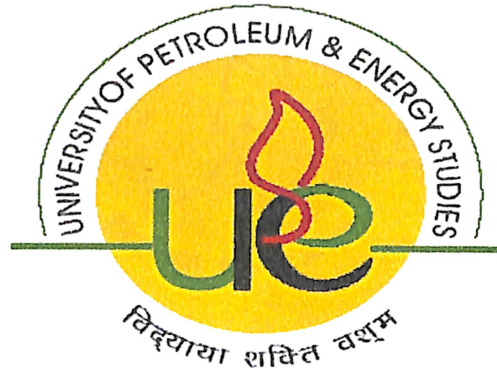


**AN ANALYSIS OF CRUDE OIL FUTURES TRADING
IN INDIA**



**A
DISSERTATION REPORT**

Submitted by

RAJDEEP KUMAR TAITERWAY

in partial fulfillment for the award of the degree

of

M.S (OIL TRADING)

Under the guidance

Of

Prof. Sharad Goel

Program Director

M.S (Oil Trading)

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

GURGAON

APRIL 2007

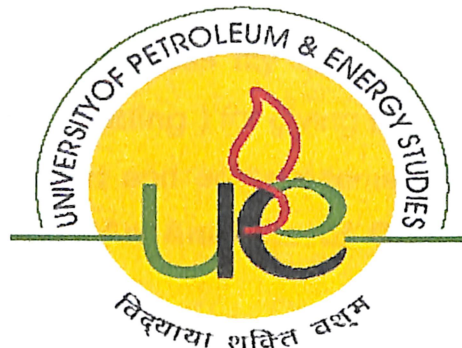
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DECLARATION

This is to certify that the dissertation report on "*AN ANALYSIS OF CRUDE OIL FUTURES TRADING IN INDIA*", submitted to University of Petroleum & Energy Studies, Gurgaon, by **Rajdeep Kumar Taiterway**, in partial fulfillment of the requirement for the award of degree of M.S (OIL TRADING) is a bonafide work carried out by him under my supervision and guidance. This work has not been submitted anywhere else for any other degree. The work was carried during December 2006 to April 2007.

Date ११/०४

Prof. Sharad Goel

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Finally I thank **God, the Almighty**, for protecting and giving me the courage to overcome the difficulties while at work.



RAJDEEP KUMAR TAITERWAY
M.S (OIL TRADING)

EXECUTIVE SUMMARY

Organized commodity derivatives in India started as early as 1875, barely about a decade after they started in Chicago. However, many feared that derivatives fuelled unnecessary speculation and were detrimental to the healthy functioning of the markets for the underlying commodities. As a result, after independence, futures trading were totally banned in 1966. Consequently, the commodities derivative markets dismantled and remained dormant for about four decades until the new millennium when the Government, in a complete change in policy, started actively encouraging the commodity derivatives market. Since 2002, the commodities futures market in India has experienced an unprecedented boom in terms of the number of modern exchanges and turnover. National commodity exchanges were established in 2003, namely MCX, NCDEX and NMCE. Energy is one of the essential commodities and traded in the two national exchanges. India imports 70% of its total consumption of crude oil and domestic production comprises of 30%. However major oil companies of India are not doing futures trading at Indian Exchanges. Recently Indian Oil Corporation Limited has started trading on NCDEX but more companies yet to come. This paper attempts to answer questions such as: what is present scenario of crude oil futures trading and its development in India. Also to examine the relationship between spot and futures prices and constraints of exchange based trading in India.



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CHAPTER 1

1.1 INTRODUCTION

Commodity futures markets have a limited presence in developing countries. Historically, governments in many of these countries have discouraged futures markets. If they were not banned, their operations were constricted by regulation. In the recent past, however, countries have begun to liberalize commodity markets. And in a reversal of earlier trends, the development of commodity futures is being pursued actively with support from governments (UNCTAD, 2002). Policy makers expect social benefits in terms of price discovery, risk management and better allocation of resources. Yet, it is well known, that even in developed countries, not all commodities are traded on futures markets. Indeed, only a minority of contracts floated by commodity exchanges succeeds in attracting trading volumes to be liquid. If this happens in environments with smoothly functioning spot markets, mature legal institutions and supportive government policy and what could be the prospects of futures markets in developing countries?

This question motivates my analysis of the crude oil futures trading at NCDEX in India. Futures trading in India have had a long chequered history. The beginning of organized futures markets can be traced to the establishment of the Bombay Cotton Association in 1875. After independence in 1947, the government enacted regulatory mechanisms and in 1966 banned futures trading altogether. Since 1980, government policy towards futures markets became gradually more permissive as it expanded the list of commodities in which futures trading was permitted. The process culminated in 2003 with the scrapping of the prohibited list. Currently, there are 24 approved exchanges dealing in commodities. Out of these, active crude oil futures trading are operational in 2 exchanges.



Although current government policy encourages futures markets as a mechanism for price discovery and risk management, the revival of futures trading has been slow. Volumes are low and most contracts and exchanges have languished for want of liquidity. A striking exception is the crude oil futures contract which has a low volume companies like BPCL, Reliance, HPCL... etc are not doing futures trading on Indian exchanges.

1.2 NEED OF STUDY

Asia is an emerging market for commodities trading (energy), whereas the markets of OECD countries are stagnant Asian market for commodities is in boom. Asia comprises of China, India, and Japan... etc economies are growing with a pace of 7 to 8 percent GDP per annum. Among these energy consumption of China and India are growing rapidly and if we analyze the growth rate of energy consumption of India is the 6th largest consumer of energy in the world. India imports 70% of his consumption of crude oil and after the deregulation of oil & gas sector since 1998 major oil companies start futures trading at international exchanges but the share is only 10%. Indian exchanges were established in 2003 like MCX and NCDEX which offers futures trading in energy along with the other commodities. If we analyze the growth rate of these exchanges it shows a tremendous growth in commodities futures trading. However the presence of major Indian companies like BPCL, HPCL, Reliance are not there. As futures trading is one of the derivatives tool for risk management and price discovery. Although I.O.C.L has recently started trading at NCDEX but still the volume is low. My area of research is to find out the constraints of exchange based trading as well as its advantage particularly in energy (crude oil). What is the growth rate of futures trading volumes and the position of crude oil among the various commodities?

1.3 OBJECTIVE OF STUDY

1. To study the overall functions of Exchanges and the futures trading in India.
2. To know the present scenario of futures trading of crude oil in India and its growth.
3. To know the constraints of exchange based trading.
4. To study the relationship between spot and futures trading of crude oil.

1.4 RESEARCH METHODOLOGY

Methodology is devoted to presenting the manner in which the research is carried out and also possibly explaining why the study was carried out in that manner.

In my research it involves both the data qualitative as well as quantitative. The justification regarding qualitative data is that, research work attracts regarding the development of infrastructure for futures trading of crude oil at MCX and NCDEX. The study further elaborates the overall growth of futures trading in India, its present position and future. So the research work is in the area of development of futures trading at MCX and NCDEX. However the volume is very low. Petroleum companies like BPCL, Reliance.... are not doing futures trading in these two commodities exchanges.

For quantitative data, I will use the data taken from NCDEX and MCX and analyze the crude oil trading volume at Indian exchanges. I have taken sample year from September 2005 to March 2007 to support my objective. Also after the introduction of crude oil futures trading in India, traders those who are earlier trading in Gold are now shifted to crude oil. So I will try figure out the shift by comparing the volume of both commodities and to find the ratio of trading between them. By using correlation analysis I will try to analyze the relationship between spot and futures prices of crude oil.



CHAPTER 2

LITERATURE REVIEW

Hull John C, (2002), “Fundamentals of Futures and Options Markets”, found that the futures contract is an agreement to buy and sell an asset for a certain price at a certain time in the future. But vast majority of the futures contracts that are initiated do not lead to delivery. The reason is that most investors choose to close out their positions prior to the delivery period specified in the contract. However many participants in future markets are hedgers. Their aim is to use futures market to reduce a particular risk that they face. This risk might relate to the price of oil, a foreign exchange rate, the level of stock market or some other variables. A perfect hedge is that completely eliminates the risk.

Ramaswami Bharat (2006) “Underdeveloped Spot Markets and Futures Trading” found that Trading volumes at the NBOT Soya oil contract at Indore have grown rapidly. They have also grown relative to the change in supplies and in open interest suggesting a growth in speculative trading. Open interest, which past work has shown to be highly correlated with hedging positions, displays the typical pattern of mature exchanges – of rising steadily as the contract moves towards expiry but peaking and falling rapidly in the time just before maturity.

Like the successful commodity exchanges in developed countries, the NBOT exchange offers opportunities to short and long hedgers (at different times) to construct risk less profit-earning trading strategies. If hedgers actively participate in futures trading, then their commercial decisions in the aggregate would affect the returns from such trading. We find that Soya oil imports exercise a significant impact on the basis and the impact varies with the extent of supplies that come from domestic production.



Prakash Udit (2005) “Trading of energy products (crude, petroleum products, natural gas) on exchanges (proposed by NCDEX & MCX) in India: Will online trading lead to the much needed price discovery for these products?”

Found that globally rising crude prices have become a very serious concern with prices scaling new heights every day. In this scenario the situation for Indian companies is even more complicated due to lack of proper trading mechanisms for hedging their risk against the Global variations? Although Indian companies have been trading on International exchanges like Nymex since the 1998 deregulation, but the denomination in those is only around 10% for the Oil PSUs like BPCL etc. This calls for mechanisms to develop exchanges which operate locally, that is within India and the Asian region. In Asian countries like Singapore (Simex) and Japan (TOCOM) who have been trading in Oil commodity derivatives for some time now, absence of trading in Middle East Crude has been a serious concern. With the start of Crude Oil trading on MCX and NCDEX, India has reached the club of select few countries. MCX and NCDEX which trade in US Sweet Light Crude and WTI Brent respectively claim that the prices will be on real time basis with Nymex and IPE. Yet trading in Middle East Crude which forms 57% of our total imports is again missing. The issue should be seen in the larger frame of creating stronger Asian Markets and finding a suitable Price Marker as Middle East crude has lost its relevance as marker. Of course price discovery is the ultimate aim of these two exchanges but it seems like a holy grail as of now. Developing similar strong markets in other Asian Nations, bringing in Middle East Crude for trade (with a viable marker), allowing trade of refined products along with crude oil are some of the essential factors needed for price discovery of these products in India and Asia. (Here the issue of price discovery has been dealt with perspective of Crude Oil and



Petroleum Products. Natural Gas though gaining importance is yet to see the activity in futures markets in Asia).

Abuja. L Narender (2006) “Commodity Derivatives Market in India: Development, Regulation and Future Prospects” found that 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 from a number of commodities, and 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.

Lerner. L Robert (2000) “The Mechanics of the Commodity Futures Markets, What They Are and How They Function” found that Commodity markets are not as commonly believed. In many ways, they operate just as public market places or auctions. For instance, prices of commodities on an exchange are determined solely by supply and demand conditions, which is no different from the way in which prices are determined in more familiar markets. In addition, commodity margins are analogous to the down payment one generally makes in connection with a real estate transaction. Once certain facts are understood, one can see that commodity markets are an integral part of a well-run economy.



CHAPTER 3

3.1 HISTORY AND BACKGROUND

The history of organized commodity derivatives in India goes back to the nineteenth century when the Bombay Cotton Trade Association Ltd., set up in 1875, was the first organized futures market. Bombay Cotton Exchange Ltd. was established in 1893 following the widespread discontent amongst leading cotton mill owners and merchants over functioning of Bombay Cotton Trade Association. The Futures trading in oilseeds started in 1900 with the establishment of the Gujarati Vyapari Mandali, which carried on futures trading in groundnut, castor seed and cotton. Futures' trading in wheat was existent at several places in Punjab and Uttar Pradesh. But the most notable futures exchange for wheat was chamber of commerce at Hapur set up in 1913. Futures trading in bullion began in Mumbai in 1920. Calcutta Hessian Exchange Ltd. was established in 1919 for futures trading in raw jute and jute goods. But organized futures trading in raw jute began only in 1927 with the establishment of East Indian Jute Association Ltd. These two associations amalgamated in 1945 to form the East India Jute & Hessian Ltd. to conduct organized trading in both Raw Jute and Jute goods. Forward Contracts (Regulation) Act was enacted in 1952 and the Forwards Markets Commission (FMC) was established in 1953 under the Ministry of Consumer Affairs and Public Distribution. In due course, several other exchanges were created in the country to trade in diverse commodities. However government had banned futures trading altogether in 1966. But gradually releases the ban and started futures trading. After the Indian economy embarked upon the process of liberalization and globalization in 1990, the Government set up a Committee in 1993 to examine the role of futures trading. The Committee (headed by Prof. K.N. Kabra) recommended allowing futures trading in 17 commodity groups. It also recommended strengthening of the Forward Markets Commission,



and certain amendments to Forward Contracts (Regulation) Act 1952, particularly allowing options trading in goods and registration of brokers with Forward Markets Commission. The Government accepted most of these recommendations and futures trading were permitted in all recommended commodities. Commodity futures trading in India remained in a state of hibernation for nearly four decades, mainly due to doubts about the benefits of derivatives. Finally a realization that derivatives do perform a role in risk management led the government to change its stance. The policy changes favoring commodity derivatives were also facilitated by the enhanced role assigned to free market forces under the new liberalization policy of the Government. Indeed, it was a timely decision too, since internationally the commodity cycle is on the upswing and the next decade is being touted as the decade of commodities.

Market of crude oil trading was deregulated in 1998, Indian companies started trading on International exchanges like Nymex but the denomination in those is only around 10% for the Oil PSUs like BPCL etc. This calls for mechanisms to develop exchanges which operate locally, that is within India and the Asian region. In Asian countries like Singapore (Simex) and Japan (TOCOM) who have been trading in Oil commodity derivatives for some time now, absence of trading in Middle East Crude has been a serious concern. With the start of Crude Oil trading on MCX and NCDEX, India has reached the club of select few countries. MCX and NCDEX which trade in US Sweet Light Crude and WTI Brent respectively claim that the prices will be on real time basis with Nymex and IPE. Yet trading in Middle East Crude which forms 57% of our total imports is just started at MCX. The issue should be seen in the larger frame of creating stronger Asian Markets and finding a suitable Price Marker as Middle East crude has lost its relevance as marker. Of course price discovery is the ultimate aim of these two exchanges but it seems like a holy grail as of now. Developing similar strong markets in other Asian Nations, bringing in

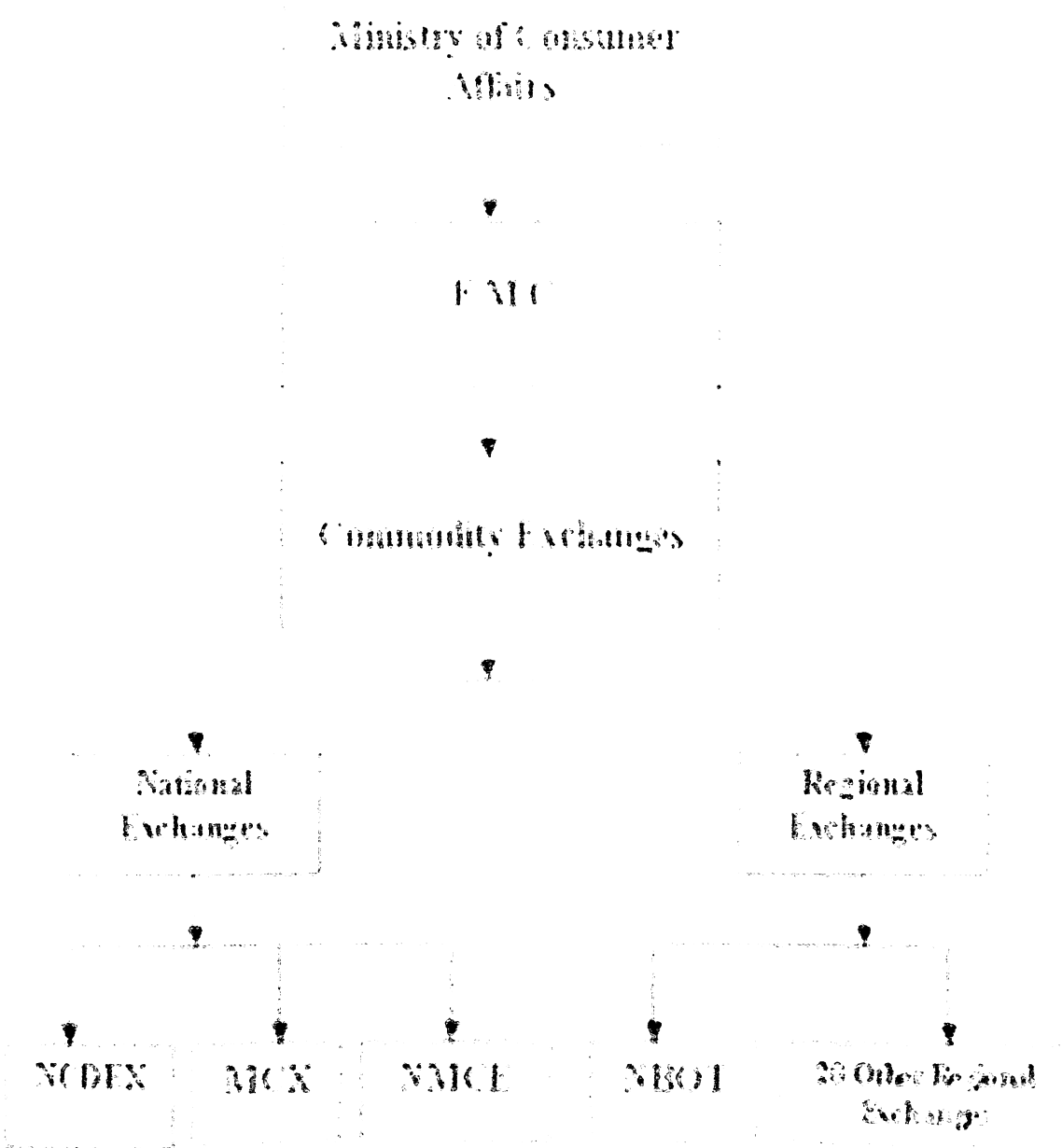


Middle East Crude for trade more (with a viable marker), allowing trade of refined products. Although India has shown a remarkable growth in futures trading since its start from 2003. However futures trading of crude oil started late but shown a tremendous growth in futures trading. MCX and NCDEX are only two exchanges which offer futures trading in crude oil.

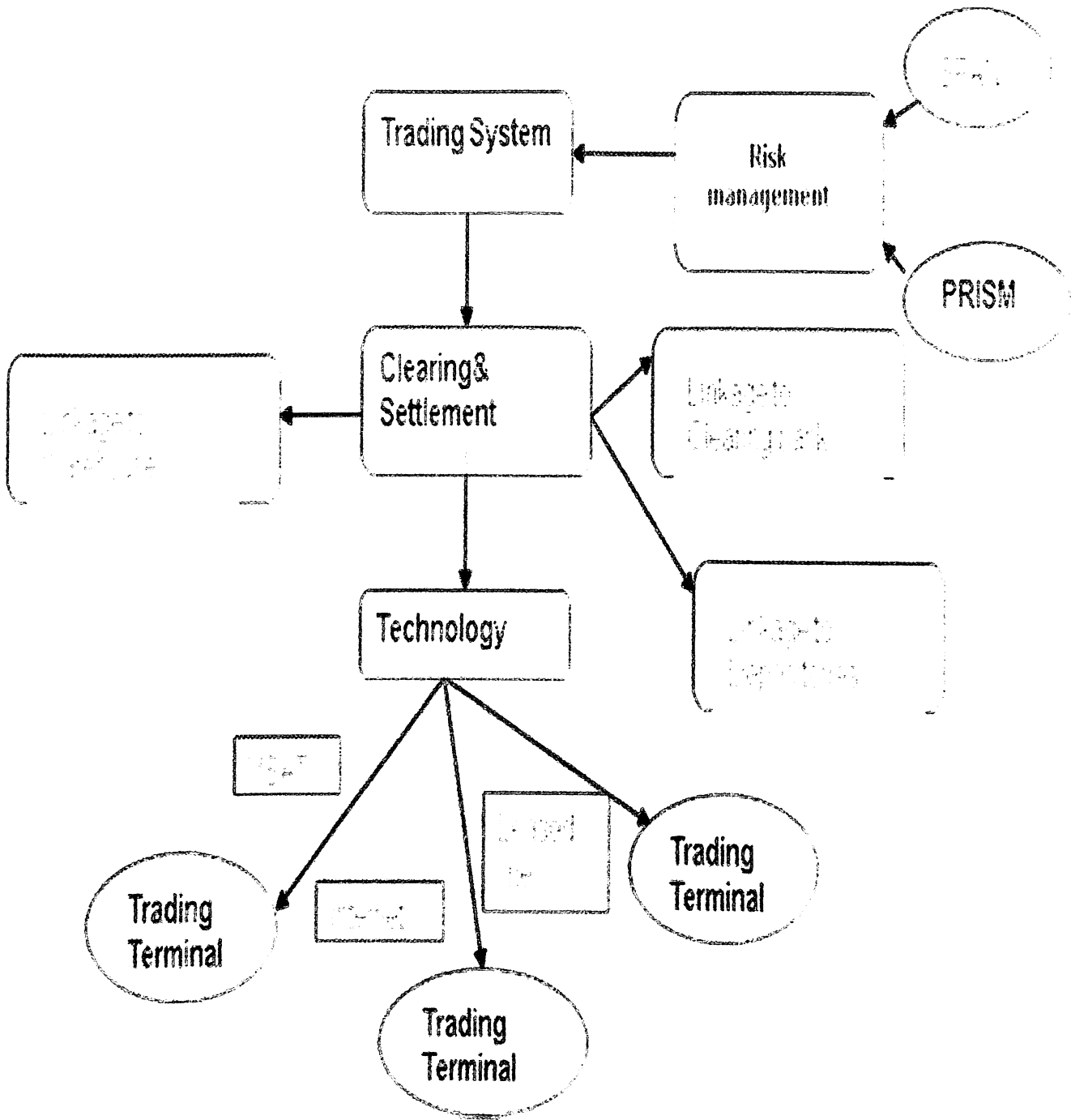
One of the questions arises that why we need futures trading? One answer that is heard in the financial sector is "we need commodity futures markets so that we will have volumes, brokerage fees, and something to trade". I think that is missing the point. We have to look at futures market in a bigger perspective -- what is the role for commodity futures in India's economy?

In India energy has traditionally been an area with heavy government intervention. Government intervenes by using APM as a mechanism of pricing earlier. But after the dismantle of APM and deregulation of energy market economist think that we could have major benefits from liberalization of the oil & gas sector. Crude oil is used to meet more than 60% of the global energy needs today. Almost all industries are dependent either directly or otherwise on crude oil and its refined products like petrol, diesel, lubricants, heating oil, aviation gasoline, asphalt, lubricating oils etc. Most of the world's crude oil reserves are found in the Middle East, Africa, Eastern Europe and Central America. The Middle East has around 65% of the world's crude oil reserves. Different oil-producing areas yield significantly different varieties of crude oil.

3.2 STRUCTURE OF EXCHANGE



3.3 EXCHANGE ARCHITECTURE



3.4 MECHANICS OF FUTURES TRADING

How prices are determined

A common misconception is that commodity exchanges determine, or establish, the prices at which commodity futures are bought and sold. This is totally incorrect. Prices are determined solely by supply and demand conditions. If there are more buyers than there are sellers, prices will be forced up. If there are more sellers than buyers, prices will be forced down. Buy and sell orders, which originate from all sources and are channeled to the exchange trading floor for execution, are actually what determine prices. These orders to buy and sell are translated into actual purchases and sales on the exchange trading floor, and according to regulation this must be done by public outcry across the trading ring or pit and not by private negotiation. The price at which transactions are made are recorded and immediately released for distribution over a vast telecommunications network.

Probably the best way to visualize how purchases and sales are made on the floor of a commodity exchange is to think in terms of what happens at a public auction. The principle is the same. Except in the futures market a two-way auction is continuously going on during trading hours. This two-way auction is made possible because of the standardized futures contract, which requires no description of what is being offered at the time of sale. Also, the two-way auction is made practicable because the inflow of both buying and selling orders to the exchange floor is normally in sufficient volume to make buying and selling of equal importance. In a public auction the accent is on selling. The purpose of a commodity exchange is to provide an organized marketplace in which members can freely buy and sell various commodities in which they have an interest. The exchange itself does not operate for profit. It merely provides the

facilities and ground rules for its members to trade in commodity futures and for non-members also to trade by dealing through a member broker and paying a brokerage.

Pricing of futures contract is very simple. Using the cost of carry logic, we calculate the fair value of a futures contract every time the observed price deviates from the fair value, arbitragers would enter into trades to capture the arbitrage profit. This in turn would push the futures price back to its value. The cost of carry modal used for pricing futures is given below:

$$F = Se^{rT}$$

Where,

r = cost of financing (using continuously compounded interest rate)

T = time till expiration in years

$e = 2.71828$

Example: Price of crude oil trades in the spot market at Rs. 2791.85. Money can be invested at 11% p.a. the fair value of one month future contract is calculated as follows.

$$\begin{aligned} F &= Se^{rT} \\ &= 2817.37 \end{aligned}$$

Clearing House

A brief explanation of the clearing house (or clearing association) and its function in futures trading is important to understanding the operation of the futures markets. Each futures exchange has its own clearing house. All members of an exchange are required to clear their trades through the clearing house at the end of each trading session, and to deposit with the clearinghouse a sum of money (based on clearinghouse margin requirements) sufficient to cover the member's debit balance. For example, if a member broker reports to the clearing house at the end of the day total purchases of 100,000 bushels of May wheat and total sales of 50,000 bushels of May wheat (Which may be for himself, his customers, or both), he would be net long 50,000 bushels of May wheat. Assuming that this is the broker's only position in futures and that the clearing house margin is six cents per bushel, this would mean that the broker would be required to have \$3,000 on deposit with the clearinghouse. Because all members are required to clear their trades through the clearing house and must maintain sufficient funds with it to cover their debit balances, the clearing house is placed in a position of being responsible to all members for the fulfillment of contracts. Therefore, instead of broker A who, for example, bought 50,000 bushels of May wheat from broker B being responsible to broker B for fulfillment of his end of the contract, the clearing house assumes the responsibility. In like manner, the responsibility of broker B to broker A in connection with this transaction is passed on to the clearing house, with neither A or B having any further obligation to one another. The clearinghouse becomes the "other party" for all futures trades between exchange members. This mechanism greatly simplifies futures trading. Considering the huge volume of individual transactions that are made, it would be virtually impossible to do business if each party to a trade were obligated to settle directly with each other in completing their transactions.

Hedging in Futures

Futures contract have been used as financial offsets to cash market risk for more than a century. Hedging allows a market participant to lock in prices and margins in advance and reduces the potential for unanticipated loss or competitive disadvantage. A hedge involves establishing a position in the futures market that is equal and opposite to of a position in the physical market. For instance a Crude Refinery company who imports crude oil can hedge by buying (going long) on the crude oil futures that will give it a cushion against sudden increase in oil prices. Hedging work because cash prices and futures prices tend to move in tandem, converging as each delivery month reaches expiration.

Hedging Example - 1

In April 2005, a crude oil exploration company is suppose to deliver one lakh barrels in December 2005 to a refiner at the then prevailing rate. However in December Crude Oil prices are expected to rule low. To protect itself from downward price movement the company decides to trade in MCX platform to hedge this price risk. In April 2005, the company sells 1000 contracts (100 barrels each) of MCX Crude Oil December contract at Rs. 2000 per barrel. The company pays suppose only 5 % of the total value as deposit (margin) with the exchange.

Hedging Example - 2

In April 2005, an oil refiner is expecting to buy 1-lakh barrels in the month of December 2005. To protect itself from upward price movement the company decides to trade in MCX platform to hedge this price risk. In April 2005, it buys 1000 contracts (100 barrels each) of MCX Crude Oil December contract at Rs. 2000 per barrel. It pays suppose only 5 % of the total value as a good will deposit (margin) with the exchange, which in other case it had to pay the entire amount upfront in the spot market.

3.5 CONTRACT SPECIFICATION OF CRUDE OIL

NCDEX

Contract Specifications of Crude Oil

Type of contract	Futures Contract Specifications									
Name of commodity	Brent Crude Oil									
Ticker symbol	BRENTCRUDE									
Trading system	NCDEX Trading System									
Unit of trading	100 barrels									
Delivery unit	50,000 barrels									
Quotation/base value	Rs per barrel*									
Basis	Sullom Voe, Shetland Islands, United Kingdom exclusive of all levies and taxes.									
Tick size	Re 0.50									
Quality specification	<table border="0"> <tr> <td><i>Crude Type</i></td> <td><i>API Gravity</i></td> <td><i>Sulphur Content</i></td> </tr> <tr> <td>Brent</td> <td>38.5 degrees</td> <td>0.36%</td> </tr> </table>	<i>Crude Type</i>	<i>API Gravity</i>	<i>Sulphur Content</i>	Brent	38.5 degrees	0.36%			
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Also Deliverable	<table border="0"> <tr> <td><i>Crude Type</i></td> <td><i>API Gravity</i></td> <td><i>Sulphur Content</i></td> </tr> <tr> <td>Forties</td> <td>41.5-42.5 xdegrees</td> <td>0.25-0.3%</td> </tr> <tr> <td>Osberg</td> <td>35.9 degrees</td> <td>0.32%</td> </tr> </table>	<i>Crude Type</i>	<i>API Gravity</i>	<i>Sulphur Content</i>	Forties	41.5-42.5 xdegrees	0.25-0.3%	Osberg	35.9 degrees	0.32%
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Forties	41.5-42.5 xdegrees	0.25-0.3%								
Osberg	35.9 degrees	0.32%								
Quantity variation	+/- 1% by volume									
Delivery center	<p>Mumbai Port / Jawaharlal Nehru Port Trust (JNPT)</p> <p>The Buyer will be responsible for the freight cost, insurance, import duty and all other taxes & levies on actual basis. Freight and insurance will be paid on actual basis on production of satisfactory documentary evidence from the seller.</p> <p>As per directions of the Forward Markets Commission from time to time, currently (with effect from May 16, 2005)-</p>									
Trading hours	<p>Mondays through Fridays: 10:00 a.m. to 11:30 p.m.</p> <p>Saturdays: 10:00 a.m. to 2:00 p.m.</p> <p>The Exchange may vary the above timing with due notice.</p>									

Delivery specification	<p>The buyers and seller shall give intentions of delivery / receipt through the delivery request window during last three trading days including the day of expiry of the contract. This will be matched by the Exchange for physical delivery.</p>
Opening of contracts	<p>The first contract would be launched on September 15, 2005 as per the approval of the Forward Markets Commission. New contracts would open as per schedule given in Exhibit 1.</p>
Closing of Contract	<p>All open positions for which delivery intentions have not been received or for which delivery intentions have been rendered but remain unmatched for want of counterparty to settle delivery, will be cash settled at Final settlement Price on the expiry of the contract.</p>
No. of active contracts	<p>Three consecutive months running concurrently</p>
Price limit	<p>The daily price limit will be 6% and will be raised to 9% after a 15-minute cooling period if the price limit of 6% is reached. If the price limit reaches 9%, trading will continue within the 9% limit.</p>
Position limits	<p>Member: 6,00,000 barrels or 20% of open interest , whichever is higher.</p> <p>Client: 1,50,000 barrels.</p>
Special Margin	<p>Special margin of 5% of the value of the contract will be applied whenever the rise or fall in price from the first day's closing price is 20%. This is payable by buyer or seller depending on whether prices rise or fall respectively. The margins shall stay in force so long as price stays beyond the 20% limit and will be withdrawn as soon as the price is within the 20% band.</p>
Quality Allowance (for Delivery)	<p>No variation allowed</p>

* 1 Barrel =42 US gallons=158.98 liters

MCX

Symbol	BRENT CRUDEOIL
Description	BRENTCRUDEMMYY
Contracts available for trading	
January contract	11 th October of the earlier year to 10 th January of the contract year
February Contract	11 th November of the earlier year to 10 th February of the contract year
March contract	11 th December of the earlier year to 10 th March of the contract year
April Contract	11 th January to 10 th April of the contract year
May contract	11 th February to 10 th May of the contract year
June Contract	11 th March to 10 th June of the contract Year
July contract	11 th April to 10 th July of the contract year
August Contract	11 th May to 10 th August of the contract year
September contract	11 th June to 10 th September of the contract year
October Contract	11 th July to 10 th October of the contract year
November contract	11 th August to 10 th November of the contract year
December contract	11 th September to 10th December of the contract year
Trading	
Trading period	Mondays through 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 freight)
Daily price limits	4%

Initial margin	5%
Special margin	In case of additional volatility, a special margin 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: 150,000 barrels For a member collectively for all clients: 600,000 barrels or 20% of the total market position, whichever is higher
Delivery	
Delivery unit	50,000 barrels with +/- 2% tolerance limit
Delivery period margin	25%
Delivery center	Port installation at Mumbai / JNPT port
Quality specifications	Brent Blend confirming to the following quality specification is deliverable: - API Gravity: Between 38 degree – 39 degree

Delivery and Settlement Procedure of Brent Crude Oil Contract

Delivery logic	Both Option
Tender day	1 st working day after expiry of contract by 6.00 p.m.
Tender and delivery period	1 st to 3 rd 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 affected 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.

An analysis of crude oil futures trading in India

Delivery margin period	25% margin will be imposed during tender and delivery period on both buyers and sellers on matched quantity.
Exemption from delivery margin period	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. (E – Expiry Date)
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 of which 90% will be passed on to the other party and 10% will be appropriated by the Exchange.
Delivery center	Mumbai
Deliverable grade	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.
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.
Storage, Insurance and Freight charges	The freight, insurance, storage and all other expenses will be on account of the buyer.
Taxes, duties, cess and levies	All other charges, levies or Cess, import or export duties 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.

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.
Extension of delivery period	As per the Exchange decision due to a force majeure or otherwise.
Due date rate	Due date rate of Brent Crude Oil will be calculated by taking Bloomberg fixings i.e., international spot price of Brent Crude Oil as reported by Bloomberg. The Bloomberg price will pertain to the last trading day (expiry date) of the MCX Brent Crude Oil contract and it would be multiplied by Rupee – US Dollar rate as notified by the Reserve Bank of India on that particular day.

Legal obligation	The member will provide appropriate tax forms wherever required as per law and as customary and neither of the parties will unreasonably refuse to do so.
Penal provisions	Delivery will be effected in case both seller and buyer agree. After giving intention, if any party fails to honour for the delivery marked quantity then a penalty of 1% shall be imposed, out of which 90% shall be passed on to the other party and 10% will be retained by the Exchange.
Intention of delivery by buyers and sellers	On the expiry day of the contract by 6.00 p.m. Seller will submit copies of documentary evidence such as Letter of Credit or any other appropriate receipt and Quality Certificate along with the intention to give delivery to the effect that he is holding stock at the time of giving his intention.
Matching of intention of buyers and sellers	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 will be closed out as per the due date rate and actual delivery will be effected only to the extent of matched quantity.
Dissemination of information on tendered delivery	On each tender days by 7.00 p.m. onwards on trading workstation
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.

<p>Delivery order</p>	<p>Along with tender notice, Brent Crude Oil delivery order will be submitted in specified format giving details of Members / Registered Non-Members who shall perform delivery.</p> <p>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.</p> <p>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.</p>
<p>Closing out of outstanding position</p>	<p>All outstanding positions on the expiry of contract where expression of interest for tendering delivery or receiving</p>
<p>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.</p>	
<p>Applicability of Byelaws, Rules, Business Rules of the Exchange.</p>	<p>The general provisions of Byelaws, rules and Business Rules of the Exchange and decisions taken by Forward Markets Commission, Board of Directors and Executive Committee of the Exchange in respect of matters specified above will form and integral part of this contract. The Exchange or FMC as the case may be further prescribe additional measures relating to delivery procedures, warehousing, quality certification, margining, risk management from time to time. (The interpretation or clarification given by the Exchange on any terms of this contract shall be final and binding on the members and others.)</p>



NYMEX

Futures Contract Specifications

Trading Unit

1000 barrels

Price Fluctuation

U.S. Dollars and cents per barrel.

Trading Hours (All times are New York time)

The contract is available for trading on the CME Globex® trading platform from 6:00 PM Sundays through 5:15 PM Fridays, with a 15-minute break each day between 5:15 PM and 6:00 PM. Off-Exchange transactions can be submitted solely for clearing to the NYMEX Clear Port® clearing website as an exchange of futures for swaps (EFS) or exchange of futures for physicals (EFP) transaction until 5:15 PM, Monday through Friday, and the day preceding a holiday.

Minimum Price Fluctuation

\$0.01 per barrel.

Trading Months

The current year and the next three years. A new calendar year will be added following the termination of trading in the December contract of the current year.

Trading at Settlement (TAS)

Trading at settlement is available for the front two months except on the last trading day and is subject to the existing TAS rules. Trading in all TAS products will cease daily at 2:30 PM Eastern Time. The TAS products will trade off of a "Base Price" of 100 to create a differential (plus or minus) in points off settlement in the underlying cleared product on a 1 to 1 basis. A trade done at the Base Price of 100 will correspond to a "traditional" TAS trade which will clear exactly at the final settlement price of the day.

WS:DB Spread

The light sweet crude oil and Brent spread will be listed for up to 72 consecutive months.

Termination of Trading

An analysis of crude oil futures trading in India

Trading shall and shall be as per the guidelines of the Board of Futures Commission for India and shall be in the official language of the country of the BFC. The contract shall be settled on the day of the delivery of the oil. The BFC shall have the right to amend the contract at any time and shall be bound to do so. The BFC shall have the right to suspend trading in the contract at any time and shall be bound to do so.

Margin Requirements

Margin to be maintained for the contract shall be as follows

Settlement

Financial based on the ITC Brent Crude Oil Futures. Financially contract settlement price on the settlement date for the delivery month

Trading Symbol

OB

UNIT OF CONTRACT

TOCOM

Futures Contract Specifications

Date of Listing

September 10, 2001

Type of Crude Oil

Middle East crude oil (the average value of Dubai and Oman which acts as the benchmark price of Middle East crude oil.)

Contract Unit

50 kl

Trading Method

Computerized continuous trading

Price Quotation



Japanese Yen per kiloliter

Minimum Price Fluctuation

JPY 10 per 1 kiloliter

Daily Price Fluctuation Limit

Base Price Price Limit

Less than JPY 28,000	JPY 800 per kl
JPY 28,000 to less than JPY 38,000	JPY 1,000 per kl
JPY 38,000 or more	JPY 1,200 per kl

* The Exchange may change the amount of the price limit at its discretion, according to the market situation.

See [Margin and Price Limit](#) for the price limits currently imposed.

* When final contract prices for three or more contract months have reached the price limit in the same direction, the Daily Price Fluctuation Limit for all contract months except the current contract month shall be expanded by 50% from the following business day, and shall remain in effect until the final contract prices for three or more months stop reaching the ordinary price limit. However, when the final contract prices for three or more contract months have reached the applicable Price Limit in the same direction for two consecutive business days, the Exceptional Measures for Price Limits will be maintained until the last contract price for all contract months (in this case, "all contract months" doesn't include the first contract month) stop reaching the ordinary Price Limits for three consecutive business days.

Customer Position Limit (for each long/short position)

2,400 contracts each month

Minimum Initial Trading Margin

Base Price Margin

Less than JPY 28,000	JPY 60,000 per contract
JPY 28,000 to less than JPY 38,000	JPY 75,000 per contract
JPY 38,000 or more	JPY 90,000 per contract

* The above margin rates are amounts determined by the Japan Commodity Clearing House Co., Ltd. (JCCH)

* See [Margin and Price Limit](#) for the current rates.

- * Each broker member determines the amount of initial trading margin applied to its customers no less than it of "Minimum Initial Trading Margin".

Trading Hours

9:00 a.m. to 11:00 a.m., 12:30 p.m. to 3:30 p.m.

Contract Months

Six consecutive months (At the day when a new contract month is generated, there will be six consecutive months starting from the month which the said day belongs to.)

Last Trading Day

The first business day of the month following the delivery month.

- * Market. No new position is allowed to be established on the last trading day. On the last trading day, those who hold positions in the current contract month must liquidate all of their positions by placing market orders at the opening of the

Delivery

Cash settlement (No delivery)

Final Settlement Price

Yen-based monthly average value of Dubai and Oman calculated by the Exchange based on the prices reported by a price information vendor (as a general rule, platts).

3.6 CONSTRAINTS AND ADVANTAGES OF EXCHANGE BASED TRADING

CONSTRAINTS

- Regulated by FMC (GOI).
- Non availability of full spectrum of players.
- No Middle East crude futures are available at NCDEX.
- Non availability of refined product futures.
- Limited hours of trading at MCX & NCDEX.
- Lack of full Range of Crude Oils Traded on MCX & NCDEX.
- Crack Spread Hedging is not available.
- Contracts to be made tailored to meet Indian Requirements.

ADVANTAGE

- Traditionally the advantages of trading commodities have Price Discovery and development of supply chain. Another significant advantage is the Cover from Forex Exposure Risk because the futures are rupee denominated which is a clear gain over hitherto trading at Nymex where the players had to look for Forex hedging.

CHAPTER 4

4.1 DATA ANALYSIS AND INTERPRETATION

I have taken all the data from secondary sources from the website of NCDEX and other relevant websites. And accordingly does the analysis part of it.

4.2 Volume Analysis of Crude Oil at NCDEX. (Monthly)

(Table 1) Volume of Brent crude oil traded at NCDEX 2005-2006

MONTH	VOLUME (Barrel)
September	6004300
October	2860700
November	2277900
December	1862200
January	1289700
February	1921700
March	3268400

Source NCDEX



Volume of crude oil futures trading from sep. to mar. 2006

Graph 1

The above graph no. 1 shows that there is a sharp decrease in the volumes of crude oil in the month of October to January and then an increase in volume from January to March. September was the beginning of crude oil futures trading at NCDEX, so it shows a sharp increase in that month but after that it decreases.

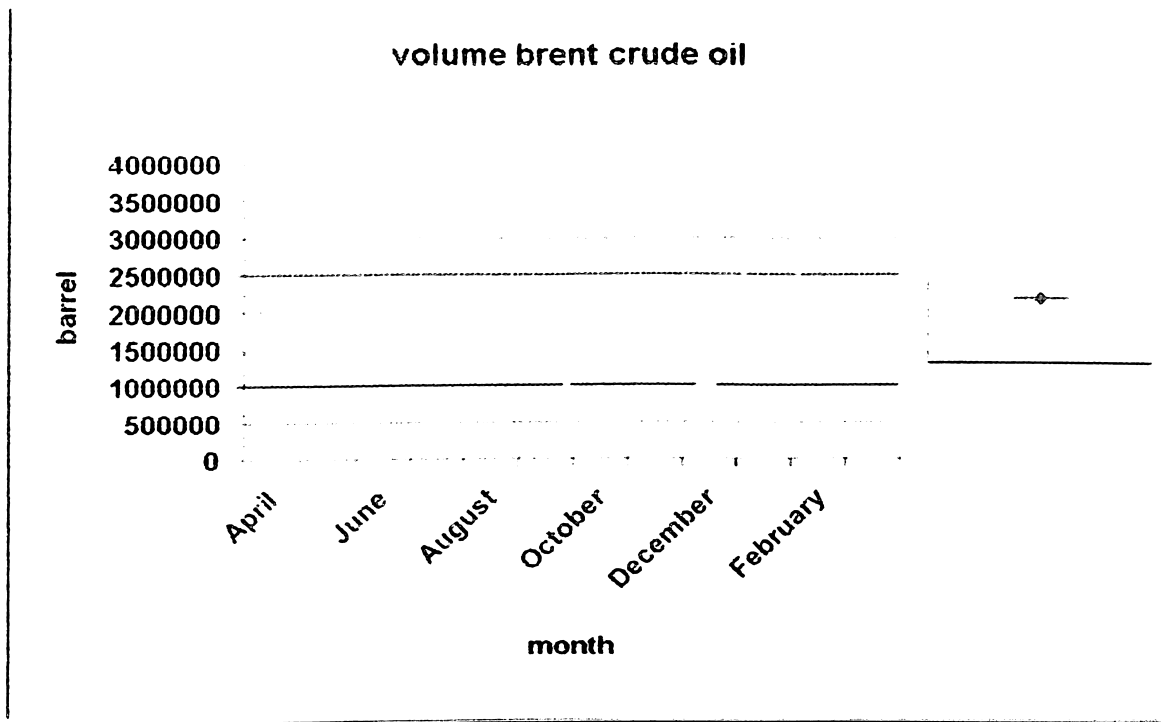


(Table 2) Volume of Brent crude oil traded at NCDEX 2005-2006

MONTH	VOLUME(Barrel)
April	814400
May	677000
June	259200
July	489000
August	640600
September	870100
October	1236900
November	1349900
December	943300
January	3385100
February	2021400
March	1525600

Source NCDEX





volume of crude oil futures trading from April 2006 to March 2006

Graph 2

And if we analyze the next accounting year we found that the graph shows sharp increase in the volume of crude oil futures trading in the month of December. This shows that the volume of trade is more in a particular month but not always. However the volumes are in a increasing trend from the month of June to November.

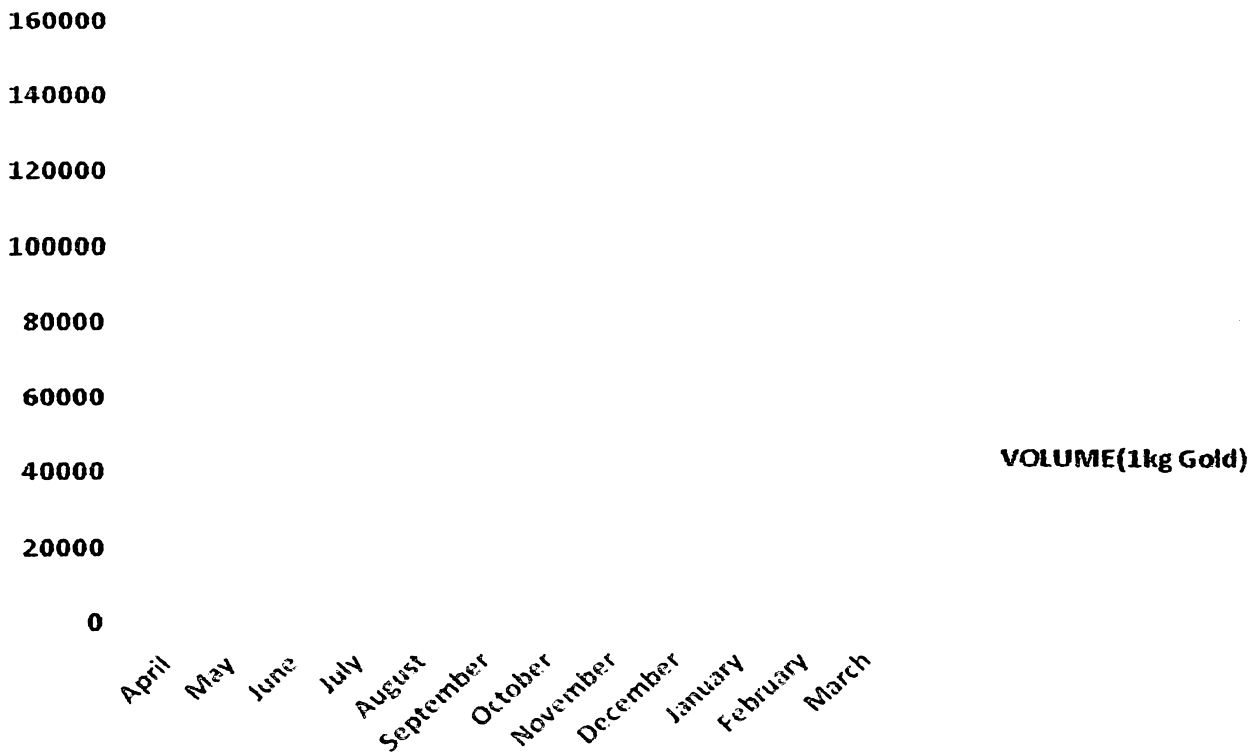


4.3 Volume analysis of Gold.

(Table 3) Volume of Gold traded at NCDEX 2005-06

MONTH	VOLUME(1kg Gold)
April	72
May	578
June	9021
July	14687
August	32937
September	41338
October	36791
November	44879
December	111920
January	86065
February	108421
March	139891

Source NCDEX



Volume of Gold traded at NCDEX 2005-06

Graph 3

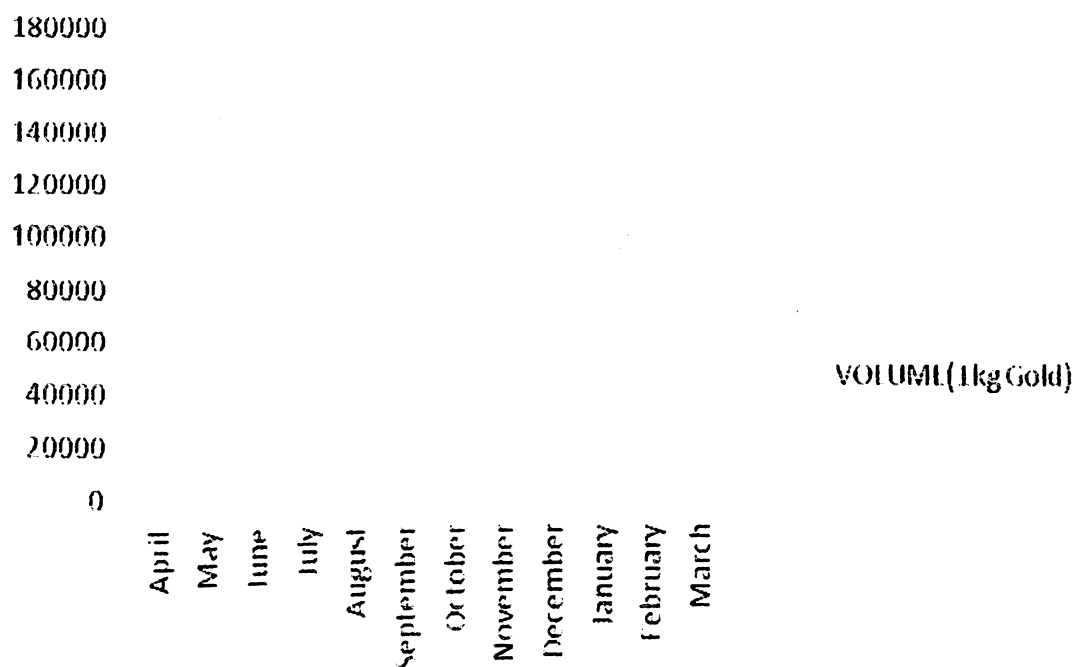
The above graph shows the trend in futures prices of gold volumes traded monthly and shows an increasing trend. Since May to September and a slight decrease in the prices and then it goes up in the month of November and a sharp increase in the month of December, which was similar to crude oil sharp increase. But again after a decrease it goes up.



(Table 4) Volume of Gold traded at NCDEX 2006-07

MONTH	VOLUME(1kg Gold)
April	120840
May	157753
June	111863
July	122966
August	103533
September	118660
October	108184
November	91917
December	111920
January	86065
February	108421
March	139891

Source NCDEX



Volume of Gold traded at NCDEX 2006-07

Graph 4

And if we analyze the graph of next consecutive year. We found that the volume of futures trading is volatile. It shows lots of increase and decrease in the volumes of gold traded .which is different to the last year of volume trade.

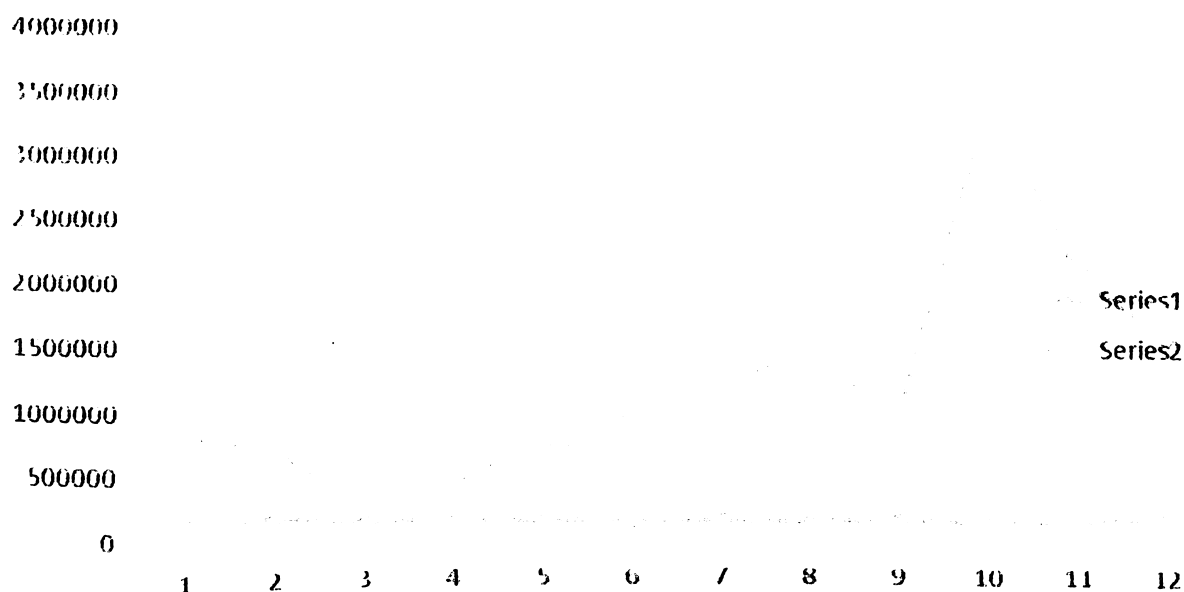


4.4 Comparison between Gold & Crude oil Volumes (2006-07)

(Table 5) Volume of Crude Oil and Gold

MONTH	VOLUME(Gold)	VOLUME(Crude Oil)
April	120840	814400
May	157753	677000
June	111863	259200
July	122966	489000
August	103533	640600
September	118660	870100
October	108184	1236900
November	91917	1349900
December	111920	943300
January	86065	3385100
February	108421	2021400
March	139891	1525600

Source NCDEX



Comparison between Gold & Crude oil Volumes (2006-07)

Graph

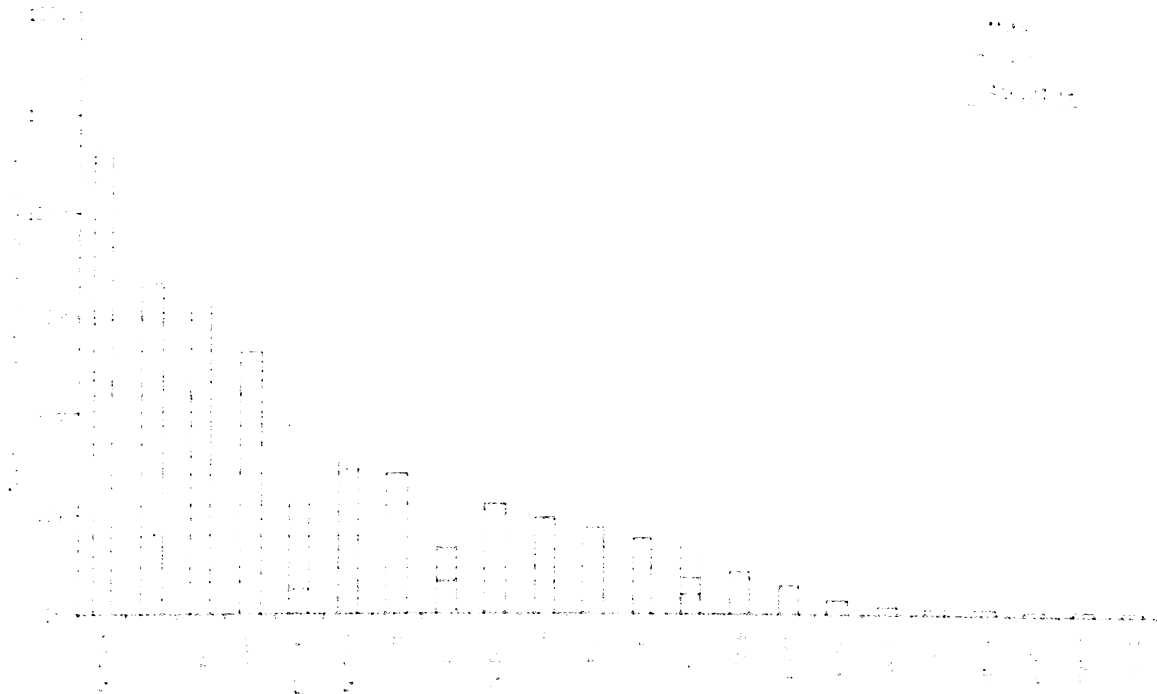


Prices of crude oil are always compared to the prices of gold everywhere. So I have taken the volumes of both gold and crude oil to show the comparison. In the year 2005-06 gold shows a huge volume in futures trading. But after the introduction of crude oil futures trading the trend is changed. Traders are shifted towards the futures trading of crude oil. Because the volatility in the prices of crude oil are similar to the prices of gold. If a trader wants to purchase a contract of gold he has to give more than 3 times of the crude oil purchase price. And if we analyze the above graph it shows that the trend in crude oil futures trading is increasing in comparison to gold futures trading



4.5 PRESENT SCENARIO OF INDIAN EXCHANGES

World's major commodity exchanges



Source: Exchange data included only futures exchanges with volume greater than 1 million traded futures and options contracts. Exchanges are ranked by trading volume in descending order.
Note: Volume measures only volume of contracts, but it is recognised that the size of contracts varies widely across exchanges.

Source UNCTAD report 2006. Graph 6

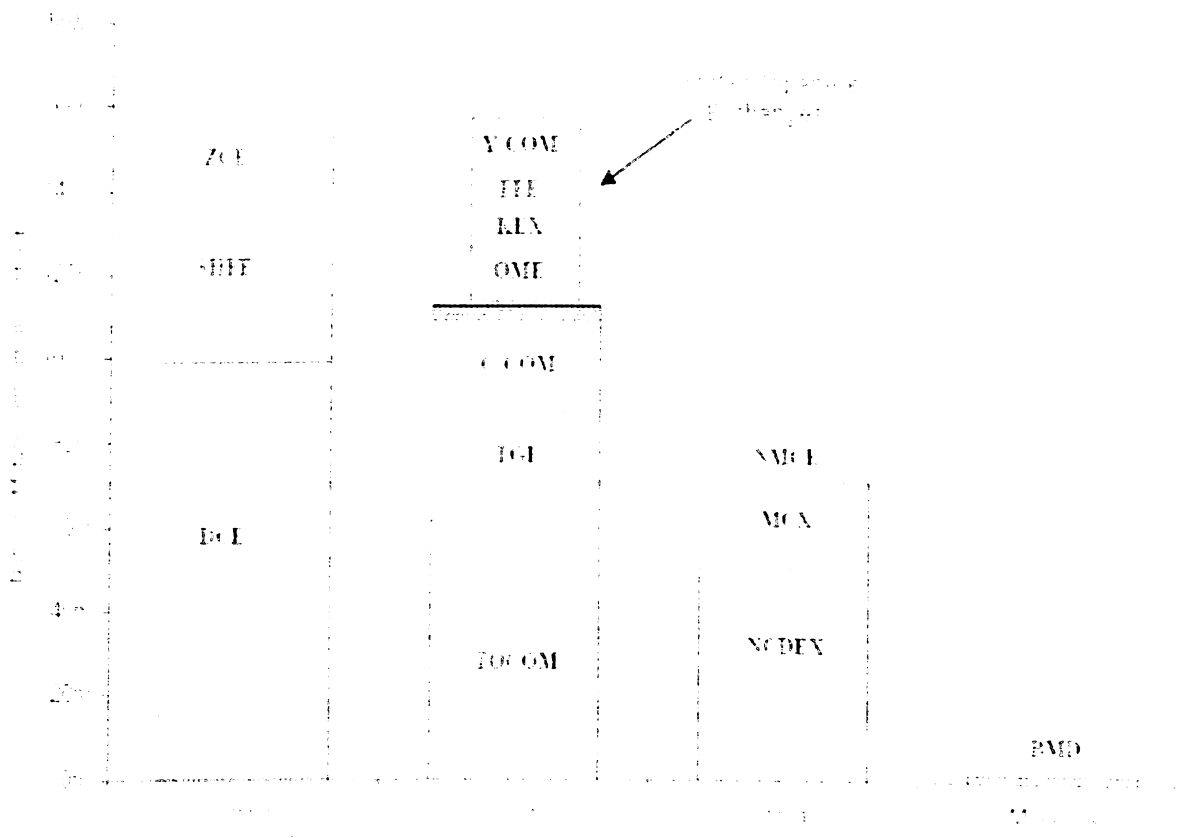
There is a strong Asian presence - ten of the twenty-two major commodity futures exchanges are situated in Asia – with representation also from Africa and Latin America in SAFEX/JSE and BM&F respectively. Looking forward, the coming years are likely to see substantial further growth in emerging commodity markets. This will be driven by the continued growth of existing exchanges, particularly those in China and India, and also by the rise of other exchanges situated in emerging markets. In Asia, exchanges in Dubai, Iran, Pakistan, Thailand and Indonesia are



among those that may become familiar to global commodity investors in the short or medium term. Additionally, India's Forward Markets Commission, the regulator of the country's commodity exchanges, has been hinting that it may grant national commodity exchange status to new entities which could provide further competition to the existing three. Developed world exchanges today provide reference prices for global trade-in most physical commodities (Bursa Malaysia being a notable exception with palm oil). However, the rapid increase in commodity consumption by the large, high-growth Asian economies and the prospective opening of the region's exchanges to overseas investors is likely to see the larger Asian exchanges assuming this role for more commodities over the coming years.



Asian commodity exchanges 2005



Source: Exchange data, include only futures exchanges with volume greater than 1 million traded futures and derivatives contracts in 2005.

Graph 7

In India, rapid market growth has occurred in recent years across both financial and commodity derivatives sectors. The **National Stock Exchange of India (NSE)**, incorporated in 1992, has risen dramatically to become the 14th largest derivatives exchange in the world with 132 million equity index and single stock contracts traded in 2005 and an annual growth rate of 75% over 2004 volumes. However, this is positively snail-paced compared with the growth levels achieved by two of the new national multi-commodity exchanges founded in 2003. Mumbai's **National Commodities and Derivatives Exchange (NCDEX)**, with its focus broadly on agriculture, has

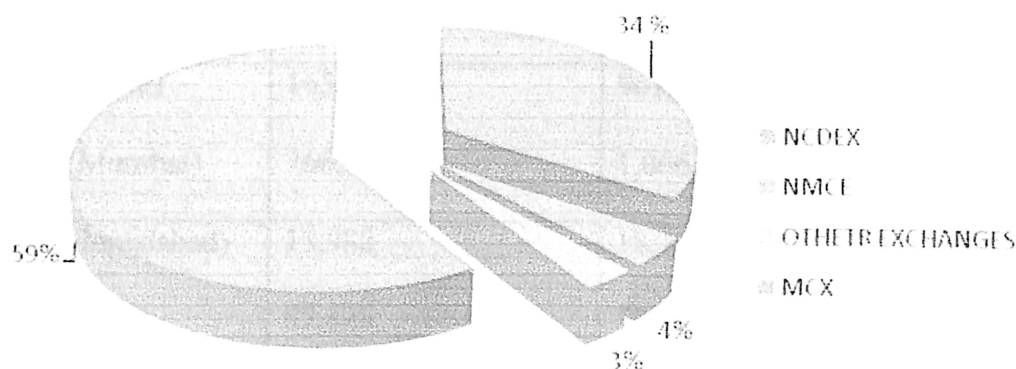


seen volume growth in 2005 of 390%. This surge saw the exchange trade an annual 50 million contracts in only its second full year of operations - a remarkable achievement enabling it to become already the world's sixth largest commodity exchange by volume and the third largest agricultural futures exchange after DCE and CBOT. **Multi Commodity Exchange of India (MCX)**, also located in Mumbai, traded 20 million contracts in 2005 and attaining an even faster growth rate of 678% during the year. Volume was more evenly distributed across the agriculture, metals and energy sectors, but in turnover terms, however, the majority of MCX's 2005 trading has been concentrated in bullion and crude oil. With prices of both commodities rising sharply towards the end of 2005 - as well as those of non-precious metals in which MCX also has the

(Table 5) Indian Commodity Exchange Market share (in terms of turnover) in 2006-07.

(Till December 2006) greatest liquidity- MCX had actually overtaken NCDEX in monthly turnover by November.

EXCHANGES	Market share (turnover)
NCDEX	34%
NMC	4%
OTHER EXCHANGES	3%
MCX	59%



Market share of Indian Commodities Exchanges.

Graph 8

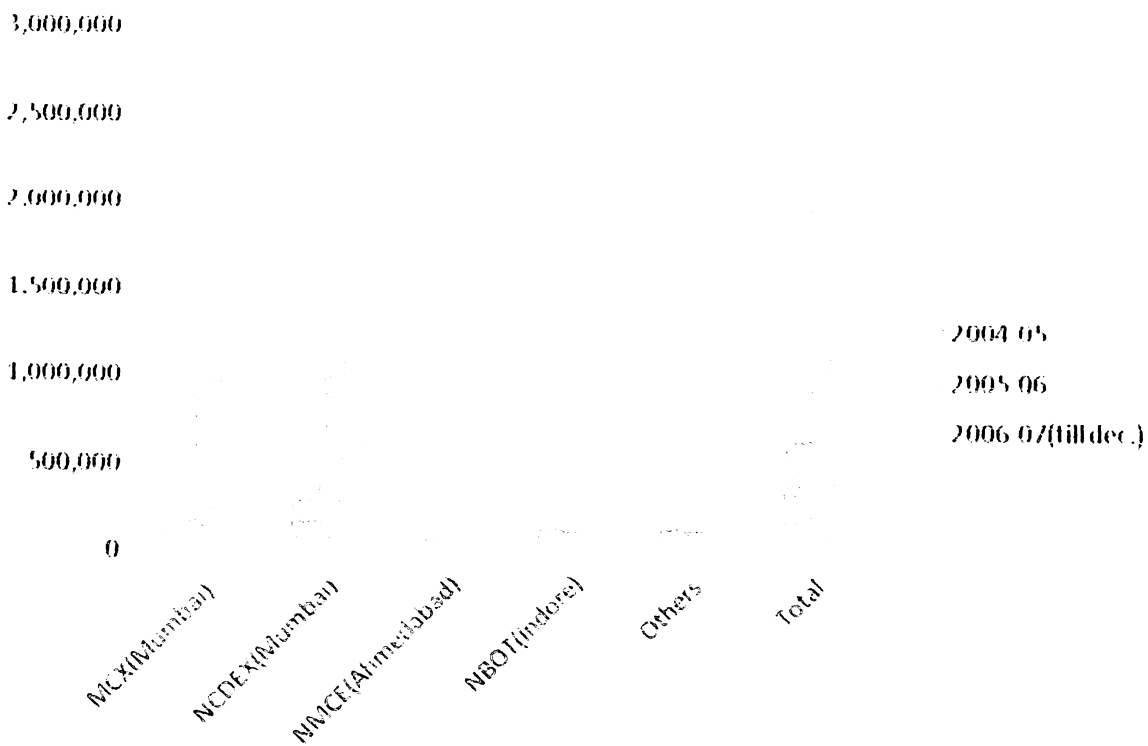
The growth in the commodity derivative trading witnessed in 2005-06 continued during 2006-07. Total volume of trade rose sharply from Rs.1.29 lakh crore in 2003-04 to Rs. 27.39 lakh crore in 2006-07 (till December 2006) (Table). In the first nine months of 2006-07, the volume of trade was already more than Rs. 21.55 lakh crore achieved in the twelve months of 2005-06. Turnover as a proportion of GDP increased from only 4.7 percent in 2003-04 to 18.3 per cent in 2004-05 and further to 76.8 per cent in 2005-06. The growth in the volume of trading has been primarily propelled by Multi Commodity Exchange, Mumbai (MCX) and National Commodity Derivatives Exchange, Mumbai (NCDEX) (Figure), with these two exchanges also accounting for a large share of the number of contracts traded on these exchanges (Table). MCX 59% NMCE 4% Other Regional Exchanges 3% NCDEX 34% .

(Table 6) Turnover on commodity futures market.

(Rs. Crore)

Exchanges	2004-05	2005-06	2006-07(till dec.)
MCX(Mumbai)	165,147	961,633	1,621,803
NCDEX(Mumbai)	266,338	1,066,686	944,066
NMCE(Ahmedabad)	13,988	18,385	101,731
NBOT(Indore)	67,823	53,683	57,149
Others	67,823	54,735	14,591
Total	571,759	2,155,122	2,739,340

Source Forward Market Commission



Graph 9

If we analyze the graph of turnover on commodity futures market in India it shows a tremendous growth in futures trading. National exchanges like MCX, NCDEX and NMCE are showing a remarkable growth in their turnover in futures trading. Among these National Exchanges MCX has the highest growth in terms of turnover and we analyze the overall growth it shows that the trend is increasing.

(Table 7) Turnover in selected commodities in Indian Commodity Exchanges

(Rs. Crore)

Commodity	December 2005	December 2006	% increase/decrease
Gold	26284	33238	26%
Silver	16911	26530	56.9%
Crude Oil	4317	9815	127.35%
Methanol	5835	2732	(-53.2)%
Guar Seed	7606	13463	77%
Refined Soya Oil	717	4707	556.5%
Chana Chik peas)	15098	6696	(-)55.65%
Pepper	98	404	312.2%
Rubber	178	452	154%
Desi Urad	1350	1929	(-)85.3%
Soya Bean	787	1739	121%

Source: Forward Market Commission

The above table shows the position of crude oil among the top 11 commodities traded on Indian Commodities Exchanges. If we analyze the percentage growth of crude oil futures trading in India it shows a 127% growth in comparison to the previous year turnover in the same commodity. So the future of futures trading of crude oil is emerging in India.

4.6 CORRELATION ANALYSIS BETWEEN SPOT AND FUTURES PRICES

(Table 8) Relationship between spot and futures prices (Jan 2006 to March 06)

Day	Price Date	Spot Price	Futures Price
Tuesday	3-Jan-06	2669.44	2730
Wednesday	4-Jan-06	2737.24	2775
Thursday	5-Jan-06	2749.44	2773
Friday	6-Jan-06	2736.13	2774.5
Monday	9-Jan-06	2780.75	2800
Tuesday	10-Jan-06	2743.75	2775
Wednesday	11-Jan-06	2743.41	2774
Thursday	12-Jan-06	2780.82	2800
Friday	13-Jan-06	2762.19	2788
Monday	16-Jan-06	2754.34	2791.5
Tuesday	17-Jan-06	2813.18	2783
Wednesday	18-Jan-06	2900.99	2875
Thursday	19-Jan-06	2862.02	2862
Friday	20-Jan-06	2903.36	2889
Saturday	21-Jan-06	2934.44	2930.5
Monday	23-Jan-06	2949	2951
Tuesday	24-Jan-06	2914.53	2912
Wednesday	25-Jan-06	2883.4	2900
Friday	27-Jan-06	2887.54	2875
Saturday	28-Jan-06	2930.46	2911.5
Monday	30-Jan-06	2948.14	2925
Tuesday	31-Jan-06	2925.58	2930
Wednesday	1-Feb-06	2895.38	2910
Thursday	2-Feb-06	2895	2915
Friday	3-Feb-06	2784.35	2828



An analysis of crude oil futures trading in India

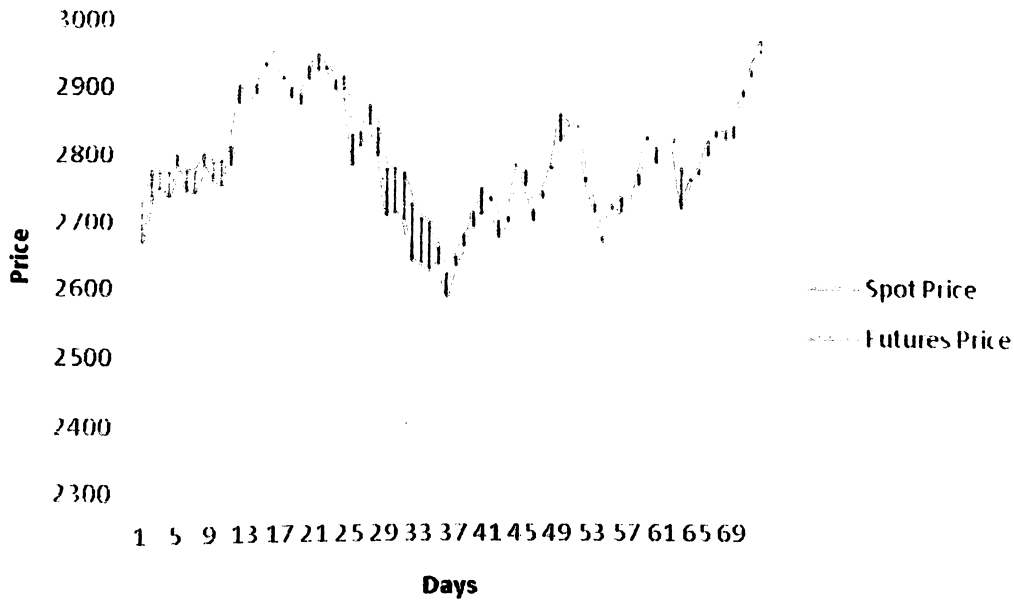
Saturday	4-Feb-06	2811.12	2831
Monday	6-Feb-06	2843.35	2870
Tuesday	7-Feb-06	2796.85	2840
Wednesday	8-Feb-06	2707.25	2777
Thursday	9-Feb-06	2712.25	2780
Friday	10-Feb-06	2699.63	2772
Saturday	11-Feb-06	2639.62	2725
Monday	13-Feb-06	2635.68	2704
Tuesday	14-Feb-06	2625.78	2699
Wednesday	15-Feb-06	2634.93	2660
Thursday	16-Feb-06	2587.12	2620
Friday	17-Feb-06	2631.88	2645
Saturday	18-Feb-06	2661.53	2678.5
Monday	20-Feb-06	2712.17	2690
Tuesday	21-Feb-06	2709.84	2748
Wednesday	22-Feb-06	2728.51	2735
Thursday	23-Feb-06	2675.42	2701
Friday	24-Feb-06	2705.39	2698
Saturday	25-Feb-06	2784.17	2781
Monday	27-Feb-06	2751.64	2773
Tuesday	28-Feb-06	2700.74	2715
Wednesday	1-Mar-06	2743.32	2735
Thursday	2-Mar-06	2781.82	2777
Friday	3-Mar-06	2859.2	2819
Saturday	4-Mar-06	2842.19	2844
Monday	6-Mar-06	2840.07	2841
Tuesday	7-Mar-06	2758.39	2765
Wednesday	8-Mar-06	2714.62	2725
Thursday	9-Mar-06	2675.83	2670
Friday	10-Mar-06	2722.9	2717
Saturday	11-Mar-06	2710.94	2735
Monday	13-Mar-06	2710.99	2712
Tuesday	14-Mar-06	2769.95	2755
Wednesday	15-Mar-06	2825.56	2821
Thursday	16-Mar-06	2787.43	2811
Saturday	18-Mar-06	2823.21	2824
Monday	20-Mar-06	2818.83	2822.5
Tuesday	21-Mar-06	2719.94	2779



Wednesday	22-Mar-06	2759.98	2764
Thursday	23-Mar-06	2769.4	2777
Friday	24-Mar-06	2818.41	2798.5
Saturday	25-Mar-06	2833.23	2826
Monday	27-Mar-06	2833.06	2822
Tuesday	28-Mar-06	2842.85	2826
Wednesday	29-Mar-06	2897.7	2888
Thursday	30-Mar-06	2927.2	2917
Friday	31-Mar-06	2968.56	2952

Correlation = 0.95972

Brent Crude 06(Jan-Mar)



Graph 10



If we analyse the above graph and the correlation between spot and futures prices of crude oil from January 2006 to March 2006 of NCDEX. It shows a very strong correlation of .95972, which means if the spot prices of crude oil changes then the futures prices of crude oil will also change. The graph also shows that the futures prices are fluctuate with the spot prices in tandem. We can also see the volatility of crude oil prices in both the market. There is misconception that the futures prices of commodities are derived by exchanges. However it is not true prices are solely determined by the supply and demand forces of the market.



CHAPTER 5

5.1 LIMITATIONS

1. Non-Availability of Full Spectrum of Players.
2. Limited trading hours of the MCX/NCDEX exchanges.
3. Lack of full Range of Crude Oils Traded on NCDEX.
4. Contracts to be made tailored to meet Indian requirements.
5. Time Constraint
6. Lack of availability of Trainers

5.2 FINDINGS AND SUGGESTION

Crude oil is one of the most essential commodities. Every industry is directly or indirectly related to the use of crude oil. Some industries are directly using the crude oil (Refineries) and some are using indirectly as petroleum products. The demand of crude oil is stagnant in OECD countries whereas the demand of crude oil is emerging in non OECD countries. Specially demand of crude oil in Asian countries such that China, India, Japan ...etc is emerging at the rate of 15%. As their economy is also increasing with the rate of 7% to 8% of GDP.

Market of crude oil is basically divided into two parts one is physical market and the other one is paper market. Which is futures trading market for crude oil. The market of crude oil was deregulated in 1998 and major oil companies like BPCL start futures trading at International Exchanges (NYMEX) but the ratio is only 10%. My area of research is totally focused on the futures trading of crude oil. Because futures trading of crude oil are emerging in India and by doing futures trading a company can minimize his risk. So I analyze the scenario of futures trading in India. By applying various approaches such as volume analysis of crude oil futures

trading , comparison with the volume of gold futures trading, contract specification on two Indian and on two International Exchanges, growth rate of turnover in futures trading of crude oil, position of Indian Exchanges in world as well as in Asia and correlation analysis between spot and futures prices. By analyzing with these various approaches what I find that the growth rate in futures trading of crude oil is 127% in comparison to the turnover of last year. Still major oil companies are not doing futures trading. Recently Indian Oil Corporation Limited has started futures trading at NCDEX. There is also a misconception among the investor's that the futures prices are determined by the exchange. But it is not true; prices are strongly determined by the supply and demand forces of the market. I have taken the prices of spot and futures from January to March 2006 and find correlation between them the correlation between spot and futures prices are .959748 which shows that there is strong relation between spot and futures prices. That futures price is not solely determined but it is dependent on the spot price. Although there are certain constraints of exchange based trading as liquidity, volume , market is regulated by Forward Market Commission under Government of India, lack of major players in the field.... etc, but there are also some advantages of futures trading at Indian Exchanges like traders are not exposed to foreign exchange risk exposure because prices are denominated in rupees.

SUGGESTIONS

I would only like to suggest that a well develop economy is the sign of well develop spot and futures market. So I suggest from my research work that major oil companies must come forward and start futures trading at MCX and NCDEX.

CONCLUSION

Commodity futures markets have a limited presence in developing countries. Historically, governments in many of these countries have discouraged futures markets. If they were not banned, their operations were constricted by regulation. In the recent past, however, countries have begun to liberalize commodity markets. And in a reversal of earlier trends, the development of commodity futures is being pursued actively with support from governments. Policy makers expect social benefits in terms of price discovery, risk management and better allocation of resources. Yet, it is well known, that even in developed countries, not all commodities are traded on futures markets. Indeed, only a minority of contracts floated by commodity exchanges succeeds in attracting trading volumes to be liquid. Crude oil is one of essential commodity and attracts traders more in comparison to Gold. Turnover in crude oil futures trading is 127% more in comparison to the last year's turnover of futures trading in crude oil. So the futures market of crude oil trading is emerging in India. However there are certain constraints of exchange based trading, major oil companies are not doing futures trading at Indian Exchanges. But if they come forward and start futures trading at MCX and NCDEX the future of futures trading is bright in India.

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