Commodity Derivatives and Risk Management
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Lecture 20
Commodity Swaps

Welcome to lecture 20 on Commodity Derivatives and Risk Management. Please recall in the previous session we had discussed commodity swaps. Now, let us revisit what we discussed briefly and continue with the remaining part of the commodity swaps. Now, commodity swaps are a mechanism through which commodity producers, consumers, value chain partners can mitigate the price risk. In the last couple of sessions or last quite a few sessions we have discussed that consumers, producers and value chain partners use futures and futures and forward contracts to mitigate the price risk. In addition to the forward and futures contract, commodity swaps are another form of mechanism or another mechanism through which parties who are exposed to commodity price risk can mitigate the risk.

And commodity swaps are bilateral contracts, and they are signed or agreed between two parties without involving any exchange in between. And this bilateral contract involves the exchange of payment between two parties and one party pays a fixed amount and the other party or the counterparty pays a floating or a variable amount. And a swap is a derivative contract and like any derivative contract you have a buyer of a contract as well as a seller of a contract. Now who takes a or who is a buyer of a swap contract, the party which pays the fixed amount that party is the buyer of the swap.

Similarly, who is the counterparty that is the seller, seller of the swap always pays the floating or a variable amount. Now let us take some examples to understand what do we mean by a fixed amount and a variable amount. Let us go to the wheat farmer's example, please note that the wheat farmer is planning to sell, let us say 170 quintals of wheat after 20 days and in a Mandi in Madhya Pradesh. And the farmer is fearing that the price is going to decline within these 20 days. So, it enters into a swap contract with a counterparty, normally a counterparty is a bank or financial institution.

So, what both parties agrees on day 0 and in our case that is 20th May 2023. So, on this day 0 farmer agrees to receive fixed amount of let us say 1800 rupees of quintal from the bank or financial institution. And that is going to be all this payment and receipt is going to be happening on 20th day from the day 0 agreement. Similarly, the farmer will also be paying a floating price and what is that floating price? The price is going to be the Mandi price which is going to be prevailing on the 20th day that is your 9th June 2023. So,

farmers will be paying a floating price to the bank or financial institution and farmers will receive 1800 rupees a quintal from the bank or financial institution.

Now let us move to the 9th of June 2023 which is the contract you know contract final date. So let us see what will happen on this date. On this date, Mandi price may be higher than 1800 rupees or lesser than 1800 rupees. If the Mandi price is higher than 1800 rupees let us say the price is at 1835 a quintal. If that happens the farmer will be selling wheat at 1835 rupees a quintal in the Monday price.

And simultaneously farmers will be paying 35 rupees a quintal to the financial institution. In the other case let us say in the Monday price which is your 1760. So, farmers will be selling wheat at 1760 and it will receive a net of 40 rupees from the financial institution. As you can see irrespective of what happens to the Mandi price on 9th June 2023, farmer is going to be getting a total receipt of 1800 rupees and hence farmer is not exposed to any commodity price risk or a wheat price risk. Let us go to this you know right side block which shows the contract specification related to the swap and trade date.

A trade date is the date on which both parties will be entering into a contract. So that is your 20th May 2023 the commodity is wheat quantity is 170 quintals. Please note that the quantity also has to be mentioned in the commodity contract. And who is the seller in this case? The seller is the party who pays the floating rate. So, farmers are paying the floating rate.

So, farmer is the seller of the swap, and the bank or financial institution is paying the fixed rate. Hence it is the buyer of the swap. And what is the fixed price negotiated on day 0 or 20th May 2023 that is your 1800 rupees quintal and reference date. Reference date is the date on which the floating price is going to be determined. So, 9th June 2023 price, Mandi price of wheat on 9th June 2023 will be compared with 800 rupees to decide whether farmer will pay money to the bank or bank will pay money to the farmer.

And settlement and payment date are the actual date on which both parties will be actually transferring the money. Not exactly both parties the party who is supposed to pay the money to the counterparty that party will be paying money to the other party. So, this is a typical example of a commodity swap. Now let us go to another type of commodity swap. Let us say a wheat farmer in India who buys fertilizer let us say it want to buy fertilizer for 500 kgs after 45 days.

And of course, the farmer will be fearing that the price is going to go up and enters into a swap contract with a counterparty which is a bank or a financial institution. Let us say day 0 which is your 12th August 2022, farmer is agreeing to pay a fixed price of 300 rupees a kg to the financial institution on the 45th day. So, this agreement is happening on 12th August 2022. And in return of paying 300 rupees a kg for fertilizer what the farmer will receive is the Argus India DAP CFR assessment price prevailing on the 45th day.

And please note that this spot price DAP CFR assessment is the spot price will be calculated and reported by a independent company called a Argus media.

As you can see the Argus India DAP CFR price assessment is reflects the spot price for the phosphate market as reported by the Argus media. And in this case CFR stands for your cost and freight this is one type of a Incotrems or international commercial terms which are you know commonly used for any kind of buying or selling agreement when both parties are you know belonging to different countries. So, there are different type of Incotrems are there and I am not going into this detail if some of you are interested to learn what exactly this Incotorms what are the different types of Incotorms you can go to the internet, and we will be able to find out more on the on this international commercial terms. Now coming back to the swap agreement. So, the farmer will be paying 300 rupees a kg and receiving the floating price.

Now let us go to the 45th day which is your 22nd September 2022 let us say Argus media reports that DAP assessment price fertilizer assessment is 373 rupees a kg. So, in that case farmers will be receiving 73 rupees a kg from the bank or financial institution. In the other case let us say DAP assessment the spot price is 262 rupees in that case farmer will pay 38 rupees a kg. So, in this case again the terms swap terms and contract specification are given I am not going to go into detail, but the only thing I would like to highlight here is please note that the buyer of the swap is a farmer. In the previous example, for example, farmer was the seller of the swap and in this case, farmer is the buyer of the swap. The rest of the things are self-explanatory, let us move to another example of a commodity swap.

So, the third example of a commodity swap is let us say the same wheat farmer who was earlier selling 170 quintals sweet at a one day instead of that the farmer wants to sell 15 quintal each day over a next 20 days. Why the farmer is wanting to do maybe the local mandi does not have a capacity to sell such large volume on a given day and the farmer is also fearing that if it takes 170 quintals on a given day it will be able to get less amount of price realization. So, farmer wants to spread itself over 20 days and still the farmer is fearing the price decline, and it enters into a swap contract with a counter party which happens to be a bank or financial institution and what is the agreement they will do please note that the farmer will receive fixed. So, farmers will be receiving 1800 rupees for a quintal, but what farmer will pay farmer will pay the floating price, which is not a single day price, but the average of 20-day mandi price of wheat to the bank or financial institutions. The remaining part of the calculation remains same in the sense on 9th June 2023 if the average 20-day price is more than 1800 the farmer will be paying money to the bank or financial institution.

If the average is less than 1800 the bank or financial institution will pay the farmer. In this case, please note that the buyer of the swap is bank or financial institution seller of

the swap is the farmer and please note that in all these 3-swap contract one of the very important requirements is that none of the parties should be in a position to influence the floating price or the floating rate. If the farmer feels that the bank or financial institution will be able to somehow influence the floating price, the farmer will not be interested to enter into a swap contract. Hence the success of the swap contract depends on the fact that some independent party or independent company must calculate and report what is going to be the floating price and in that case. In fact, in all over the world there are many independent companies which are now calculating and reporting spot prices of various commodities and these commodities are these spot prices are getting used to be being used by swap counterparties as a reference price.

Now, this particular block which shows examples of some of the you know price assessment done by independent parties for example, Argus media is an independent party. One of the prime objectives of this particular company is to generate different price assessments. So, this particular block shows at a given point in time Argus media is in a publishing price assessment 4 different price assessment for jet fuel. So, this Argus media US Gulf colonial pipeline jet fuel price assessment is one type of one price assessment for jet fuel. Similarly, the other three as you can see New York Harbor buck eye pipeline jet fuel price assessment and there is other two price assessments for the jet fuel.

Now, the question is why Argus media would be publishing so many prices assessments and what do you exactly mean by price assessment. So, the price assessment is not exactly the spot price quoted by one member who is let us say operating at a colonial pipeline. So, Argus media will be reaching out to various you know sellers of jet fuel, buyers of jet fuel, dealers of jet fuel operating at this particular location colonial pipeline and will collate the spot price transaction data on a daily basis. And from this multiple spot price data it will do some kind of some kind of a methodology it will use some kind of a methodology to arrive at a spot price for a given location. So, it is not that you know this spot price is available and Argus media is just reporting it.

Argus media will be spending considerable time effort and energy to collate this spot prices from various intermediaries' jet fuel producers, jet fuel buyers and other suppliers, owners of storage location all these members it will reach out collect the spot price transaction data do some kind of averaging and on a given day it will publish one spot price and that price will be known as the price assessment. Now, the question is why Argus media will have four different jet fuel assessments for a given day. Please note that different airline will have a different preference for a location in which they will be filling jet fuel for their aero planes. So, each different location the number of you know delivery points, number of buyers, number of sellers, the network infrastructure network all this will be different giving rise to a different price. So, on a given day maybe the price jet fuel price at these four locations will be different.

So, if a particular airline company is filling the airline let us say at New York Harbor buck eye pipeline location he or that particular company would be interested to swap the price risk with respect to this particular underline. Hence, depending upon the requirement of the physical market operators these independent companies publish various kinds of price assessment and price assessments are used as a floating price benchmark or reference point to price the swaps. In addition to the spot price assessment there are many commodities' future indexes that are also being used as you know reference point. One such popular index is your Bloomberg commodity index. In India we also have MCX iCOMDEX bullion index.

In India also we have NCDEX polled spot prices. So, these indices of futures or spot prices can also be used as a reference point. Now, this particular block which I have taken from the National Bank of Canada as many a times during this lecture I have said that the counterparty position to wheat farmer or you know airline companies are banks or financial institution. So, do really banks and financial institution take counterparty position the answer is yes. The details related to what kind of a swap contract being offered by National Bank of Canada is available in this website and this particular snapshot is a picture from the website to indicate what is the kind of what are the different types of swap contracts being offered by this particular bank.

Again, I would urge each of you to visit this particular website or any other bank which is offering a counterparty position for swap contracts to go and visit these websites to get an understanding of the reality how banks and financial institutions are offering different kinds of swap contracts. Now, coming back to this third panel of this particular slide please see that the bank and financial institution on the left side of the you know left side of the panel the bank is paying the fixed rate. So, this side of the transaction bank is a seller of the swap, and this side of the transaction bank is a buyer of the swap. So, what banks try to do is that banks do not want to remain only on one side because the moment they are paying fixed and receiving floating they may end up paying a very high rate. So, they would like banks to mitigate the risk by entering into a counterparty transaction and in this side if the bank has become a buyer of the swap in swap in this side of the transaction bank would like to be seller of the swap.

Now, let us assume a very theoretical situation where this farmer wants to enter into a swap contract in wheat and the financial institution is the counterparty. Similarly, another you know company which is branded wheat flour maker some kind of an auto manufacturing company that also wants to enter into a counterparty position with the same financial institution. So, the financial institution will let us say is paying 1800 rupees to the farmer it will receive 1800 rupees to the farmer. So, this side of the risk is taken care of and or if the farmer is paying the floating rate it would like to receive the same floating rate and while receiving the fixed rate the bank may charge 1850 rupees and in this side of the transaction bank may pay 1800 rupees. So, it will receive the same

amount of floating rate, but it will receive a higher amount of 50 fixed rate from the branded wheat flour maker let us say that is 1850 and it will pay 1800 rupees a quintal to the other side of the transaction.

If a bank or financial institution will be able to arrange both sides of the transaction, then it will be benefiting 50 rupees a quintal. So, in reality though it is not always feasible for banks to completely take a counterparty position, banks do try to mitigate the risk of swap by entering into an exactly opposite position with another counterparty. Now, let us go to some other examples of swaps as I said that swaps are bilateral contracts. So, both buyer and seller of a swap can enter into many different types of swaps as long as both parties agree to it. In subsequent slides this slide as well as couple of more slides I will be giving some examples of different kinds of a swap, but these are by no means exhaustive in nature.

There are many other different kinds of swaps being written by different counterparties and banks. Now, coming back to a different kind of swap which is known as your total return swap. So, in this total return swap there will always be a buyer of a swap and a seller of a swap. So, who will be the buyer of a swap? The buyer will be paying a fixed rate of 6 percent, let us say once in 3 months for the next 6 months on a notional principle of 1 million rupees. Please note the word notional principle means these 1 million rupees is not transferred between the buyer of the swap or the seller of the swap actual payment will be based on these 1 million rupees.

So, what the buyer is paying? The buyer is committing to pay 6 percent once in 3 months on 1 million rupees and what the seller will be paying? Please note that the seller will be paying or agreeing to pay a specific commodity return. For example, the specific commodity return could be based on swap in spot price return over each of the 3-month period at some specific location. Maybe some specific mundi or something will be mentioned as part of the contract. So, swap in spot price return over each of the 3-month period at a given location will be the return which will be paid by the seller of the swap, or it could be the return calculated based on the near month swap in future price at Chicago Mercantile over Chicago Mercantile exchange over 3 months. It could be this swap in spot price return, or it could be near month swap in future price return.

Now, let us come to the come to the actual you know payment let us say 3-month party A will be paying 6 percent of 1 million rupees, party B is supposed to pay 8.5 percent. So, this 8.5 percent will arrive from this particular side that is swap in spot return over the next 3 month.

So, if swap in prices have gone up by 8.5 percent party B is supposed to pay 8.5 percent to party A. Similarly, the second payment, which is going to happen at the end of the second month party A will pay 6 percent, party B will be let us say you know based on

the swap in price return it is going to be 4 percent. So, in that case party A will receive a net of 2.5 percent in the first case and will pay or 2 percent on a notional principle of 1 million rupees after 3 months and 6 months respectively.

So, this is an example of a total return swap. Now, let us quickly go to the next kind of swap, which is a commodity basis swap. In this case, please see that one party will be paying the spot price of a commodity and the other party is going to be paying the future price. Please note that no fixed amount is mentioned, but what is mentioned here? Party A is going to pay the Richard Bay coal spot price which is going to prevail on a let us say 3 months from today. And what party B is going to pay? The Richard Bay coal futures price prevails at the ICE, that is intercontinental exchange settlement price. So, both parties are not mentioning any specific price or rate.

In this case whatever the spot price, party A will pay, party B will pay the futures price. And finally, both these prices will be netted off. So, if the spot price is higher than the future price, party A will pay. If the future price is higher than the spot price, party B will pay.

So, this is an example of a commodity basis swap. And as you know basis is defined as spot minus future. So, hence this kind of swap is known as your commodity basis swap. Again another kind of a very popular swap is a commodity volatility swap. And here please note that the parties will be exchanging or payment between both parties will be governed by the volatility of the 2 assets. Again, just like the previous example party B, party A will be paying the volatility of the Richard Bay coal spot price, party B will be giving the volatility of Richard Bay coal futures price at ICE.

So, based on the let us say 50,000 tons is the underlying. So, based on this underlying calculation one party will be total payment will be adjusted depending upon the which volatility is higher or which volatility is lower. Now, coming back to the you know one of the very important aspects related to commodity swaps is that swaps or for that matter any other bilateral derivative contracts carry significant amount of counterparty risk. There is no exchange which comes into picture as part of the commodity swap agreement. There is no initial margin, there is no mark to market margin.

So, to minimize the risk of counterparty, membership of international swaps and derivative associations has become a norm. In fact, this international swaps and derivative association is a membership kind of a organization where any party who wants to enter into a commodity swap has to be a part of this particular association. Now, if a wheat farmer wants to enter into a swap agreement and it wants to enter the swap agreement with a bank or financial institution, the bank or financial institution may not agree to enter into a contract with the wheat farmer if the farmer is not a member of ISDA. Now, what is the benefit of ISDA? ISDA membership brings some kind of an

informal agreement to the members that how they should behave or how they should conduct themselves if they are counterparty to a swap agreement. So, ISDA brings out a document called ISDA master agreement.

The complete details regarding the master agreement are available on this particular website and what this master agreement indicates lists the terms and conditions for the OTC derivative contract. For example, if a farmer wants to enter into a swap contract with a bank or financial institution, what should be the terms of the contract? What parameter it should be careful about? What should be the fine print? How the word should be written? All these details are given in this master agreement and this master agreement provides a template and both buyers and sellers of the swap agreement will be forming their swap agreement in line with this ISDA master agreement. And when both buyers and sellers will be for you know completing or preparing their swap agreement as per the ISDA master agreement, this makes the contract enforceability easier. In fact, this master agreement is kind of a very comprehensive document which looks into all kinds of all kinds of you know parameters or aspect related to a swap agreement. And if one party is not able to fulfill his or her side of the bargain, then the enforceability of this default is easier.

So, with this we will end today's lecture on commodity swaps. In the subsequent lecture or in the next lecture we will be discussing various types of commodity derivative in indexes. With this we come to the conclusion of today's session, and I eagerly look forward to interacting with all of you in the next session. Thank you all of you.