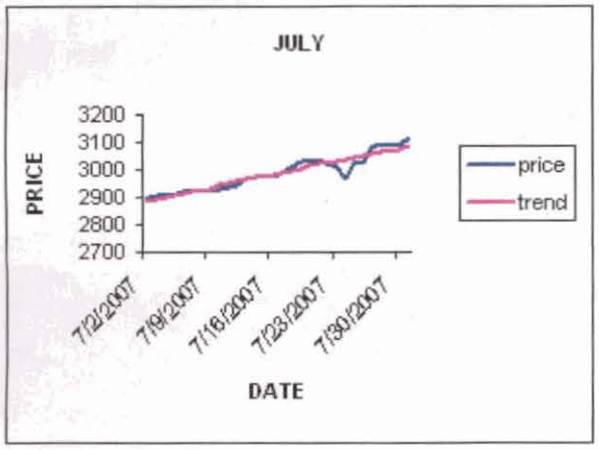


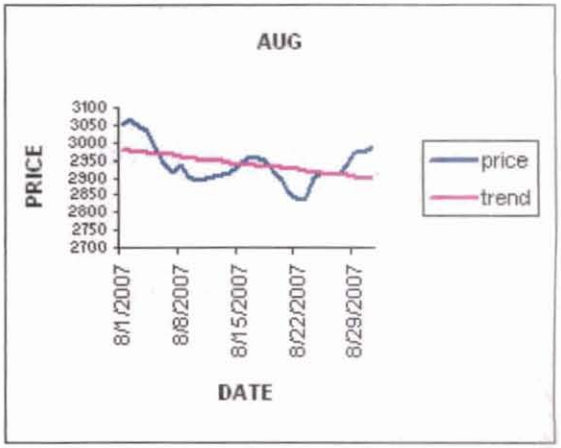


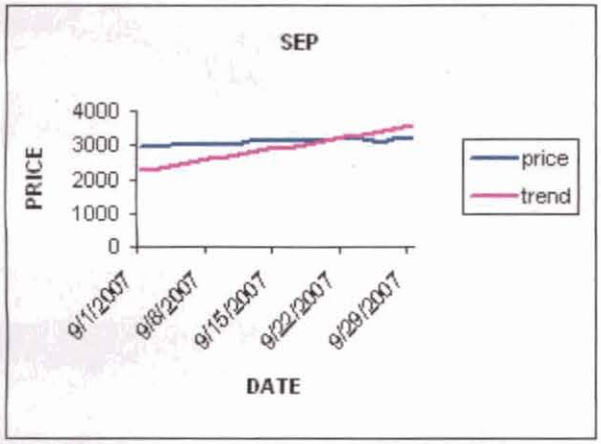


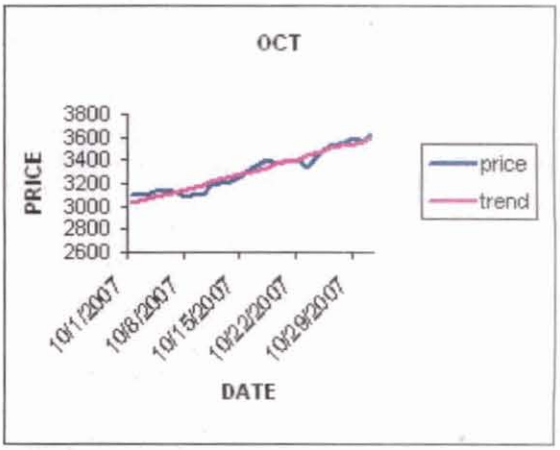


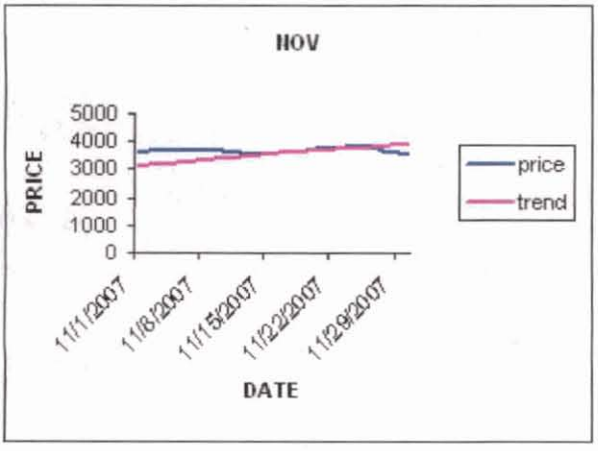
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -LINEAR TREND METHOD

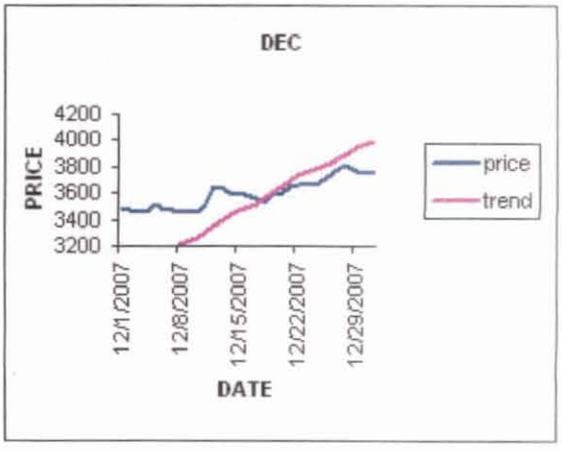




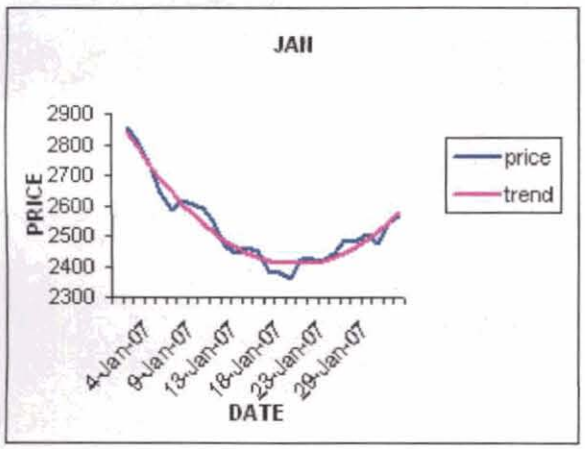


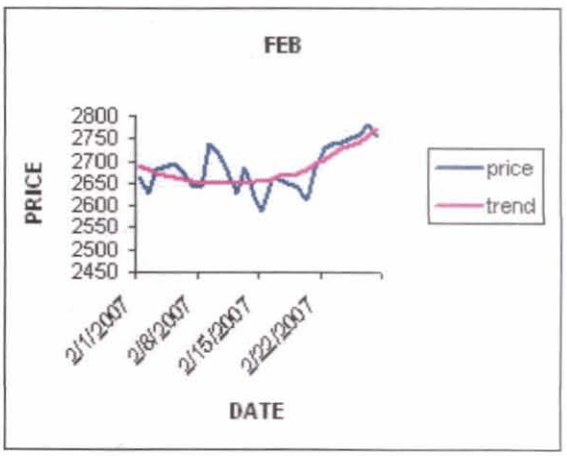


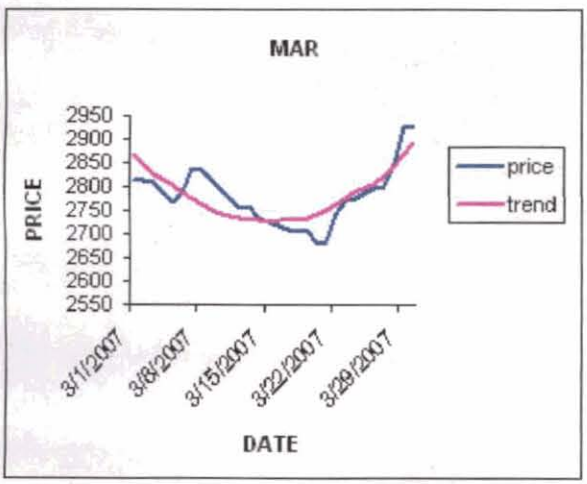


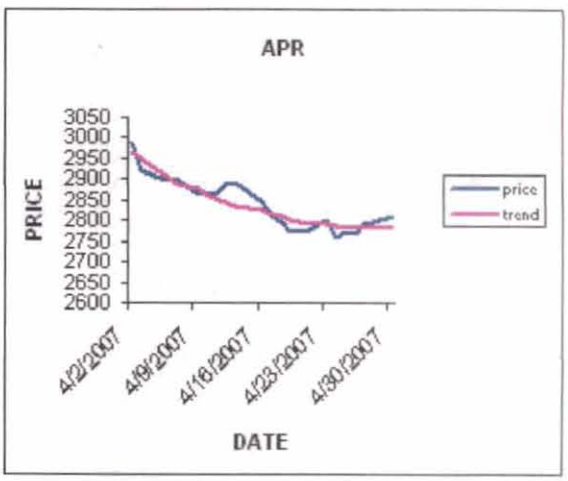


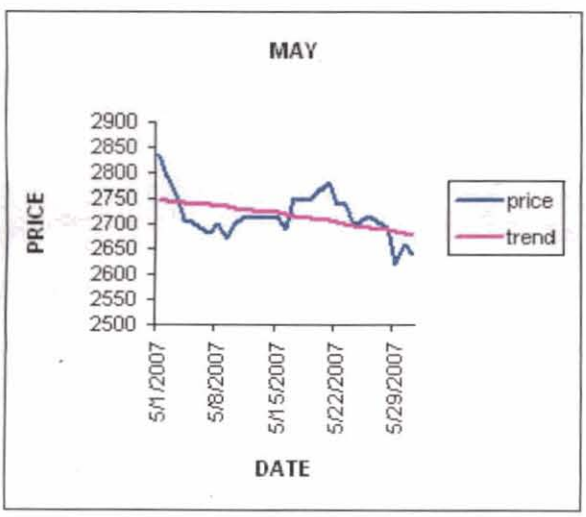
Appendix II
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -PARABOLIC TREND METHOD



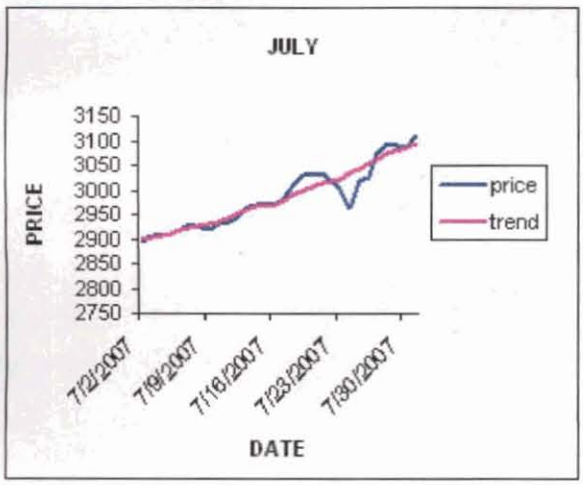


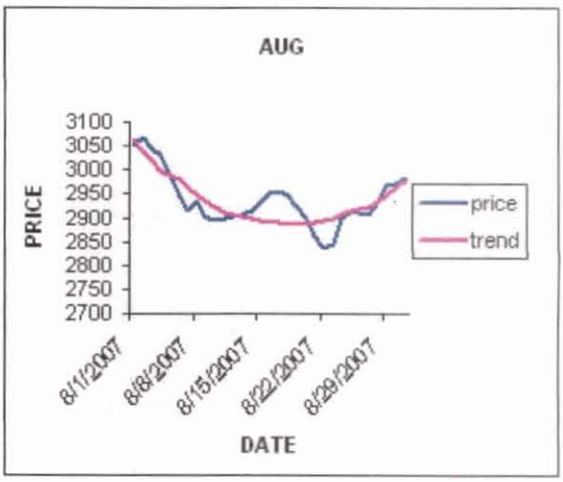


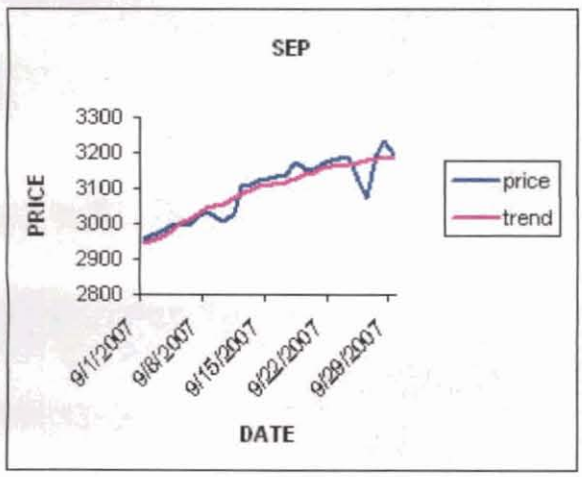


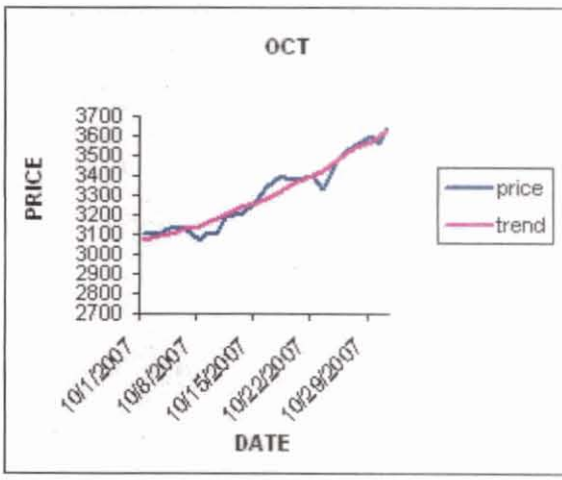


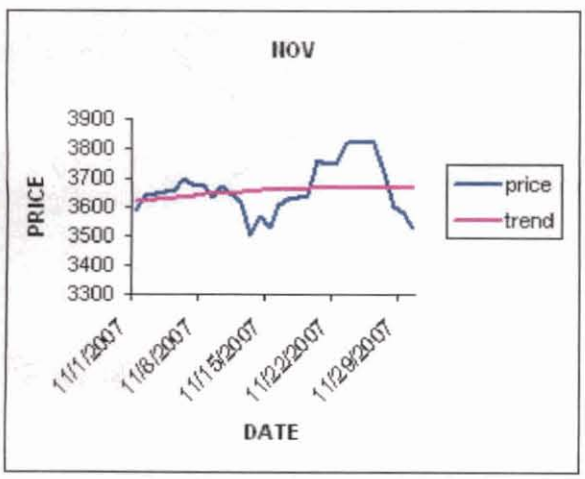
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -PARABOLIC TREND METHOD

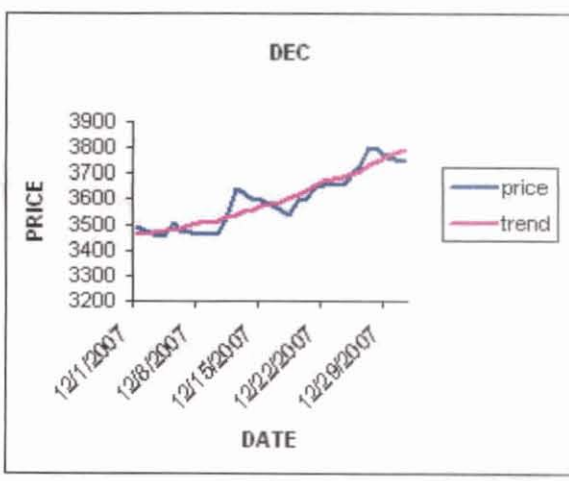




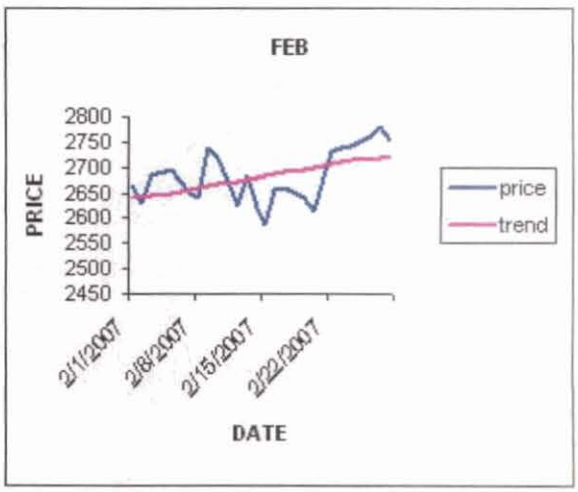


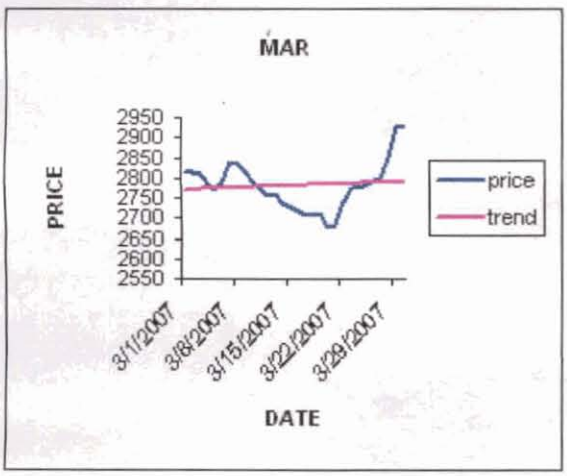


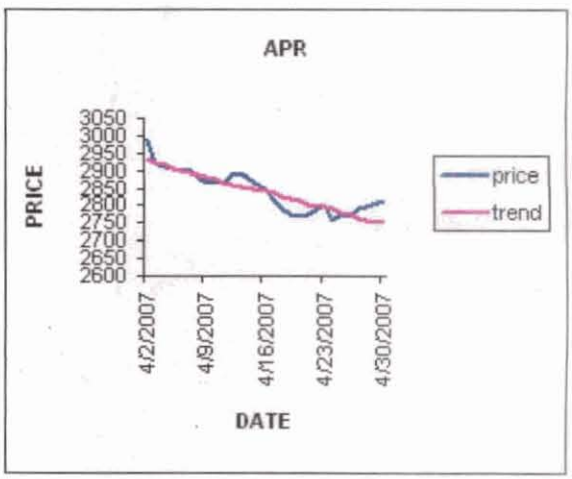


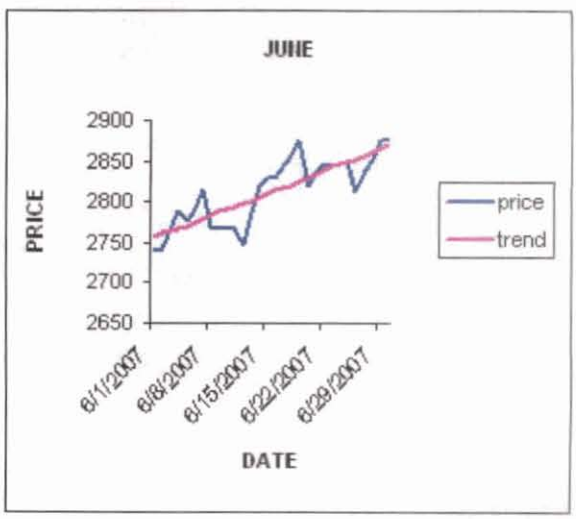


Appendix III
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -LOGARITHMIC TREND METHOD

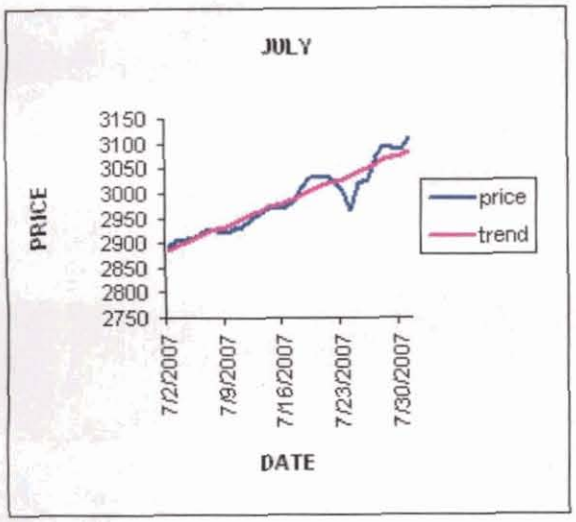


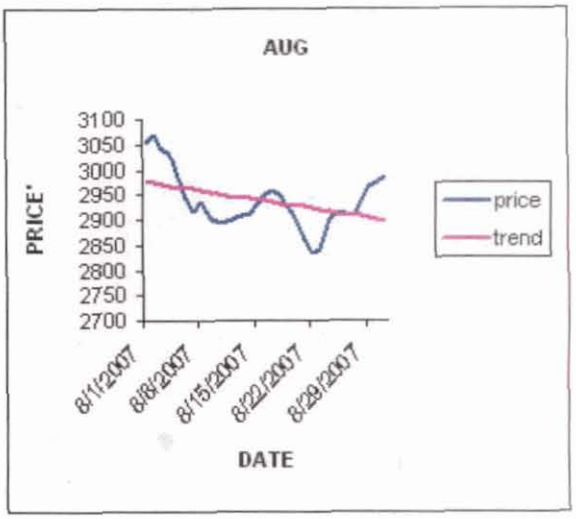


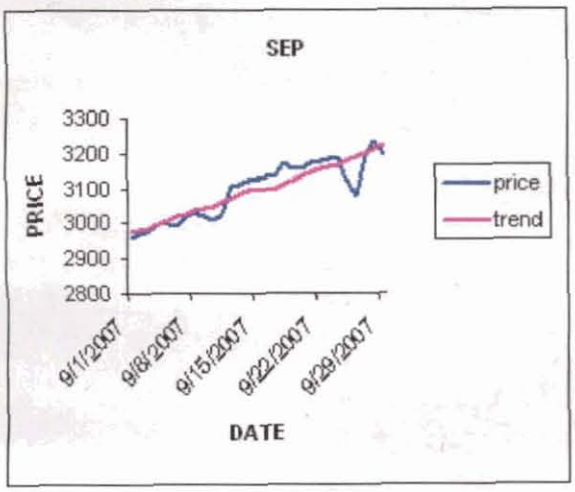


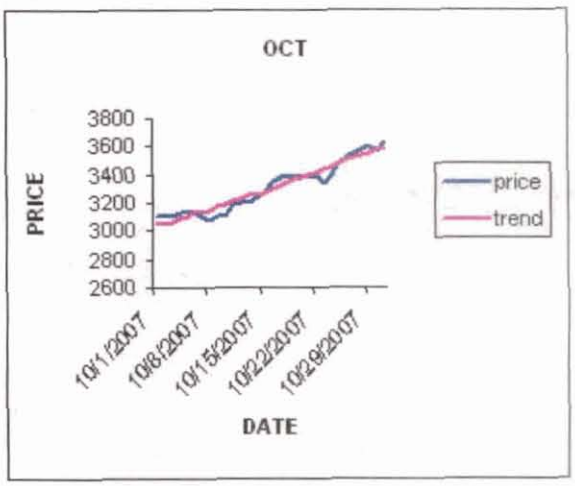


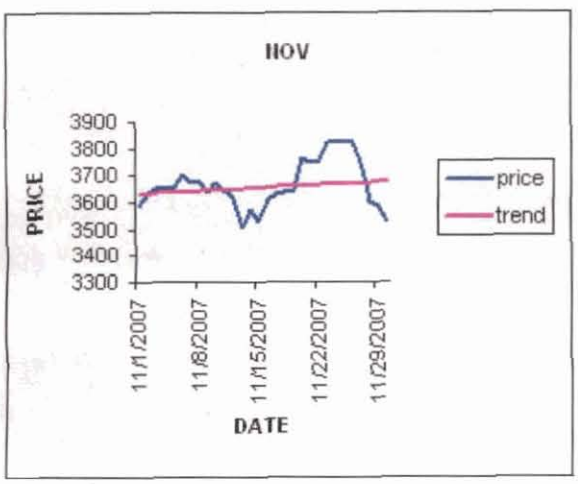
GRAPHS SHOWING ACTUAL PRICES AND TREND VALUE -LOGARITHMIC TREND METHOD

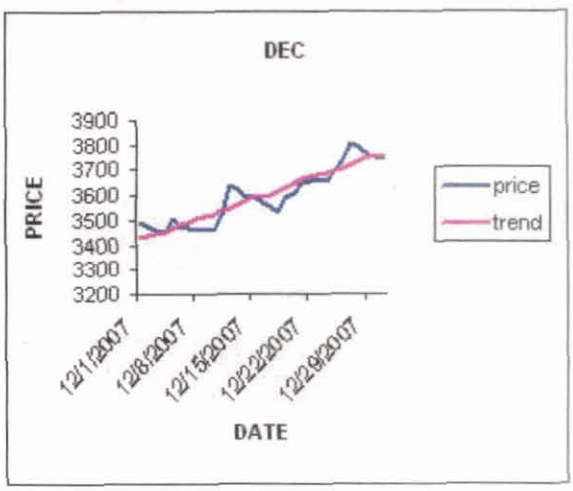




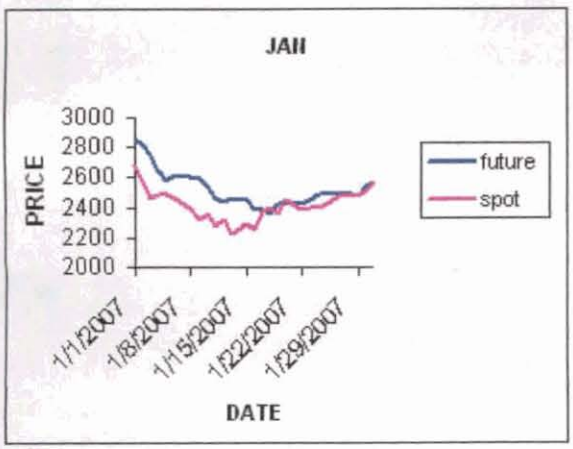


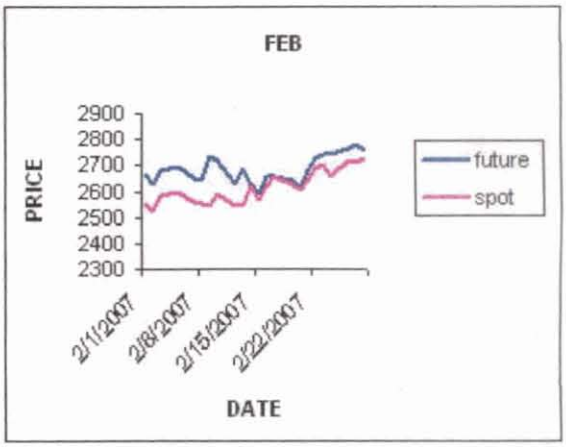


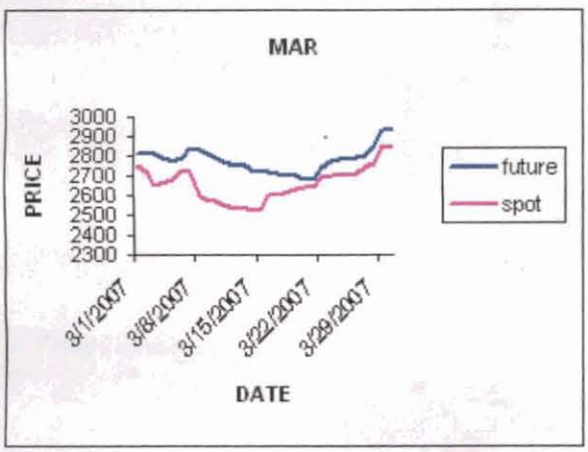


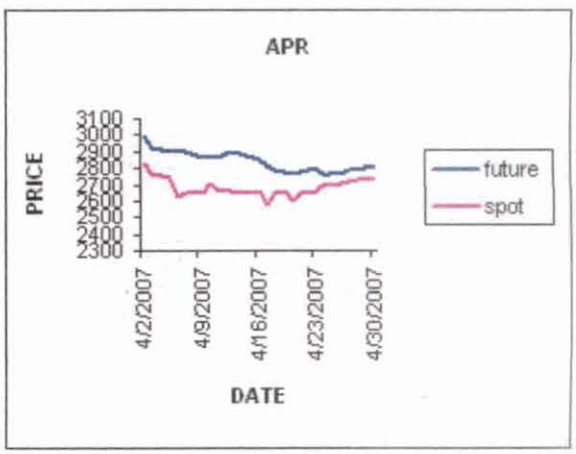


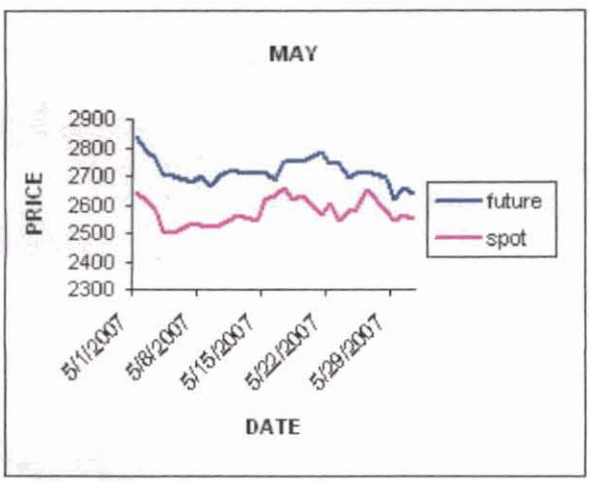
Appendix IV
GRAPHS SHOWING MOVEMENT IN SPOT AND FUTURE PRICES

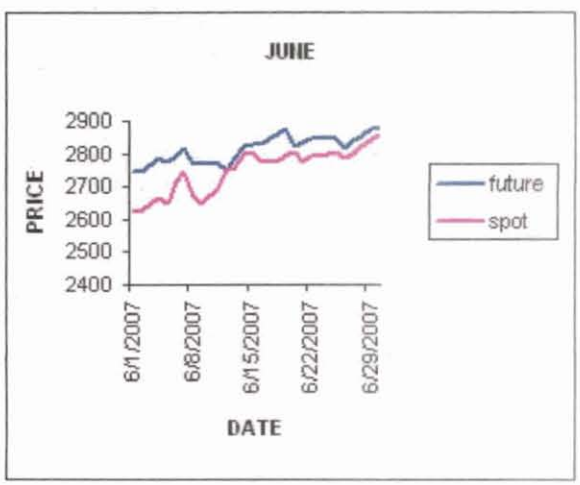




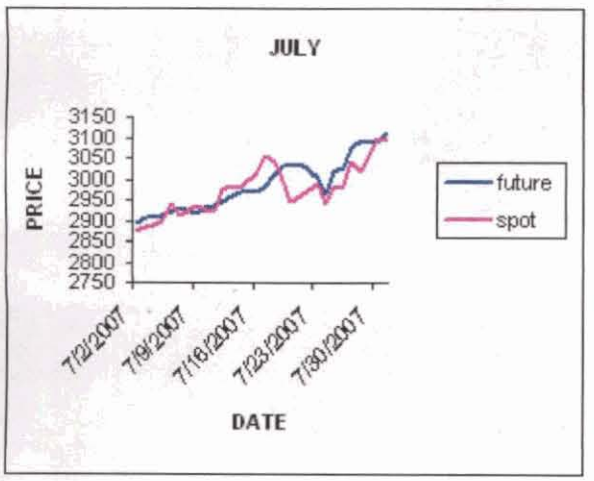


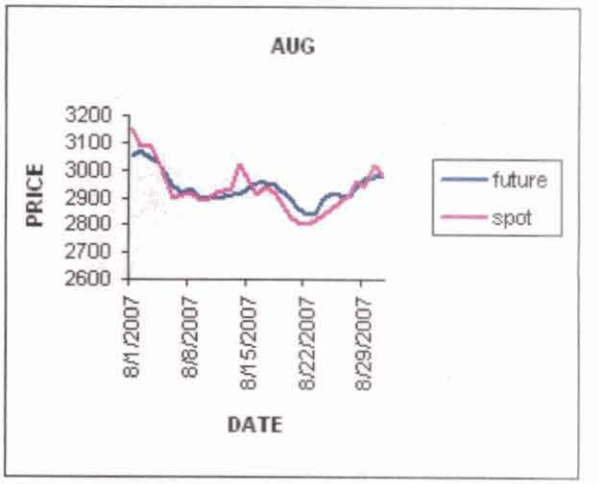


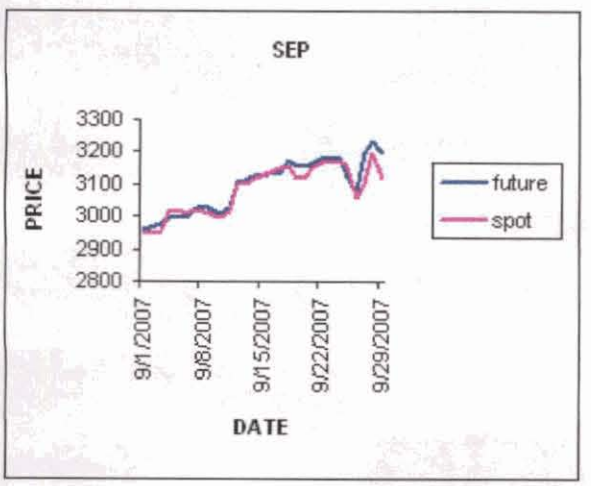


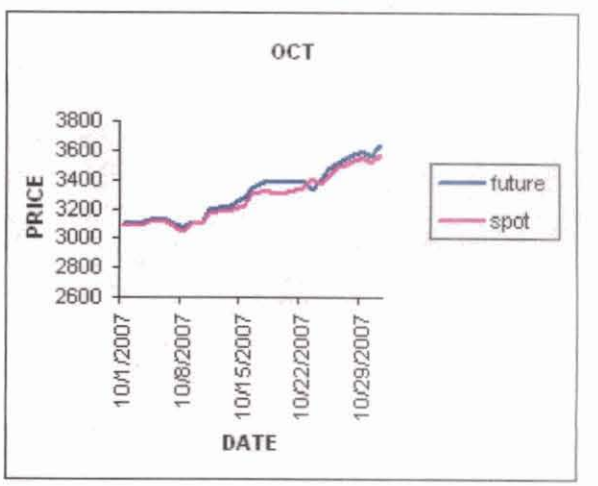


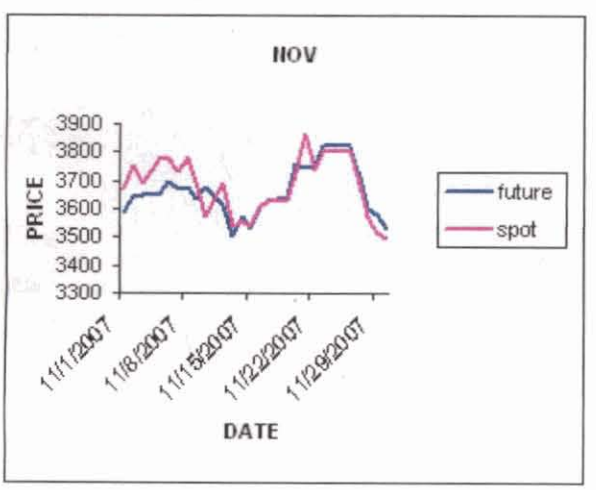
GRAPHS SHOWING MOVEMENT IN SPOT AND FUTURE PRICES

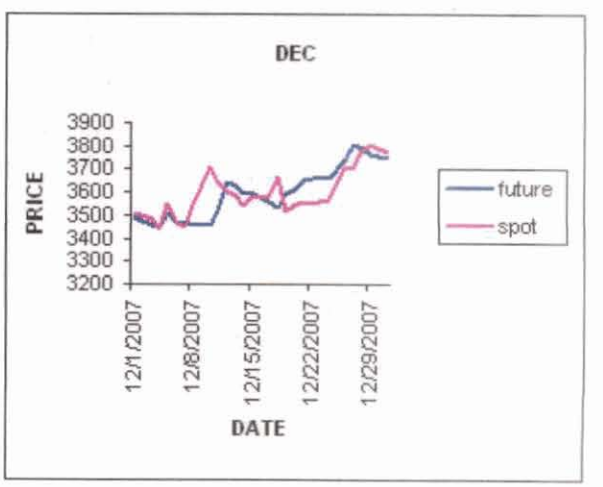












Appendix V

ABBREVIATION

API - American Petroleum Institute
BBA - Bombay Bullion Association
BOLT - Bombay Online Trading System
BSNL - Bharat Sanchar Nigam Limited
CBOT - Chicago Board of Trade
CMC - Computer Mediated Communication
CTCL - Computer to Computer Link facility
CWC - Central Warehousing Corporation
DJCI - Dow Jones AIG Commodity Index
DTSS - Derivatives Trading and Settlement System
EIA - Energy Information Administration
FCRA - Forward Contracts (Regulation) Act
FMC - Forwards Markets Commission
GSCI - Goldman Sachs Commodity Index
GTC - Good till canceled order
IPE -The International Petroleum Exchange of London
IPSTA - Indian Pepper and Spices Trade Association
MCX - Multi Commodity Exchange
MTNL - Mahanagar Telephone Nigam Limited
NBHC - National Bulk Handling Corporation Ltd.
NCDEX - National Commodity and Derivatives Exchange
NEAT - National Exchange for Automated Trading
NMCE - National Multi Commodity Exchange of India
NYMEX -The New York Mercantile Exchange
OPEC - Organization of the Petroleum Exporting Countries

OTC - Over the counter

R/JCRB - Reuters/ Jefferies CRB Index

RICI -Roger International Commodity Index

SPAN - Standard Portfolio Analysis of Risk

TOCOM -The Tokyo Commodity Exchange

TWS - Traders Work Station

VPN - Virtual Private Network

Vsat - Very Small Aperture Terminal