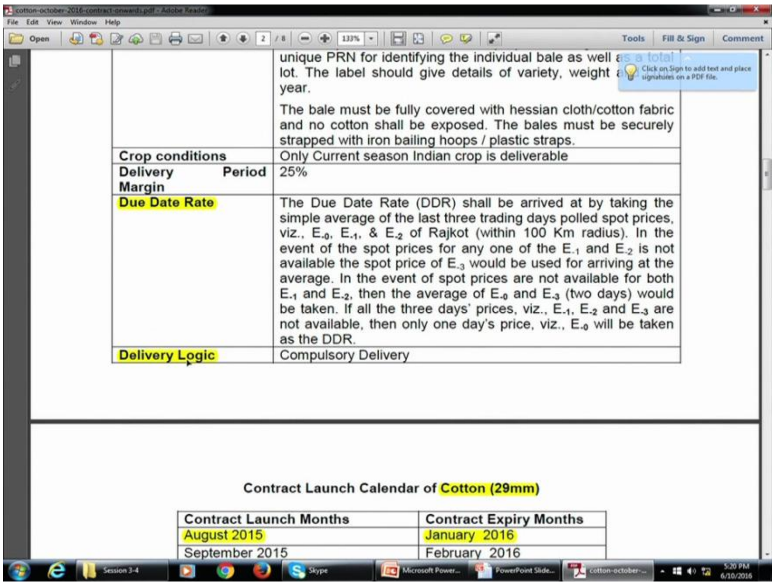
Commodity Derivatives and Risk Management
Professor Prabina Rajib
Vinod Gupta School of Management
Indian Institute of Technology Kharagpur
Lecture 4
Futures Contract Specifications (Continued)

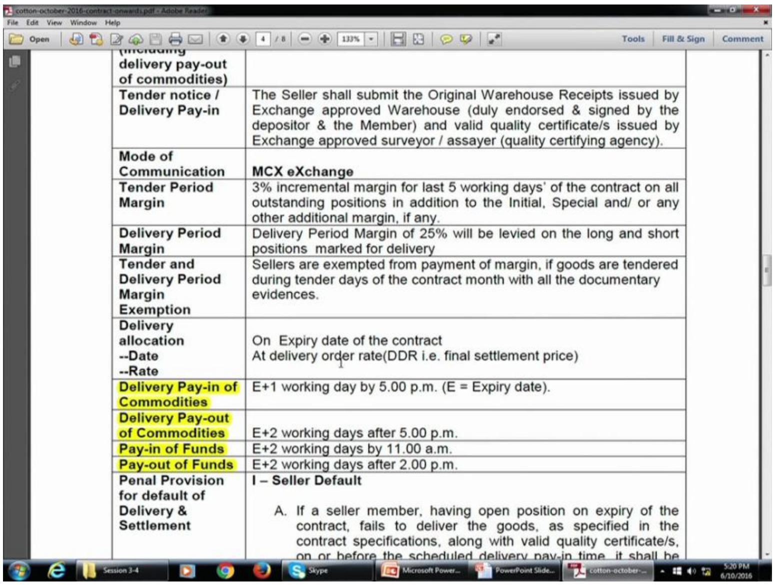
Welcome to the fourth session on Commodity Derivatives and Risk Management. In the previous session we discussed about the different aspect of futures contract specification and we will continue from the last session. Let us go to the MCX Cotton Futures contract which we started discussing in the session 3, so now let us go to the delivery and settlement.

(Refer Slide Time: 1:03)



Here I would like all of you to pay attention to the word delivery logic and compulsory delivery. So what exactly is this compulsory delivery or delivery logic, I will explain little later. Suppose let us say 29th of June 2016, the June contract comes to an end and on that day you have around 400 contracts open.

(Refer Slide Time: 1:42)



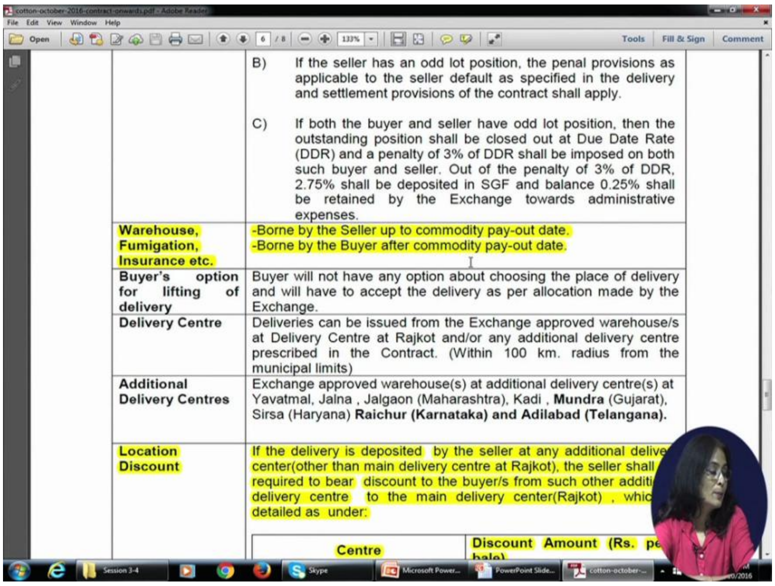
delivery pay-out of commodities)	
Tender notice / Delivery Pay-in	The Seller shall submit the Original Warehouse Receipts issued by Exchange approved Warehouse (duly endorsed & signed by the depositor & the Member) and valid quality certificate/s issued by Exchange approved surveyor / assayer (quality certifying agency).
Mode of Communication	MCX eXchange
Tender Period Margin	3% incremental margin for last 5 working days' of the contract on all outstanding positions in addition to the Initial, Special and/ or any other additional margin, if any.
Delivery Period Margin	Delivery Period Margin of 25% will be levied on the long and short positions marked for delivery
Tender and Delivery Period Margin Exemption	Sellers are exempted from payment of margin, if goods are tendered during tender days of the contract month with all the documentary evidences.
Delivery allocation --Date --Rate	On Expiry date of the contract At delivery order rate(DDR i.e. final settlement price)
Delivery Pay-in of Commodities	E+1 working day by 5.00 p.m. (E = Expiry date).
Delivery Pay-out of Commodities	E+2 working days after 5.00 p.m.
Pay-in of Funds	E+2 working days by 11.00 a.m.
Pay-out of Funds	E+2 working days after 2.00 p.m.
Penal Provision for default of Delivery & Settlement	I – Seller Default A. If a seller member, having open position on expiry of the contract, fails to deliver the goods, as specified in the contract specifications, along with valid quality certificate/s, on or before the scheduled delivery pay-in time, it shall be

That means 400 long futures contract or 400 short futures contracts are available to the available with different traders. So that means because the delivery is compulsory delivery so all long position holders will take delivery of the underlying goods and the short position holders will be delivering the underlying that it 400 contracts into 25 bales. So 400 into 25 so whatever that amounts comes to that will be 10,000 contracts will 10,000 bales of cotton will be delivered in the through the exchange platform. So how the delivery this particular this delivery pay-in delivery pay-out?

So E + 1 working day by 5 pm, so E stands for expiry, so delivery pay-in means the short futures position holder will provide the warehouse certificate to the exchange or to the clearing house by E + 1 that is Expiry + one working day and by 5 pm. So the short futures holders will provide the warehouse receipt which has been quality certified and as said as per the quality specification mentioned in the earlier part of the contract specification. Now delivery pay-out of the commodities that is the exchange will pay or transfer this warehouse receipts to the long futures position holder on E + 2 working day after 5 pm that is expiry + 2 days. Similarly pay-in of the funds that is the long position holder will be paying money to the exchange so they will be paying money by 11 am.

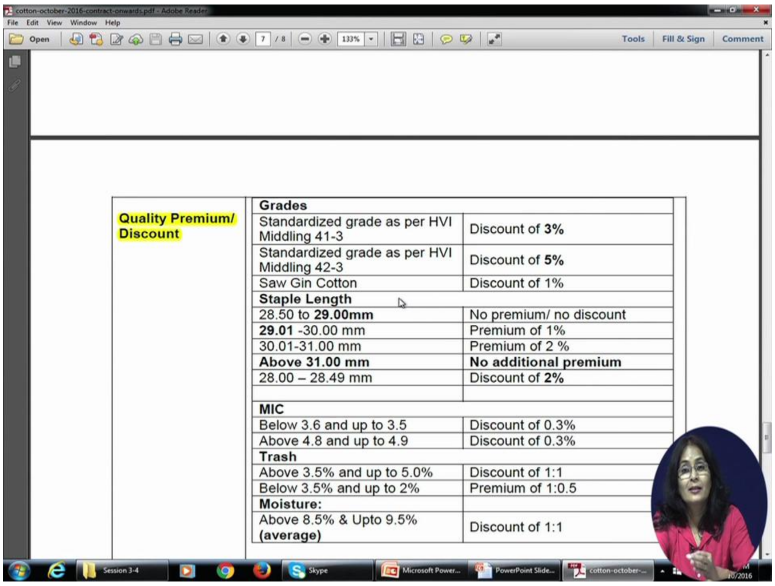
So E + 2 working day 11 am and pay-out of the funds will be that is the exchange will pay money to the short futures holder on E + 2 working day after 2 pm. So if you see the sequencing of these 4 things that is delivery pay-in, delivery pay-out, pay-in of funds and pay-out of funds, so the short futures holder will pay warehouse receipt first then only the exchange will transfer the money to its account. Similarly, long futures holder will first pay money to the exchange then only the exchange will transfer the warehouse receipt in their name. And this if seller defaults what will be the penal provision? If buyer defaults what will be the penal provision? The penalty will be charged by the clearing house. However the clearing house will abide by the counter party's payment on receipt through its settlement guarantee fund.

(Refer Slide Time: 5:19)



Now we have discussed already due date rate and the standardization of the contract also indicates who bears the warehousing expenses. So borne by the seller up to the commodity pay-out date and borne by the buyer of the commodity after the commodity pay-out date. Now the delivery can happen in additional delivery centre, now if the sellers instead of delivering at Rajkot if they would like to delivery or they have the goods already stored at exchange approved warehouses at locations which are other than Rajkot like let us say Yavatmal in Maharashtra or Mundra in Gujarat or Kadi in Gujarat or Jalgaon in Maharashtra all this, they they will be receiving lesser amount. They will not get the due date rate amount that is the spot price calculated on the contract expiry date. They will be getting a lesser amount so discount amount or bale.

(Refer Slide Time: 7:06)



Quality Premium/ Discount	**Grades**	
	Standardized grade as per HVI Middling 41-3	Discount of **3%**
	Standardized grade as per HVI Middling 42-3	Discount of **5%**
	Saw Gin Cotton	Discount of 1%
	Staple Length	
	28.50 to **29.00mm**	No premium/ no discount
	29.01 -30.00 mm	Premium of 1%
	30.01-31.00 mm	Premium of 2 %
	Above 31.00 mm	**No additional premium**
	28.00 – 28.49 mm	Discount of **2%**
	MIC	
	Below 3.6 and up to 3.5	Discount of 0.3%
	Above 4.8 and up to 4.9	Discount of 0.3%
	Trash	
	Above 3.5% and up to 5.0%	Discount of 1:1
	Below 3.5% and up to 2%	Premium of 1:0.5
	Moisture:	
	Above 8.5% & Upto 9.5% **(average)**	Discount of 1:1

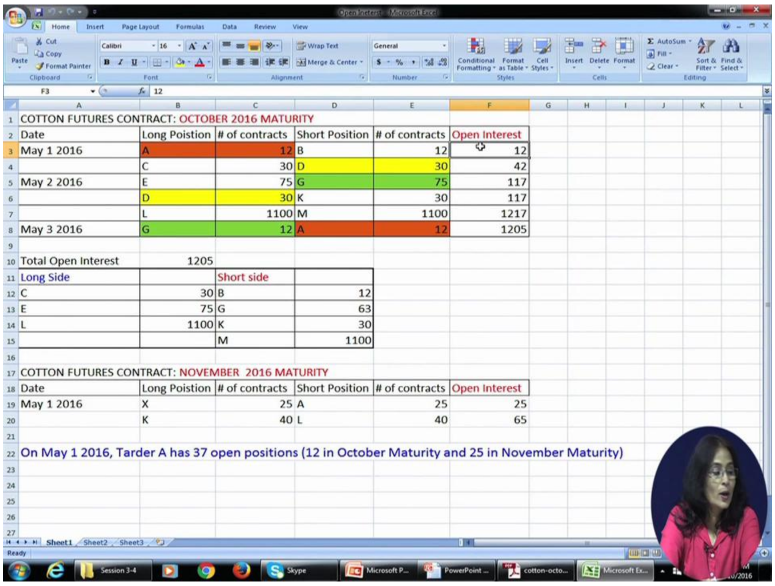
So they will be getting less amount because the buyer of the commodity is will be incurring certain expenses for transferring goods from the these warehouses to Rajkot warehouses, as if not necessarily the buyer will transfer the warehouses but actually the price negotiated is with respect to the as if delivery is going to happen at Rajkot. So if a seller short futures holder is delivering at any other exchange approved warehouses there will be a there will be a discount, he will not be getting the full amount. Similarly Quality Premium and Discount, many a times if the commodity underline has some quality variations but within the whatever has been mentioned as per the quality specification but some minor variations are there can be some premium or some discount associated with it.

(Refer Slide Time: 8:07)

So you have rest of the other things which are mentioned and this brings an end to our discussion on standardization of commodity futures contract. Now let us understand a little more on how open positions or open interest are calculated at exchanges. Let us say on 1st May 2016 let us say a trader wants to take a long futures position on 12 cotton contracts and who is the counter party? Counter party is a Trader B, of course Trader A would not know or there is no way of Trader A knowing who is the counter party so it is the anonymous or a exchanges provide anonymous or a matching system so you will know whether your order has been executed or not. But you will not get to know who is the counter party anyway you do not need to know because as per the notation you are the exchanges becomes a counter party to each and every trade which gets executed in a commodity exchange.

Now after this trade both A and B have 12 open positions, so A took long position in 12 futures contract, B took long short futures position in 12 contract so both parties now have 12 open positions for ok there is a mistake on my part. Please make it is not December 2016 contract, this is October 2016 contract. So now let us say on same day that is on 1st May 2016 on the same day suppose Trader C and do D took long and short futures positions in 30 contracts each. So C takes let us say long futures position on 30 contracts, D is taking as a counter party same 30 contracts, now open interest increases to 42. Now this particular let us say Cotton futures contract so on May 1 Trader A took long position on October 26 Cotton Futures contract October 2016 maturity contract for 12 contracts.

(Refer Slide Time: 10:01)



Who is the counter party? B and B also took the same 12 contracts so what is the open interest? Open Interest is 12. Similarly on the same day C takes long futures position on 30 contracts, D takes the long futures short futures position on 30 contracts so you have now open interest as 42 contracts. Now so these are the two contracts which got executed only on day 1 that is 1st May. May 2 you have E, sorry E took 75 contracts and G took 75 contracts so now open interest increases to 42 + 75 that is your 117.Now let us say on 2nd May, D who had earlier taken 30 short futures contract would like to square up its position. So when we are talking about the word square up means if you have taken long futures contract on a commodity underline for a specific maturity you can square up that particular position by taking a short futures position for the same number of contracts for the same underline and same maturity.

So let us say D would like to square up the position by taking 30 long futures contract for October 27 maturity on contract. So D took long futures contract and who is the counter party? K. So K is the now the new counter party so now if you see from the D's point of view D does not have any open position. D had initially taken 30 short futures and D squared up this by taking 30 long futures position. So what happened to our open interest? Open interest remains unchanged. Similarly 2nd May, you had L taken 1100 contracts and M taking suppose let us say 1100 contracts. So this is theoretical example we discussed that maybe as an individual client somebody cannot take more than 48 contracts at a given point of time.

Let us ignoring that fact, so let us say L took 1100 contract and M took 1100 L took 1100 long position and M took 1100 long position. So what happened to the available open interest so that is 1270. Now on May 3rd suppose G which had earlier interested to take earlier had taken short position would like to square up its position but not fully, but partly. Let us say G would like to square up position12 contracts and who is the counter party? Like G, A is also interested position so A had earlier taken long futures contract. It will be able to square up its position by taking short futures contract, so what happens to the open interest at that point of time? Open interest is 1205.

So how exactly this 1205 is calculated? 1205 indicates the available number of long futures or short futures contract available to be squared off before maturity. As on that date these many contracts are available to be squared off. So we have to calculate either the long side long future side or the short futures side, not both. So let us say on this date May 3rd so the exchange will report how many open interest available. Open interest available is 1205, so how this 1205 has been calculated? C has 30 long futures, E has 75 long futures, L has 1100 long futures. So sum total of it is coming to 1200 or if you consider from the short side short futures side B has 12 contracts, G has 63 contracts, K has 30 contracts and M has 11 contracts.

Please note that the number of traders need not necessarily be same. However the number of open positions for the either from the long side or the short side has to be same. You can have a different numbers of traders but you can have but you have to have the same number of long futures or short futures position. Now so let us say for a specific trader let us say the same trader which suppose on May 1 X took long position on 25 contracts and trader A took short position in 25 contracts so please ignore this. This is not the same A is not here so you are another or it could be the same it could be the same trader so A had taken 12 contracts on May uhhh1uh long futures position on October 27 contracts 12 units and on the same day A also took 25 short futures contract for November 2016 maturity.

So that means on May 1st trader A has 35 open positions, 12 for October maturity and 25 in November maturity. So combining both October and November contract A has 37 open contracts 37 open positions so out of which 12 is for October maturity and 25 is for November maturity. Now how do then we summarize how open interest gets calculated? When 2 new traders enter into positions, open interest increases, When one existing trader squares up with another existing squares up with another new trader, open interest remains unchanged. When 2 existing traders starts squaring up with each other, open interest goes down.

(Refer Slide Time: 17:03)

As I mentioned, squaring up means closing an open position and long futures position can be squared up by taking short futures position for the same contract and the same maturity. And as you recall in the previous session we discussed that exchanges limit the amount of open interest a client can have can have at a given point of time. So exchanges limit the open position for a trader or trading member so that no trader has a power to manipulate the market. So at times in fact this something interesting I thought of sharing with you all. At times traders take long futures position in that is in the futures market they take long position and simultaneously they take long position in the cash market.

That means they start buying and acquiring the physical underline. So they now have a long futures position and they own the asset underlying asset. And when they are owing the underlying assets specifically in a situation where you do not have more of the underlying available in the market that is in a situation of a supply constraint, they acquire the cash they pick position in the cash market, they buy the underlying, put it in warehouses or go-downs and do not release them into the market and simultaneously take long position and when the contract approaches the maturity if they keep the if they would like to take delivery that means the short position short futures position holders have to buy underlying from somewhere and give it to the exchange as part of the delivery.

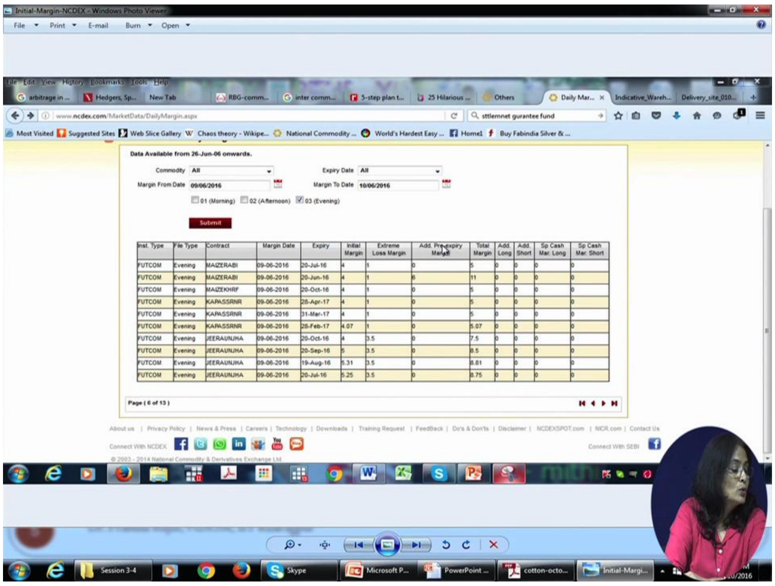
So anyway this long position holders by that time has already cornered the market and cornered the physical market means they are now owing the underlying assets and there is not much of underlying asset available in the spot market, so what happens? Price rise happens in the spot market. This is typically called as squeezing the shorts or cornering of the market and that leads to many a times an unusual increase in the spot price. So that is the reason why many a times futures trading has been blamed for access price rise in the underlying commodities. Now as we discussed that clearing houses charge different types of margin, in this session will discuss how what are the different types of margin are charged by the or levied by the exchanges and how some of the margins gets calculated.

(Refer Slide Time: 19:36)

Not margins get calculated, how the margin rates get calculated. Exchanges require traders to pay different types of margin so one of the cotton contract if you recall has 4% as the margin and I also mentioned that both long and short futures position holder whenever a trader takes a his order gets executed, he has to he or she has to give the initial margin. So how the initial margin? So suppose this margin percent is 4 as per the further cotton contract it was 4%, number of contract let us say in our case the trader A took 12 contracts and price per contract, so whatever price he the rate at which is ordered the price at which is ordered got executed so multiplication of this 3 will give the initial margin.

So and who collect the initial margin? Clearing house collects the margin from the trading member on behalf of the trader in the form of cash, fixed deposit and bank guarantee. So as I mentioned if I am a client or whether I pay margin or do not pay margin that is a clearing house does not worry about it. If I have a trading account with let us say ICICI Direct or Kotak Securities these 2 bodies are answerable to the clearing house for depositing the margin money on my behalf. So it becomes the responsibility of these brokers or trading members to collect the margin from me and deposit. If somehow they are not been able to collect the margin or they are to increase the trading volume they are giving me some benefit of collecting less margin from me then they have to give whatever the margin required on my behalf.

(Refer Slide Time: 21:57)



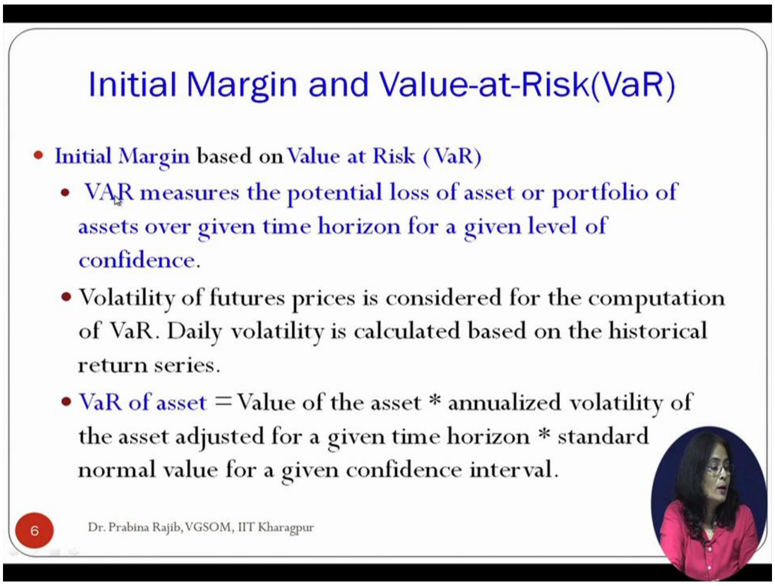
Now let us see does initial margin vary from commodity to commodity. This particular screen short, which I have taken National Commodity Derivative Exchange Website, this source if you focus on little bit this particular, so 6th column source the initial margin levied by the NCDEX. So you have the maize for maize which is maize rabi for a contract which is maturing on 26th July and which is the spot date so this is the information which is available, I collected from the on 9th June 2016 the 20th July contract had 4% margin. Similarly for all maize rabi has 4%, maize kharif has 4%, kapas has 4% but let us say interestingly let us say jeera, jeeraunjha that is jeeraunjha means the jeera to be delivered at the Unjha market.

So jeeraunjha which is maturing on 28th October that has 4%, Jeeraunjha which is maturing on 20th September has got 5% as initial margin. August contract has 5.31%, July contract has 5.25%. And so it is very very clearly visible that initial margin varies across commodities and also initial margin can vary for the same commodity for but for different maturity. Besides the initial margin there are other margins like Extreme loss margin, pre-expiry margin or delivery margin and there are other margins additional short, long and special margin, all these are there so let us go to un understand how exactly initial margin gets initial margin percentage gets calculated by the exchange. What is the basis on which exchange announce that the initial margin is going to be? 4%, 5%, 6%, whatever that maybe.

(Refer Slide Time: 24:12)

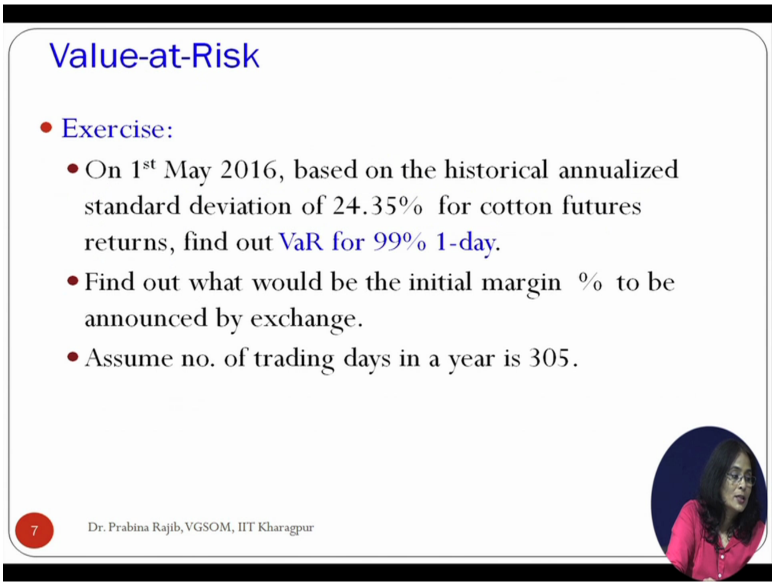
Initial margins are based on value at risk methodology. So maybe any of you as part of your financial derivative, you may have read what the value at risk methodology is. I will be briefly taking you through what is the value at risk methodology and how VaR methodology is calculated or used for calculating the initial margin.

(Refer Slide Time: 24:32)



Let us say what is the value at risk again there is a mistake on my part. Value at risk is always had a small 'a', it is a capital A here. So VaR measures the potential loss of a asset or portfolio of assets over given time horizon for a given level of confidence. Now how exactly Value at Risk is calculated for a futures contract? So volatility of futures prices is considered for the computation of VaR, so daily volatility is calculated based on the historical return series. So the exchange takes cognizant of the futures prices from the futures prices, daily futures prices it calculates the daily return series or volatility annualized volatility and how exactly the value at risk of the asset is calculated.

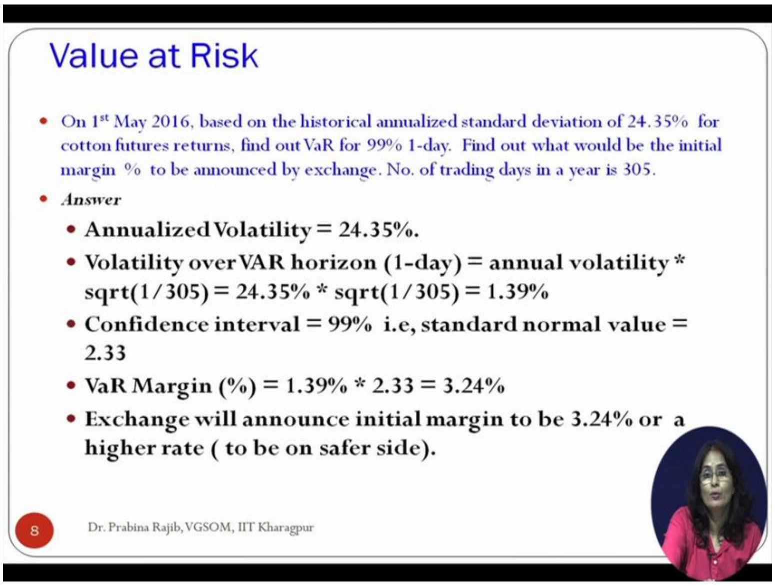
(Refer Slide Time: 25:44)



Value at risk of the asset is calculated value of the asset into annualized volatility of the asset adjusted for a given time horizon into standard normal value for a given confidence interval. So let us take an example how exactly it will be calculated. Let us say on 1st May 2016 based on the historical annualize standard deviation for cotton futures analysis of annualize standard price of cotton futures indicates that the volatility is 24.35% and we need to calculate the VaR for one day VaR for 99%.

So how do we go about it? And here my assumption is that the exchange operates Monday to Saturday that is 6 days a 6 days a week, so that is the reason why I have taken number of trading days as 305. If in India now we have exchanges operating from Monday to Friday that is 5 days a week so this number will be reduced to 252. Now with let us say assumption of 252 trading days, with the assumption of 305 trading days let us find out what is going to be the 99% 1 day VaR for a commodity whose the futures annualize volatility based on the futures price is for 24.35%.

(Refer Slide Time: 27:21)

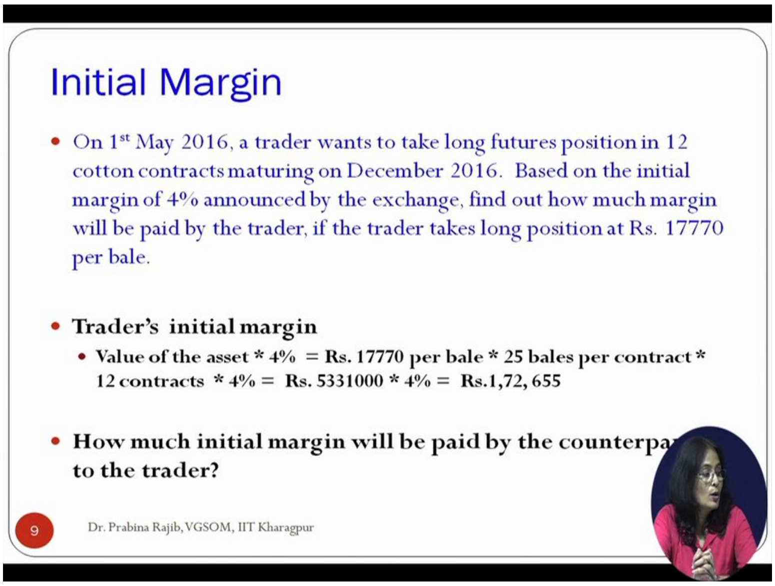


Now this is the calculation, so annualized volatility is 24.35%, I am sure all of how to calculate annualized volatility. You can download the futures price in a from the exchange website and find out the continuous compounding return that is LN PT by PT - ,1so today's price by yesterday's price. Natural logarithm of that will give you continuously compounded daily return and you can find out the standard deviation of that series and multiply it by square root of 252, square root of 252 is going to give you the annualized return volatility.

So volatility so you have annualized volatility of 24.35%, volatility over the VaR horizon that is 1 day, annualized volatility into square root of 1 by 305. As I mentioned that I had I have assumed that the exchanges operate from Monday to Saturday that is 6 days a week that is the reason why I have taken 305 as my number of trading days. So that comes to so volatility over 1 day is 1.39% when my annualized volatility is 24.35%. So I require my confidence interval is 99% so that means the corresponding standard normal value is 2.33. And what is the important assumption here that the futures rate price futures returns follow a normal distribution.

So that is a very important assumption we are making here, so based on that we are finding out the 99% confidence sorry the standard normal value for 99% confidence interval. So you have so that comes to 2.33, so now you have we have a VaR margin will be 1.39% into 2.33 that comes to 3.24%. So the exchange can announce the initial margin to be 3.24% or rate higher maybe 3.5% over depending upon how much margin of safety the exchange would like to keep with itself.

(Refer Slide Time: 30:00)



Now let us say on 1^{st} May 2016 a trader wants to take long futures position in 12 cotton contracts maturing on December 2016. Based on the initial margin of 4% announced by the exchange, find out how much margin will be paid by the trader if the trader takes long position at rupees 17770 per bale. So that is one bale of cotton has 170 k 170 kg, so trader's initial margin will be the long position holder's initial margin is going to be 17770 per bale into 25 bales per contract into 12 contracts. It took long position in 12 contracts into 4% so that comes to 1, 72,655 rupees. So the trading the broker of the trader is supposed to deposit has to deposit a initial margin of 1, 72,655 rupees to the clearing house.

Now my next question to you all is that how much initial margin will be paid by the counter party to the trader? So the trader who took long futures position somebody else must have taken a short futures position. The answer to this question is the same that is the trader is the counter party is also going to deposit 1, 72,655 rupees because the initial margin has to be paid by both long futures position and the short futures position. And whenever a party completely squares out, let us say this particular trader who took long futures position 12 long futures position on 1^{st} May would like to square up on or squares up the contract on let us say 7^{th} May 2016, then on the same day he will be able to get back the initial margin what he had paid earlier. So this so whenever traders square up their position whatever initial margin they have deposited, they get back from the clearing house.

(Refer Slide Time: 32:35)

So let me summarize what we discussed in session 4. In the session 4, we discussed different aspects of delivery, settlement and delivery procedure. We discussed about how exchanges ask for premium or discount depending upon the quality variation or in additional delivery centre if the buyer if the seller is delivering goods in a centre which is not the basis centre mentioned in the commodity contract specification. The exchange asks the seller exchange ask the buyers to pay little less than the due date rate or the final spot price arrived. And we also discussed how initial margin based on value at risk is calculated besides value at risk initial margin. We also discussed mm very briefly about the extreme loss margin and additional margin and special margin as delivery period margin.

Uh even if without going much into understanding of how each and every margin gets calculated, the basis of the most important understanding we must have this point of time is that the exchanges levy this different types of margins so that a counter party who is who is incurring loss he we exchanges do not allow the loss to be inflated to a greater extent. So as and when a party is incurring loss because of the movement of the spot market or the future futures market prices, they ask as and when whatever loss is happening that should be contributed by the loss making party so that the loss should not become too big to manage at a given point of time.

So this at this point of time I would like to wind up the session 4 here. Will in the session 5 we will continue to discuss how mark to market margin is we will discuss how mark to market margin is calculated and other aspects of the product contract specification Thank you all of you.