Commodity Derivatives and Risk Management

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Lecture 02

Commodity Spot Market & Different types of Auctions

Good afternoon all of you and welcome to Commodity Derivatives and Risk Management. And this is session 2 or lecture 2. And today we are going to discuss different aspects of commodities spot market and different types of auction mechanisms used in this commodity spot market. Now let us understand what we mean by commodity spot market. So, a commodity spot market is a market where buyers and sellers exchange goods for immediate delivery. In contrast to the commodity spot market, we have commodity exchanges which offer derivative contracts on commodities such as futures options and swaps.

Now coming back to the spot market is very widely dispersed. There is no specific location or a place where we can say that this is the spot market. For example, someone buying 2 kgs of potato from our friendly neighborhood shop is also an example of a spot market transaction. A farmer selling 250 quintals of potato to a wholesaler in a Mandi or a wholesale market is also an example of a spot market transaction.

Similarly, with online trading facilities many wholesale markets are shifting to online platforms. However, even though the trading is happening, or order matching or buyer sellers' interest are matching through online mechanisms these are examples of spot exchanges or markets. In the right-side panel, I have given one typical example of a spot market or a wholesale market related to wheat and this particular image I have sourced from the India Today magazine and the source information is given here. In this context I would also like to take all of you through to a new initiative of Government of India which is e-national agricultural market which is an example of a spot market. So, this particular slide shows the different kinds of trades which are currently being done at the e-NAM or e-national agricultural market and as you can see that this particular the slide indicates the wholesale market belonging to which state and which location APMC stands for your agricultural produce market committee or local Mandis and what kind of commodities are getting traded, what is the minimum price at which these commodities have been traded, maximum price, the model price and how many commodities has been arrived in that particular market and how many commodities have been traded and on which date the commodity has been traded.

So, in this context let me take you to the actual website. So, this is the website of e-NAM which lists the different kinds of commodities which are being traded at different APMCs or local Mondays. So, this is a toggle switch, you can just play around and check what are the different kinds of Agri commodities which are getting traded in different exchanges. For example, in Andhra Pradesh on 8th May 2023, you have different APMCs, different commodities, minimum, maximum, model price, how many how much of commodity has arrived, how much commodity has been traded and what is the unit specification for each commodity is very very clearly available. So, this is an example of a spot market.

However, this is the online spot market where the buyer and sellers are not physically interacting with each other, they are interacting with through an online platform and buying selling is happening. This is a typical process flow of e-NAM. It starts with a buyer or a seller or a seller of Agri commodity getting themselves registered in the e-NAM platform and once they register themselves the sampling and assaying of the commodity whatever the underlying commodity, they want to sell that is done at the online platform and once that is done then the auction process starts. So, the seller wants to sell the commodity to whom it will sell that and at what price it is going to sell that will be arrived through a auction mechanism and once the auction is completed the buyer and seller order matching is done rest of the post order processing activities such as weighing, invoicing and online payment and rest of the activities are initiated. So, to summarize an electronic spot exchange is basically an e-auction platform and what is spot market or spot exchange does that a seller solicits bids from the buyers to sell the underlying commodity to the highest buyer or a buyer who solicits bids from the seller to buy the commodity to buy the underlying commodity from the lowest bidder.

Let me give an example of the Food Corporation of India. Food Corporation of India regularly undertakes spot market transactions through an initiative called open market sell scheme. Basically, all of us we know that the Food Corporation of India buys significant quantities of wheat and rice from farmers of India at a minimum support price which is normally announced by the Government of India long before the farmers produce the wheat and rice. And when the Food Corporation of India buys a wheat and rice which is significantly more than what Government of India requires Food Corporation of India initiates an auction process or process to sell this excess wheat and rice through an initiative called open market sell scheme. So, this is again a snapshot of the wheat auction done by FCI there is a auction platform which is value junction dot in ,that particular website through which Food Corporation of India initiates the auction.

And as you can see the date and time of the e-auction date and time of the close of the e-auction and at which Food Corporation of India go down the from which Food Corporation of India go down the which will be sold and here the commodity with be mentioned the for quantity is also mentioned and also if you can see that there is reserve price is mentioned. That means, Food Corporation of India does not want to sell wheat any at an any price lesser than this. So, in this context let us understand what the different types of auctions initiated by different spot exchanges all over the world. In an auction can be you know two types one is your forward auction and the other one is a reverse auction. So, the forward auction is an auction where the seller solicits bids from the buyer and is interested to sell the underlying commodity to the highest bidder which we call it as a H 1.

H 1 is the price which is been given by or bid by the party which is the highest bidder. Similarly, a reverse auction is a process in which a buyer solicits bids from the seller and buys the underlying commodity from the lowest bidder or the L 1. So, again different types of auctions under the different types of auctions of forward and reverse auction. Your price arrival process can be based on English auction, or it can be a Dutch auction, it can be first price sealed bid auction, you can have a second price sealed bid auction or Vickrey auction and you can also have a swiss challenge auction. Similarly, if a particular buyer or seller is interested to buy or sell many units it can initiate an auction where it can be a single or uniform price auction or it could be a multiple price auction.

Now, let us understand what the differences among these types of auctions are. Let us start with the forward auction where the seller is interested in selling a particular unit. So, this slide shows the different types of auctions undertaken by auctioneers for selling a single unit and the first type of auction is known as an English auction. So, in this auction seller initiates the auction for selling an item different buyers bid the item in an open outcry manner. So, what is the meaning of open outcry? Open outcry means all bidders will be coming to a specific location a specific physical location and bidders will be sitting in front of the item which is being bought which is being sold and bidders will be bidding and every bidder price will be in will be available to the every other bidder.

So, if I am bidding a one price whoever are other bidders will be also be able to see or hear the price that is the meaning of the open outcry system and successive higher price is quoted by the bidder. Suppose if I am participating in a bidding process and I want to buy a particular item if I am quoting 10 rupees maybe the next bidder may quote 15 rupees and so on and so forth and finally, the highest bidder buys the item and this type of auction is commonly used for selling art, antique pieces, jewellery pieces etcetera. Now coming to the next type of auction which is the Dutch auction in this Dutch auction the seller initiates the auction for the selling the item because it is a forward auction, and the bidding starts at a very high price and the bidder, or the seller displays the price here the buyers do not actually quote the price or do not explicitly mention the price. The seller gives a very high price which is displayed in a particular screen or a location and the seller itself progressively lowers the price until a buyer is willing to buy the commodity and this type of you know this is an example of descending price auction and this is also known as the clock auction and is a very very famous example of this Dutch auction is undertaken in Netherlands to auction the flowers. In Zambia they also use this auction to sell fish.

So, the website or YouTube link I have given it is a beautiful website with beautiful YouTube video which indicates how the Dutch auction is done for selling flowers. Now coming to the third auction which is a Japanese auction again it is this you know forward auction. So, the seller initiates the auction for selling the item. The seller sets a minimum reserve price which is usually a very low price or even at times it may start at 0 and the displayed price increases progressively, and a prospective buyer exits the auction if the price is high. The auction stops when there is only one buyer who finally ends up buying you know commodity at the prevailing price.

Now let me take you to the you know next set of auction mechanism that is your first price sealed bid auction. So, in case of a first price sealed bid auction, the seller initiates the auction and buyers bid the item and every buyer gives the price in a sealed bid and the price quotation given by every buyer is not known to each other it is hidden from all other bidders and once the auction closes the seller the bidder opens the envelope or opens the seals and whoever is the highest bidder, he buys the item and pays the H1 price. Now coming to another variant of this sealed bid auction which is is known as your second-price sealed bid auction. In this second price sealed bid auction the seller initiates the auction and buyers bid for the item. The bids of the buyers are sealed and not known to all and thus hidden from all other you know bidders except the seller.

In fact, it is the same the process is exactly like the first price sealed bid auction, but once the bids are opened the highest bidder buys the item the highest bidder buys the item, but pays the second highest bid price which is your H2. So, this bidding is also known as the Vickrey auction. So, I thought of you know doing a small little diagram. So, understanding this auction process becomes easier because they say that a picture says a thousand words So, let us understand the English auction. Let us say a particular piece of painting is being auctioned to be sold and it is an English auction and the forward auction the seller is initiating the auction price and the seller may keep a reserve price here.

Let us say the seller has kept a reserve price of 30 rupees and once the auction starts let us say the third person bids a price of 50. Once the third person bids a price of 50 maybe the first person bids a price of 100, the next person bids a price of 200, the next person bids a price of 300 and so on and so forth. This process goes on finally, and the highest bidder gets to buy the piece of the painting. So, this is an example of an English forward auction. Now, let us go to the Dutch auction.

So, here the seller initiates the auction and seller starts at a very high price. Let us focus on the first circle which is the first clock. Let us say the seller starts at a price of 100 rupees. The seller wants to sell the underlying commodity or underlying asset at a price of 100 rupees. You can see that there are 4 bidders, but none of them have raised their hands because they do not want to buy the item at 100 rupees.

Now the clock starts ticking and from 100 rupees suppose the clock moves to 90 rupees still there are no takers for it. Now from 90 rupees when the clock comes to 80 rupees you can see the second bidder has raised his or her hand and with this process the auctions come to an end the second person buys the underlying asset by paying 80 rupees. So, this is an example of a Dutch auction. Now coming to the third auction which is your Japanese auction again it is a forward auction where the seller has initiated the auction. Please note that at the start of the auction the seller starts at a very low price.

That is let us say the seller wants to sell the item for 10 rupees and you can see there are all the price is so low that every member whoever is being part of that the particular auction process they are happy to buy it at 10 rupees. After that let us say the seller increases the price to 20 rupees the moment the seller increases the price to 20 rupees, one of the prospective buyers feels that 20 rupees is too high, and he or she leaves the auction process. Similarly, when the price goes up to 30 another person leaves and when the price goes up to 40 only the last man or woman standing is available and he or she buys the item by paying 40 rupees. So, this is an example of a Japanese forward auction mechanism. Now let us come to the first price-sealed bid auction process.

Let us say a particular seller wants to sell an item and he has solicited bid as you can see there are three bidders A, B, and C are giving three envelopes with the price written 45 70 50 written to the seller and the seller receives these envelopes at a given point in time it opens all these three envelopes and sees who is the person who has given the highest bid. So, it is Mr B who has bided for the highest price and is willing to pay 70 rupees. Hence the seller sells the item to Mr B and collects 70 rupees from Mr B. So, this is an example of a first price sealed bid auction mechanism. Now let us come to the next type of auction mechanism which is your second price sealed bid auction mechanism.

Here we have five bidders A, B, C, D and E and the seller wants to sell an item and different bidders are again providing their bids in a sealed envelope and the seller opens all these envelopes at a given point in time and gets to see the price bids and the person the seller obviously, would be interested to sell the commodity or the underlying asset to the highest bidder, but in this case the seller does not collect 58 rupees, but it collects 52 rupees, but it sells the item to party C. C is the highest bidder, but it ends up paying the price which is quoted by the second highest bidder. So, this is an example of a second price sealed bid forward auction. Similarly, in the reverse auction space that is where the buyer is initiating the auction the same process is done you have a Dutch auction, you have a Japanese reverse auction, you have first price sealed bid reverse auction, you have second price sealed bid reverse auction. So, I will not be going into the nitty gritty of these details, this particular the slide is self-explanatory, and all details related to the auction process are mentioned here.

Now coming to the auction process where the auctioneer wants to sell many units hence it is known as a multi unit forward auction. The forward auction means as I have already informed or already mentioned forward auction is always initiated by the seller. So, if the seller wants to sell many units the seller can use a single uniform price auction, or it can undertake an auction which is a multiple-price auction. So, the seller has many uniform units to sell, it solicits bids from the buyers. So, the buyer will be giving how many units they would like to buy at what price and once the bid closes the seller sorts the bids received from the buyers,all these bids it sorts in ascending order that is from highest to lowest and the price at which all units can be sold becomes the uniform price and all buyers pay the same price.

Similarly, in the case of a multiple-price auction the seller has many uniform units to sell and the seller solicits bids from the buyers and the buyers give both units and the price of how many units they want to buy at what price and the seller goes on allocating the units from the highest bidder to the lowest bidder. And what is different between this multiple price auction and single uniform price auction is that in case of a single uniform price auction all buyers pay the same price in the case of a multiple-price auction different buyers end up paying different price. So, now let us discuss in detail the process of the multi-unit forward auction and in the case of a multi-unit forward auction the seller wants to sell many uniform units, here in this picture as you can see the seller wants to sell 1000 lumber pieces or 1000 wooden pieces and it solicits bids from different buyers and this particular table shows different buyers bidding the number of units they would like to buy at whatever price. So, different buyers are competing with each other, and they would be you know they would be giving the number of units they would be buying and the price at which they will be buying. And the seller who is started the auction process will receive these bids and once it receives the bids and it opens the bid it will start the process of identifying to which buyer it will be selling these lumber pieces.

Now, to do so, it will create a total demand schedule. So, what do we mean by total demand schedule? Please note that it will start from the highest price because it will be very happy to sell these units to the highest bidder. So, in this total demand schedule it will create a demand schedule where the price per unit which is the highest price have the 150 units demanded. The next price, that is your 375 total number of units demanded is 500, but when we are preparing the total demand schedule it will be cumulative demand schedule which is your 650. And what is the rationale for doing so, that if somebody is willing to buy it at 400 that same person will be very happy to buy it at 375 rupees.

So, this process will go on till we prepare the total demand schedule for all bidders. In this case it is coming to a total 1820 units have been demanded at the lowest price of 310, but the seller wants to sell only 1000 lumber pieces. So, what will be the uniform price it will be charging from all buyers? That is 340 rupees. So, once these 340 rupees arrived so, any bidder who has bid a price which is greater than or equal to 340 will be able to buy this wooden boards from the seller.

So, now, how the process will go on. let us identify who are the bidders who have bid a price which is higher than your 340. So, you have 375 bidder A, you have bidder B, you have bidder C and bidder D all these 4 you know people have bided at a price that is greater than or equal to 340. And bidder E and Bidder F have bided at a low price. So, the seller would not be interested in selling the wooden boards to these 2 bidders. Now, coming back to how many units it will be selling to which bidder and when every bidder is paying the same price.

So, the number of units will be decided on a pro-rata basis. So, what is the meaning of pro-rata basis? So, the number of units demanded at a price of 340 is 1150, but the company wants to sell only 1000 units. So, accordingly if a bidder has bided 500 units at a price that is more than 340, the bidder will be buying units at 340, but he or she will not be able to buy it by the 500 units, he will be able to buy it at 500 into 1000 divided by 1150 units. So, going by that logic buyer A will be buying 435, buyer B will be buying 174 units, buyer C will be buying 130 units and buyer D will be buying 261 units and the total units sold will be 1000 units at a price of 340. So, this is an example of a multi-unit forward auction.

With this, we will come to an end of session 2 and we will be continuing with this auction process in the next session. Thank you all of you.