Commodity Derivatives and Risk Management
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Lecture 6
Commodity Options and Commodity Spreads

Welcome to the next session on commodity, derivatives and risk management. In this session will discuss different aspects of commodity options and one thing I would like to highlight here is that the commodity options normally have commodity futures as the underlying not the underlying goods. Also in Indian exchanges commodity options are yet to be traded. however majority of International exchanges as such as LNE and CME Singapore exchange, Signex etc., we have commodity options with commodity futures as underline.

Now let us before we go to understand the contract specification of commodity options let us understand or let us revisit what is our understanding on 4 different options that is long call, short call, long put and short put. I will give the example of this as if the options have the commodities as underline and from there we will take it up how the settlement will happen when the futures are as underlined. Now let us go to our understanding of options.

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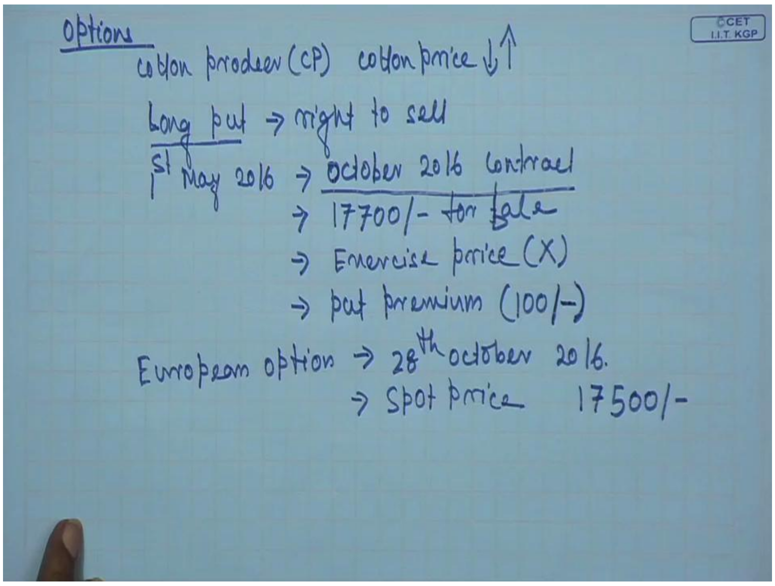

So when a trader takes a long call or long put or short call short put option. Let us say a cotton producer so CP hears that the price is going to be volatile. Cotton price will may go down may go up, he is not very sure of it, so he would like to buy a option contract where he if he if he chooses to if he chooses to exercise the option he will be able to sale cotton at a fixed price. Let us say so in this case Cotton producer will take a long put option. So by taking a long put option he has right to sell. So let us say he takes long put right to sale so again on 1st May 2016 he takes October 2016 option contract at a price of let us say 17700 per pair. So this for this is going to be our exercise price, we term it as X.

Now when the Cotton producer is taking a long put option somebody has to take a shot put and the Cotton producer has to pay a premium so it has to pay a put premium. Let us say put premium is rupees 100. So on October 26 contract when the contract matures let us say this is a European contract so European option so European option means cotton producer will be able to exercise the contract only on the maturity date so being a European option let us say 28 of October is the contract maturity date so the long put option holder may exercise may not exercise depending upon the prevailing price on the exercised date.

Now let us say on 28th October the Cotton spot price is let us say 17500. Now my question to all of you is that whether this cotton producer will exercise the option contract or not? Whether he will exercise the right to sell? Long put means he has bought but what he has bought is the right to sell. So the answer to this question is that of course definitely he is going to exercise because without this contract if he goes to the market he will be able to sell it at 17500 with the contract he would be able to sell it at 17700.

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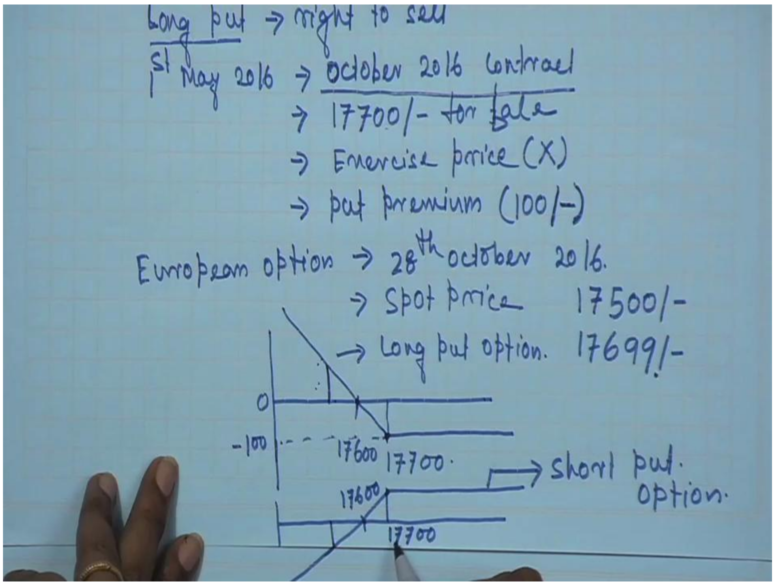

Now if you draw a payoff diagram so any price so this is going to be our 17700, this is going to be 17600, so this any price any price less than 17700. Let us say the spot price is 17699, will he exercise? Yes he will exercise because if he goes to the spot goes to the spot market he will be able to sell it at this price but with option contract he will be able to sell it at a higher a price of 1 rupee.

So any price less than this label he will exercise but he will start making profit from this price or so this is the pay off for long put option holder. And as we know it option contracts are zero sum game so what would be the pay off for? So this is my zero this is the level of minus 100 so what will be the pay off for the counterparty shot put, so lack of space please ignore. So this is going to be so you will have this is the 17700 this is 17600 so this is the pay off for short put option holder.

So as we know zero sum game so when at a price of let us say 7 let us at a price of 1700 5 17500 this party will gain long put option will gain 100 rupees benefit after adjusting for the premium and this party will lose 100 rupees after adjusting from the premium receipt. Now let us go back to now let us go back to payoff for the long call or long put sorry long call and short call options.

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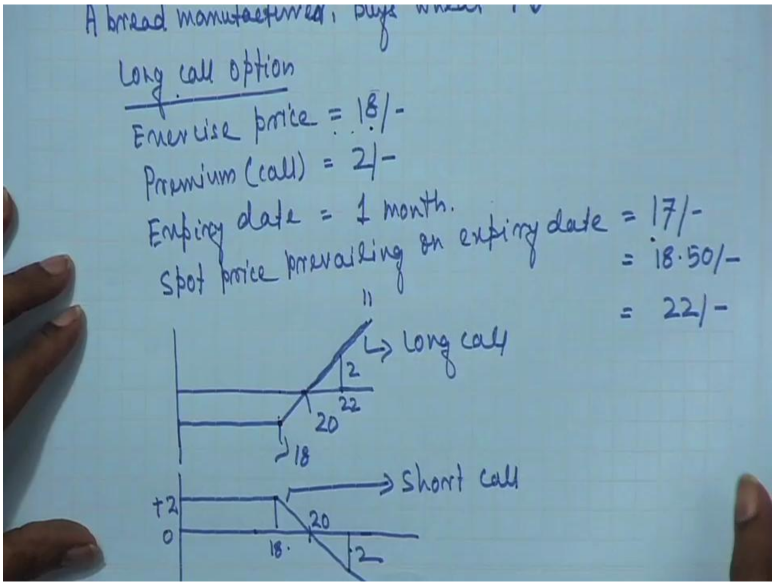

Now let us say a let us say bread manufacturer buys wheat and it fears that wheat price may go up or go down or wheat price is supposed to may exhibit high volatility. If price goes down he will be very happy if price goes up he will be unhappy so to take a insurance against this risk it may enter into a long call to buy wheat so buy wheat for let us say it enters into a long call option, what price? The exercise price is 18 rupees for taking this exercise it pays a call premium of call premium of let us say 2 rupees. Now expiry is expiry date is let us say 1 month from today. Now on the expiry date being an European option on the expiry date what will be his action that is whether he will exercise this right to buy or not?

Now let us take different price. Let us say in the prevailing spot market on expiry date the spot price prevailing on expiry date is 17 rupees, will he exercise? Will he exercise his long call? No, he will not exercise because if he goes to the open market he will be able to buy wheat at 17 rupees but if he goes to his counterparty he will be able to buy wheat at 18 rupees so he will not exercise and he will forego his right to buy from the counterparty. Now let us say that the spot price prevailing on the exercise date is 18 rupee 50 paisa.

Will he exercise? Yes, he will exercise the contract .So what will be his pay off? Its so this axis is the different pay a different spot prices so any price up to 18 he will not exercise but any price after 18 so this is your 18 rupees this is your 20 rupees. So any price after 18 rupees the long call will exercise his option and any price after 20 he will start making profit from the long call. Who is counterparty? Counterparty is a short call. Again the same concept is applied here so both short call has a you know mirror image so up to in if the price is less than 18 rupees, his benefit is going to be 2 rupees a kg. Any price higher than this he will be earning less than that so any price higher than 20 rupees he will start incurring loss. Let us say prevailing market price is 22 rupees.

If prevailing market price is 22 rupees, the long call option holder will exercise its option buy wheat from the short call party at 18 rupees. So what is going to be the the gain for this party will be 2 rupees profit for this and loss for this party will be 2 rupees. So this is this is the pay off for short call. So this brings to concept called in the money, out of money and at the money.

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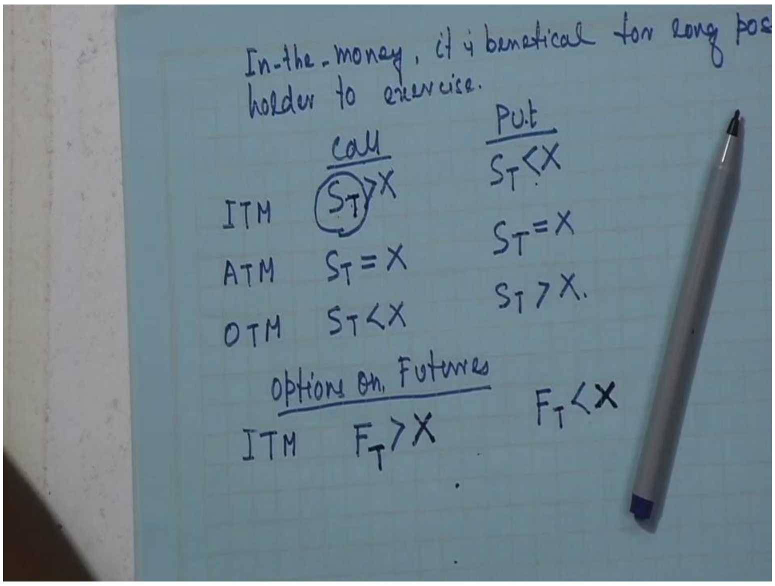

So what is the in the money? In the money means it is beneficial when we take an option as a in the money. It is beneficial for it is beneficial for long position holder to exercise. So when we are talking about in the money we have at the money and you have out of money. So we have all option here we have a put option, so when it will be in the money? When the spot price prevailing on the expiry is greater than the exercise price. As spot price prevailing on the expiry is less than the exercise price then the put option will exercise. For call when the spot price is higher than exercise the buyer will exercise and buy the underlying at the price of X. When ST is equal to X or closer to very near to X, it will be called as at the money option. When it will be called out of money? ST is less than X and ST is greater than X.

Now let us go to our understanding on options on futures. So when we are talking that commodity options have futures as a underline when an option is going to be in the money. So when the in place of a ST we it is not the spot price of the underlying we replace it with FT that is futures price prevailing on the option expiry date if it is greater than the exercise price then it will be an in the money and the long call option holder will exercise. Similarly for in case of a put option when FT futures price prevailing on that day is less than the exercise price then it will become a in the money put option and the owner of the put option that is long put option holder will be able to exercise.

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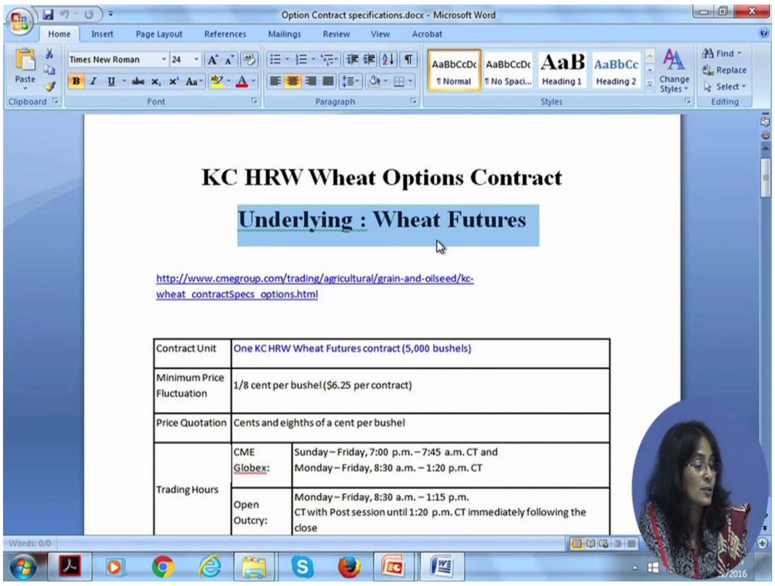

Now let us go to our so this is let me take you to this link. Please see this one this is the wheat option contract offered by CME that is Chicago Mercantile Exchange and please see this one what is a underlying? Underlying is not wheat but underlying is wheat futures.

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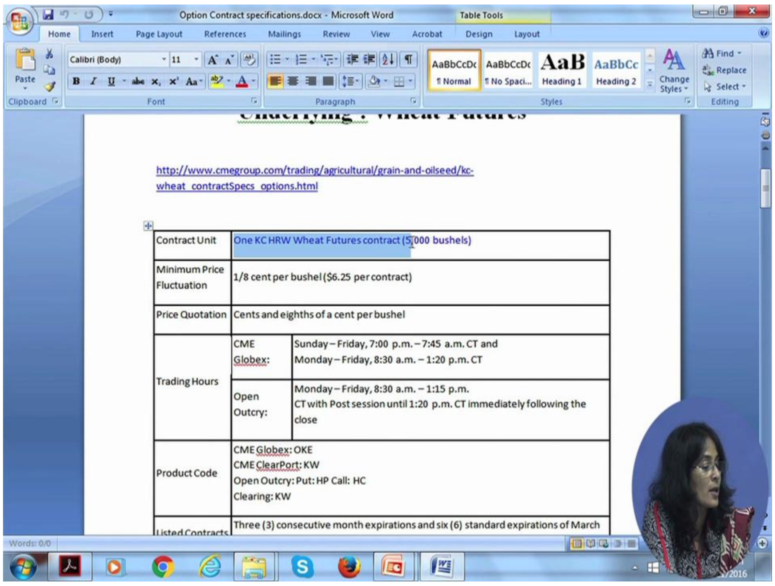

So it is also very clearly what the contract unit is? Contract unit is the wheat futures contract for 5000 bushels. So these are the different standardization and different aspects which are given so this link will be available to you so you can spend some time understanding more about this option contract but what I am driving here or what I want all of you to focus is that this contract does not have wheat as a underline but it has wheat futures as underline.

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Now so as I discussed when the long call or long put position holder exercises the in the money options they take positions in the futures contract. So when long call position holder exercises, he takes the long futures position and simultaneously the short call whoever is a counterparty to long call he takes the short futures position.

Similarly you have a long put position holder when he exercises that party exercises the party takes the short futures position and short put position holder takes a long futures position. So once the contract once the option contract expires so now nobody will be holding option contract so long call short call long put shot put position holders now will have either long futures of short futures depending upon what position earlier they had taken.

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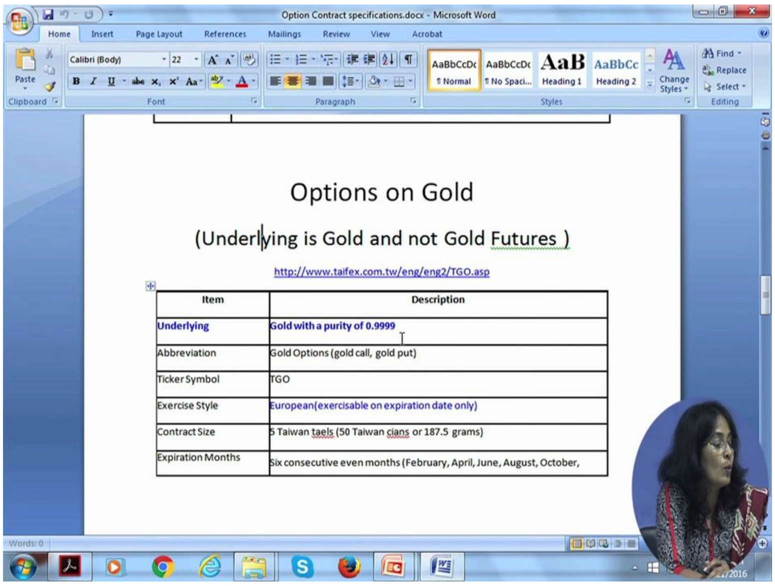
Options on Gold

(Underlying is Gold and not Gold Futures)

http://www.taifex.com.tw/eng/eng2/TGO.asp

Item	Description
Underlying	Gold with a purity of 0.9999
Abbreviation	Gold Options (gold call, gold put)
Ticker Symbol	TGO
Exercise Style	European(exercisable on expiration date only)
Contract Size	5 Taiwan taels (50 Taiwan cians or 187.5 grams)
Expiration Months	Six consecutive even months (February, April, June, August, October,

So this is this is all about a commodity options however as I said that not all exchanges have commodity futures as underline you have very few you have I will just give an example. a tie fix, so you have a tie fix options on gold and the underlying is gold and not gold futures. Underlying as mentioned here the underlying is gold and gold and not gold futures but it is not very common.

Most of the commodity exchanges have futures as underlying and in India right now there is a considerable amount of debate going on whether we should have options um commodity options with commodity futures as underlying or actual commodities as underlying. Now let us go to the next type of contracts which commonly trades at a exchange.

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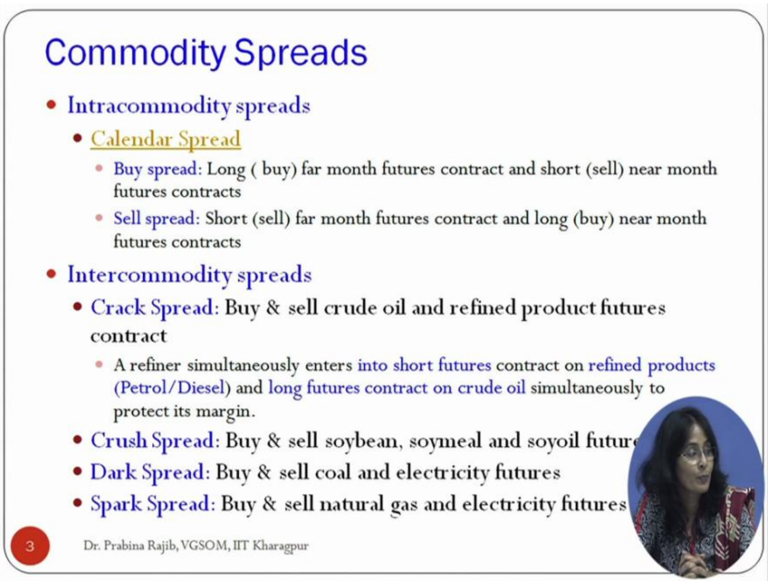

So this is called commodity spreads, so what exactly is a commodity spread? Commodity spread is that simultaneously a buyer takes position in two option two futures contract. So let us take a simple example of a calendar spread. Calendar spread means somebody can take a long futures position in a near month contract and simultaneously sell um futures contract that is takes a short futures contact in a far month contract or vice versa.

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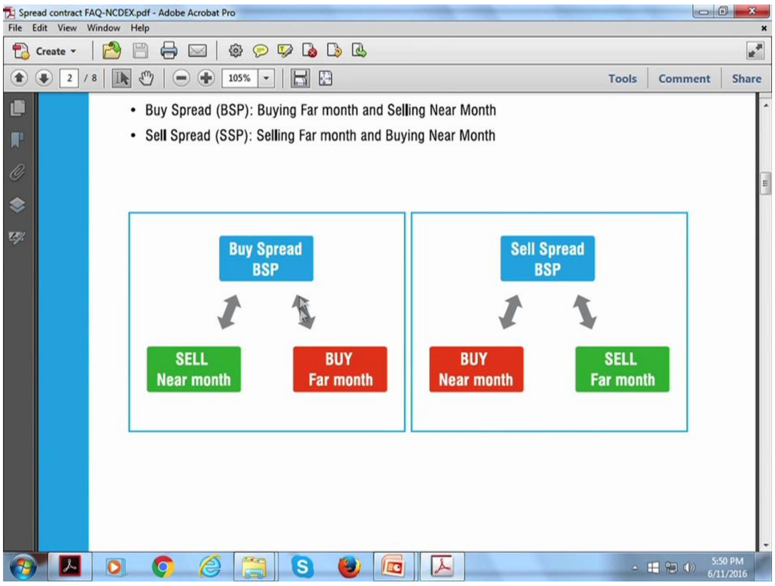

So when you have somebody takes a calendar spread and he is taking a buy spread he takes a long position in a far month futures contract and short position in a near month contract. Similarly you can have in the sell spread contract you have a short position for far month futures contract and long position for near month contract. So in India we have calendar spreads available so this is this particular link source the spread orders which are available to which a trader can take.

As I mentioned buy spread means buy the far month and sell the near month. Sell spread means sell the far month and buy the near month. So depending upon how the futures price how what is the movement between the future price of near month far month, a trader can either by a spread contract or sell a spread contract. More about this spread contract and how this can be order can be placed all these details are available in this particular link and you can spend some time understanding more about it.

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Besides the calendar spread, many exchanges also offer inter commodity spreads. So what are these inter commodity spreads? You can have crack spread, you can have crush spread, you can have dark spread, you can have a spark spread. So what do you mean by crack spread? So somebody may can buy the crude oil futures contract and simultaneously sell refined futures contract.

That is refine product futures contract that is futures contract on petrol, diesel and aviation turbine fuel or kerosene whatever it is. So simultaneously somebody takes long futures in crude oil and take short futures in refined product or vice a versa. So these kinds of contracts are called crack spread. Crush spread, somebody can take long futures in soya bean and short futures in the derived product that is soya meal and soya oil so or vice versa that is also known as a crush spread.

Dark spread so buying and selling coal and electricity futures. Spark spread buying and selling natural gas and electricity futures. In India we do not have electricity futures available. Also coal futures to my knowledge coal futures also do we do not have coal futures listed in any of the commodity exchanges. So traders cannot you know take benefit of this two spreads however traders can take benefit of crack spread and crush spread.

Now at this point of time I would like to you know elaborate little more on what is a difference between a hedger speculator and a arbitrageur. Many a times we use the word hedger, we use the word speculator, we have also heard people saying that speculation is equal to gambling and speculation is bad for market. So many kinds of things you have you may have heard people saying but what eh what is the meaning of or who is the hedger and who is speculator and who is arbitrageur? Let us understand little more.

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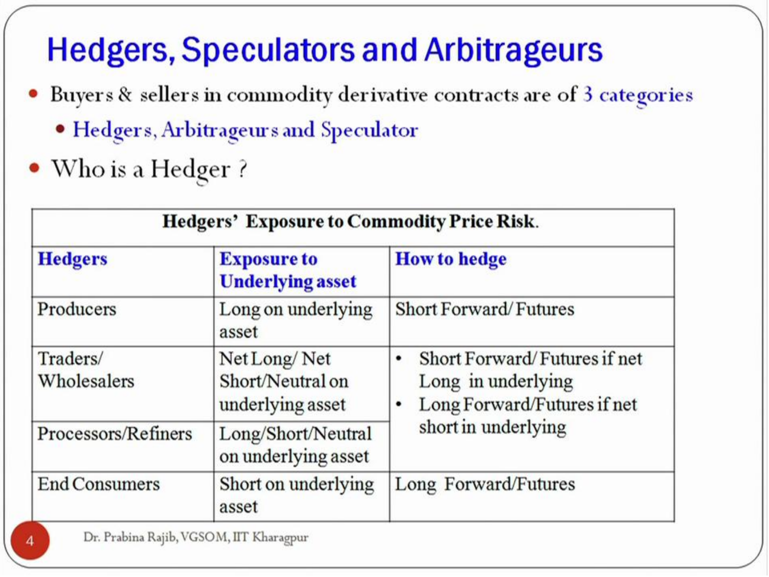

So who is a hedger? Hedger has to have a exposure to the underlying market. Let us say a Cotton producer fears that cotton price is going down and he would like to mitigate that risk by entering into a short futures contract or long put option. So in that case that trader will be treated as a hedger. Suppose the counter party to this particular long the Cotton trader cotton producer is a bank or financial institution or for that matter it could be me or you or individual trader.

In that case that particular counter party is going to be a speculator because that party does not have anything to do with the underlying asset. So who is a hedger? Hedger has to be hedger could be a producer of the commodity hedger could be end consumer of a commodity or hedger could be a trader or wholesaler or a processor or a refiner.

So when a producer is always long on asset, producer is continuously producing the commodity and what is the producer's fear that price will go down so that producer will be able to mitigate the risk by entering into short futures contract or long put option. Now similarly end consumer let us say a bread manufacturer as I mentioned just now a bread manufacturer which buys wheat, so what is that company's fear?

That company's fear is that wheat price is going to go up so what it will do? It will be able to enter into a long futures contract or a long call option on wheat. Now besides this producers and consumer you can also have many other value chain partners. So they can be let us say they can be a trader or a wholesaler so or a processor, refiners, etc. They may be long on underlying asset or short on underlying asset.

So let us take an example of a let us say a wholesaler. Let us say wholesaler of cotton. So a wholesaler of a cotton as of today let us say it is not owning any cotton bales but it has already agreed to sell some cotton bales at a fixed price. It will be delivering cotton bales at a future date but the price negotiation has already happened. Now in the meantime if the cotton bale price increases and he has to pay a higher price for that, so his input cost goes down but his revenue is already fixed. So in that case his margin will go down, so in this case the wholesaler will be having a net short position in the underlying.

So how we will mitigate this risk? He will be able to mitigate this net short position in the underlying market by entering into a long futures position. So he will be he will be entering into a long futures position. If price increases he is going to he will be eh incurring loss so he will be entering into long futures position.

Similarly suppose the wholesaler has already bought the cotton bales and he is anticipating prices are going to go down if he does not do anything. And when he goes and sells the cotton bales he will be earning less amount of money. So how he will mitigate that risk? So he already has a long position in the underlying he will be able to mitigate by entering into the short futures position.

So this value chain partners other than the producers and consumers of commodity they can be you know they can have they can have a long position in the underlying or short position in the underlying, net long or net short position on the underlying and accordingly they will be able to mitigate by taking futures or options contract. So as I mentioned who is a hedger? Hedger has to have a exposure to the underlying.

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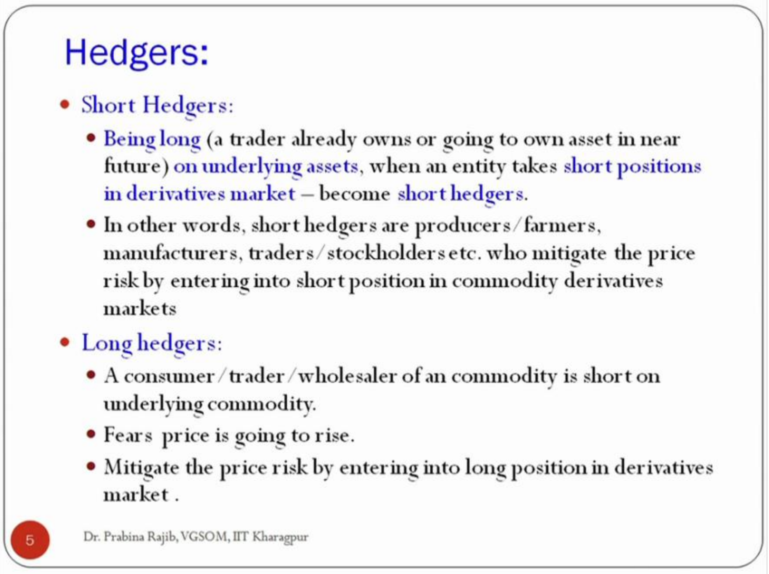

And who is the short hedger? Short hedger is a party who owns the asset which already owning the asset or long on the asset and he will be able to mitigate that risk by entering into a short position. So your producers will be short hedgers and who will be long hedger? A consumer who does not have the underlying asset with him and but his fear price is going to rise so he will be he takes a long futures position or long call option to mitigate that risk in that time it will be known as a long hedger.

Now who is a arbitrageur? Arbitrageur all of us we know who make a risk less profit by buying and selling simultaneously. So a trader sorry arbitrageur has to buy and sell in a two different contracts at two at a given point of time. Let me give you one example of a inter-market arbitrage. So what is exactly a inter-market arbitrage? Inter-market arbitrage is let us say and gold futures contract is trading at CME and gold futures contract in dollar terms is also trading at Dubai gold exchange.

Uh we also have a gold futures but it is not denominated in dollar terms. It is denominated in INR terms, rupee terms. So let us say a trader who find who feels that this two there can be a you know some difference in prices of the futures contract trading a at Dubai gold exchange and Chicago mercantile exchange, he can buy and sell buy he can take futures in one exchange and take long futures and take short futures in other exchange and from the price differences he he can get some benefit.

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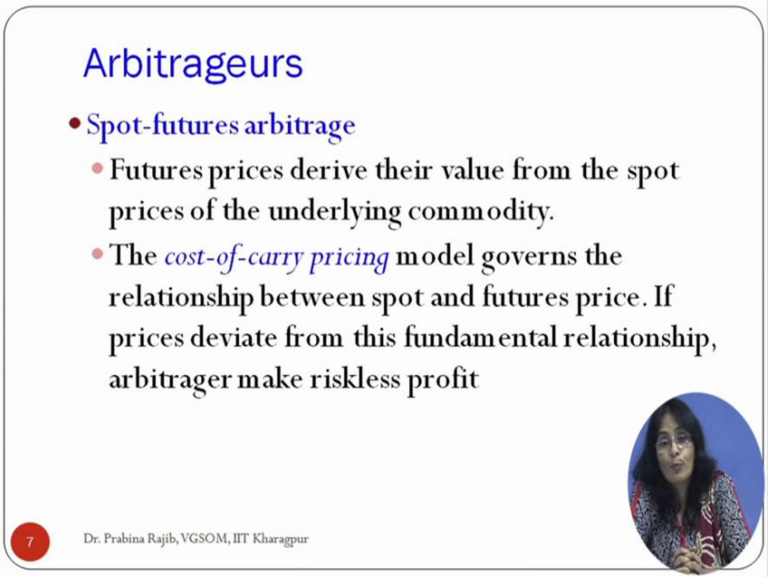

You can also have something called as spot futures arbitrage. So in case of a spot futures arbitrage, you will have the here I would like to mention that the spot and futures price move in tandem because future price derives its value from the spot price. So you cannot have spot price and futures price deviating from each other for a long period of time.

So if there is some mispricing has happened so arbitragers will be able to do cash and carry arbitrage or reverse cash and carry arbitrage. These two aspects will discuss in the next session. So the arbitragers will be able to take arbitrage benefit if spot and futures prices deviate from each other significantly. Now who is a speculator? Speculator has nothing to do with the underlying commodity.

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They take risk, they form a view about what is going to be the futures price and accordingly they take a buy or sell position, they take long futures position or short futures position. They do not deal with the underlying commodity in any manner. Like let us say if I today take a you know I start trading in commodity derivatives so I will be my trading will be treated as a speculator because I do not um I do not you know my day-to-day business does not require me to get exposed to price risk in a significant manner.

Of course my consumption of sugar per month is 3 to 4 kg and sugar prices increases and I will end up spending more. Yes, if I can go to the exchange and I can mitigate that risk you know I can take position of um futures contract on 3 to 4 kg of sugar then only I will be treated as a hedger otherwise if I enter into a futures contract on sugar, I will be treated as a speculator. Now question is do we need speculator?

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The answer to this question is yes, we need speculator because we can have some situation where we the speculator's presence is absolutely necessary. I will give two examples here. Suppose the commodity prices have fallen significantly and there are many consumers who would like to take long hedge position to lock in the lesser price.

They are very happy that prices has gone down and they are anticipating the price is going to go up, the consumer so they would be very happy to enter into a a futures contract to lock in a lock in this lesser price. But there may not be a counter party who is willing to take a position. No hedger is may be willing to take a position so you will have a speculator who is willing to take risk and be a counter party position to this you know long hedgers.

Similarly let us say commodity price has increased significantly. It has gone up very high and producer and sellers of the commodity would like to lock in this high price by entering into a short futures contract. At that point of time they may not get enough number of hedgers as counter party. So who fills in at this point of time? Speculators who are willing to take a risk for getting a benefit.

So in that case so that could be situation when you have you know the presence of speculator is mandatory or otherwise there will not much of a trading volume. There may be you know buy orders buy futures order sorry long futures orders must be coming or short futures or must be coming to the exchange platform but there may not be order matching may not happen because there are not enough counter party to you know take the other to take the counter party position.

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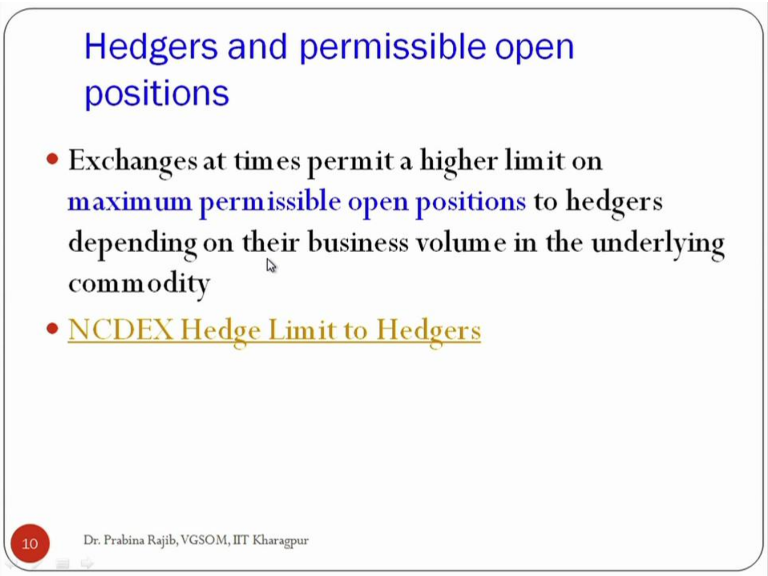

So this with this we come to an end of this session. So okay one thing I would like to also say here, exchanges at times permit or allow a longer larger amount of maximum permissible open position if they are hedger.

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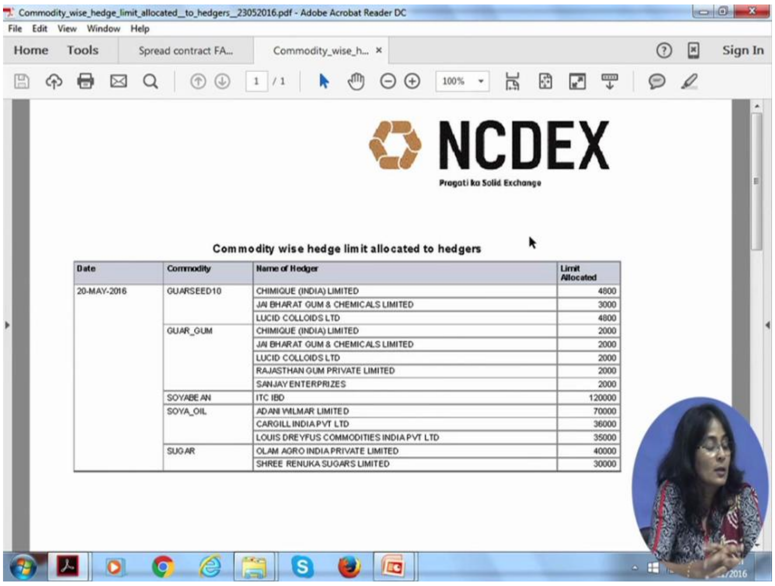

Commodity wise hedge limit allocated to hedgers

Date	Commodity	Name of Hedger	Limit Allocated
20-MAY-2016	GUARSEED10	CHIMIQUE (INDIA) LIMITED	4800
		JAI BHARAT GUM & CHEMICALS LIMITED	3000
		LUCID COLLOIDS LTD	4800
	GUAR_GUM	CHIMIQUE (INDIA) LIMITED	2000
		JAI BHARAT GUM & CHEMICALS LIMITED	2000
		LUCID COLLOIDS LTD	2000
		RAJASTHAN GUM PRIVATE LIMITED	2000
		SANJAY ENTERPRIZES	2000
	SOYABEAN	ITC IBD	120000
	SOYA_OIL	ADANI WILMAR LIMITED	70000
		CARGILL INDIA PVT LTD	36000
		LOUIS DREYFUS COMMODITIES INDIA PVT LTD	35000
	SUGAR	OLAM AGRO INDIA PRIVATE LIMITED	40000
		SHREE RENUKA SUGARS LIMITED	30000

So NCDEX, this particular slide so this link of NCDEX shows what are the um amount of limit allocated to different hedgers, so this is a report which is published on 20th May 2016. So this is for different if you can see Soyabean to ITC ABD so they have allowed you know 120 thousand tons of open positions can be taken by ITC at a given point of time. So with this we end up this session however last couple of session there are certain key takeaways.

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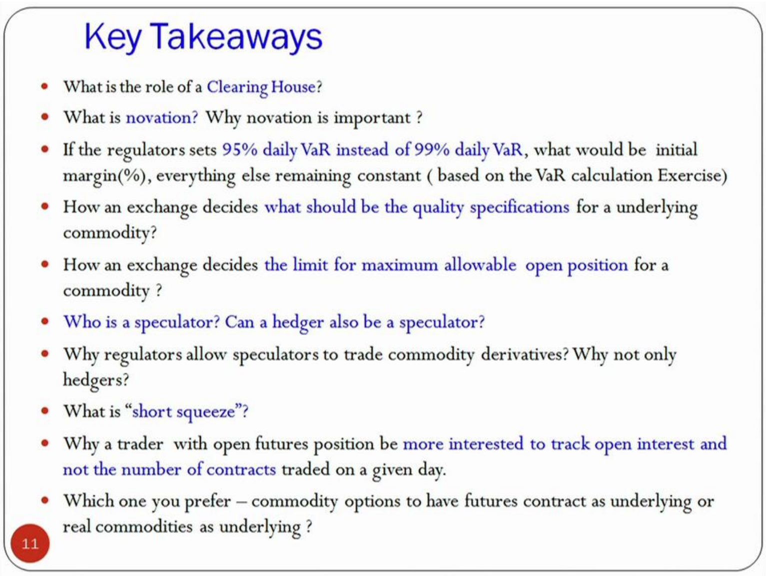

Its mentioned in this particular slide, so from these are the key take away from the last couple of sessions, so what is the role of a clearing house? What is innovation? How value at risk can be calculated and how an exchange decides what should be the quality specification for a underlying commodity? How exchanges decide the limit for maximum allowable open position? Who is a speculator? What is hot squeeze?

And also I am I am I am going to end this session with one question that is whether you would prefer commodity exchanges to have underlying commodity exchanges to offer contracts commodity option contracts to have futures contracts as underlying or commodities as underlying? So thank you all of you, looking forward to meeting you all, interacting with you all in the next session.