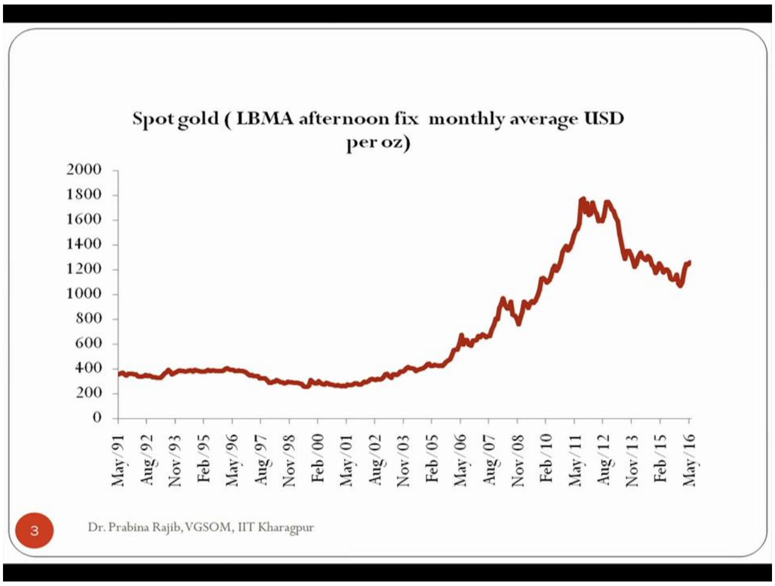
Commodity Derivatives and Risk Management
Professor Prabina Rajib
Vinod Gupta School of Management
Indian Institute of Technology Kharagpur
Lecture 30
OTC Contracts on Gold and Gold Dehedge

Welcome to this session on Commodity derivatives and risk management and today, we will be discussing the remaining part of gold derivative. And if you recall, in the last session, we discussed about good delivery list and how exchange does not take responsibility of quality assessment with respect to the delivered gold and there are identified refiners or exchange identifies some refiners whose gold can be accepted as a good delivery on part of the exchange. Now, we will be discussing the different kinds of forward contracts and other OTC over the counter contracts which are signed by gold mining companies for mitigating the gold price risk.

(Refer Slide Time: 1:31)

And what are these derivative contracts, these are your forward contracts, streaming deals, option contracts and collars. So we will be discussing little in detail about the forward contract gold forward contract and before we go to the discussion on gold forward contract, I want you to recollect a spot price movement of the gold price. If you can recall in last to last session, I had mentioned that gold price remained around dollar 300 to dollar 400 per ounce for 10 to 15 years during 1990 and some early part of 2000.

(Refer Slide Time: 2:31)



And 2002-03 onwards, it started picking up and let us go to this particular picture which is shows the movement of the gold spot price and this is the LBMA afternoon fix monthly average US dollar price per ounce of gold, so if you see during May 1991 till February 2004-05, gold was almost in the range of 300 to 400 dollar, so during this prolonged period of low price, many commodity many gold mining companies started entering into forward contracts to deliver gold at a fixed price for a substantial long period of time.

And subsequently when gold price increased, they realized the mistake on their part for entering into a long term forward contract over a long period of time and many companies many gold mining companies undertook something called a dehedging. So many times in this particular course, I have mentioned hedge, hedge, hedge but this is the this is the probably the first time when we are talking about a word called dehedging, so what exactly dehedge and how companies go about dehedge, we will be discussing in the next couple of minutes.

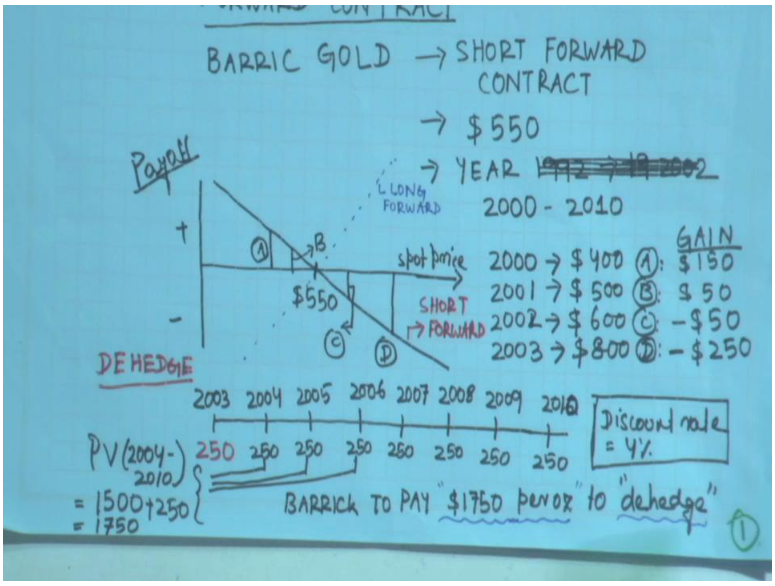
(Refer Slide Time: 4:03)

Uh as I mentioned that gold mining companies sell gold at a fixed price for at a future date, a for a future date as part of a forward contract and as I mentioned, gold was prolonged a bear period during 1999 onwards and many gold actually it will be 1991 so many gold companies in the world entered into the forward contracts to sell gold at a fix price and downside of the hedging became apparent when gold price started to climb up during 2001.

And many these gold mining companies dehedge their forward position relatively at a earlier part of the gold rally. However a company called Barrick Gold waited till 2009 to dehedge and what was the cost associated with the dehedging, what kind of repercussion of happened on the company, this is a very important dimension of gold hedging and whenever we talk about gold hedging, definitely Barrick Gold's dehedging case is also discussed.

In fact, Harvard Business Review has a case on the dehedging program of Barrick Gold, which very clearly describes about the amount of gold it entered into amount of forward contract, it is entering to the price and subsequently what happened, so if you can get access to that particular case study, you it is worth reading. Now, if you if you see this particular slide, to dehedge in the year 2009, the company is issued 4 billion dollar worth of stock to unwind its 9.5 millions of ounce hedge book. So during 2009, it still had entered into delivering 9.5 million ounces of gold at a fixed price and dehedge comes with a cost. Now, let us take an example, a theoretical example why dehedging is comes with the substantial amount of cost.

(Refer Slide Time: 6:49)



Now, so this is this is the Barrick Gold, Barrick Gold had entered into let us say during 2000, it entered into a short forward contract for delivering or selling gold at a price of 550 dollar per ounce. And this contract, started in the year 2000 and it was let us say up to year 2010 so now let us see, suppose the in the year 2000 to 2010 was the contract period. 2000 during 2000, suppose the prevailing gold price is around 400 dollar so Barrick Gold is very happy.

This is the position, it has entered into a short forward a position, so payoff for Barrick is going to be this line so if spot price this is the X axis is the spot price, this is the positive direction and this is a positive payoff and the negative payoff. Now, if prevailing spot price is anything less than 550, Barrick Gold stands to gain from the hedge contract. Let us say during 2000, suppose the price is around 400 dollar so in that case, Barrick Gold is going to be, this is the 400 dollar Barrick Gold benefit is to the tune of this. So for every 1 ounce of gold, it has it had earlier it had contracted to sell, it will be getting 150 dollar per ounce benefit.

Now, similarly, let us say in 2000, the price is prevailing around dollar 500 and it will be selling the gold at 550 so it is making a profit of 50 dollar per ounce. Now, let us go to the next year, let us gold starts gold price starts increasing and next year price goes to 2002, it is 600 so in that case, the loss to Barrick gold on account of the hedge comes to 50 dollar per ounce. Let us say Barrick Gold hedge is some year, you are going to gain and some year you are going to lose, so Barrick Gold did not mind delivering gold at 550 when the contract is when the spot market gold is selling at 600.

Now, let us say by 2003, gold price increased to 800 so what is the loss on account of the forward contract for every ounce if delivered to the counter party, it came 250 dollar so this is dollar 150 gain, dollar 50 gain, dollar 50 loss, 250 dollar loss. Now, when it became increasingly let us say evident for the company that gold price is going to go up and up. Now, if the company does not do anything, it will go it will go on incurring higher amount of loss so let us say in the year 2003, Barrick Gold decides to dehedge so dehedge means, in 2003 Barrick Gold is going to pay 250 dollar + the present value of the loss as if the gold price is going to be dollar at 800.

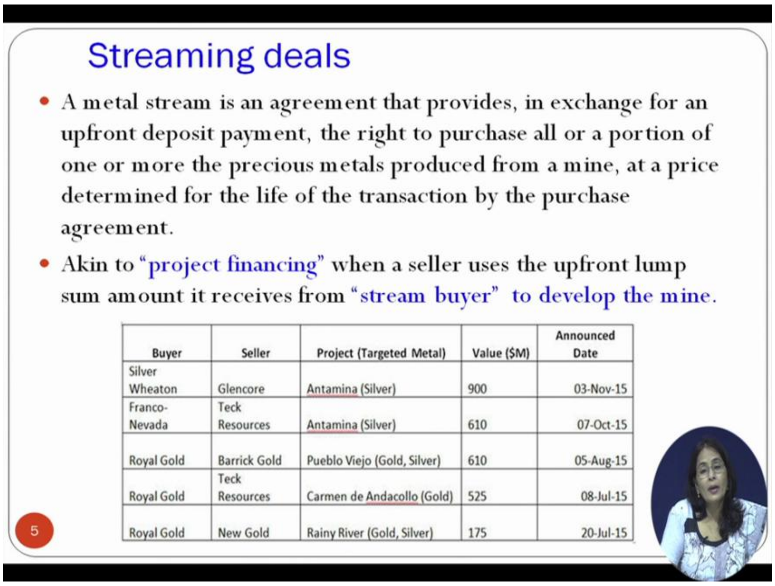
So if gold price is going to be at 800 dollar so the loss is going to be 250, 250 dollar, 250 dollar, 250 dollar so 2004, 05, 06, 07, 08, 09, 10 so remaining so many years, this Barrick Gold company's loss as on today, that is as on today, Barrick Gold loss is 250 dollar for during 2004 to 2010. Now, what is going to be if it has to dehedge or basically in case of your in case of a futures contract, suppose it had taken a short futures contract and it want to take a long futures contract so exactly now, if it has to buy back the short futures position so it has to pay to the counter party so what is going to be the present value of the payment so this present value of the payment is going to be 2000 a discounted value of 250.

This 2004 to 2010, whatever the discounted value, so I have used a discounted rate of 4% per annum so with discounted value, this comes to 1500 for 2004 to 2010 + this year 250 so that comes to 1750 dollar per ounce, so to dehedge in the year 2003, Barrick Gold is supposed pay 1750 dollar per ounce of gold, it has agreed to deliver as part of the forward contract and multiplied by whatever the number of ounces it has already agreed that is going to be a substantial amount of money and in case of Barrick Gold, it came to almost 4 billion dollar 4 billion dollar and to pay for to unwind its short futures short forward position, it went to the equity market and issued seasoned equity or follow on public offer and it raised this dollar 4 billion to dehedge.

Mining company so no company was entering into any kind of a hedge program. Of course gold was going on increasing at a almost at a continuous rate if you if you know gold prices was hovering around some 11000-12000 around 2010-11 and in Indian rupee and it is it is hovering around 27000-28000 now, it is almost a I would not say exponential growth a consistent growth in the gold price what we are experiencing. So that probably that is the reason why none of the gold mining companies were interested into entering into a hedge contract. But if you if we consider the gold price in dollar terms, the gold price picked around

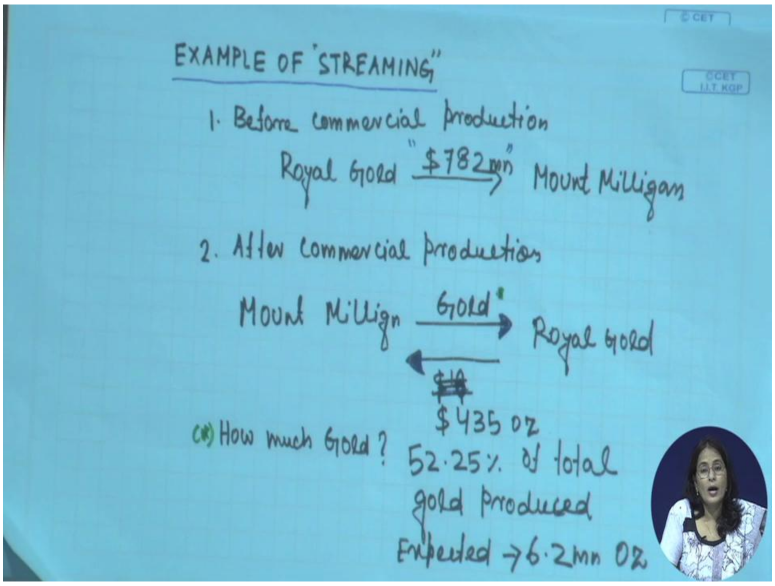
1700 dollar sometimes around mid 2012 and 2013 onwards, it has gone down and couple of days before, it was hovering around dollar 1300.

(Refer Slide Time: 14:59)



Now, many gold mining companies have started rethinking their ideas about hedging so they are entering into forward contracts but they are not terming these are forward contracts, these are different kind of a contracts they are entering and these contracts are known as streaming contracts. So what are these streaming contracts, let us let us go this PPT to understand more. So what exactly is a steaming deal or streaming contract so a metal steam is an agreement that provides in exchange for an upfront deposit payment the right to purchase all or a portion of one or more precious metal produced for a mine at a price determined for the life of the transaction by the purchase agreement? Quite a big sentence, quite a long sentence, it is simple, it is nothing but a project finance kind of a agreement so let us take this example.

(Refer Slide Time: 15:48)

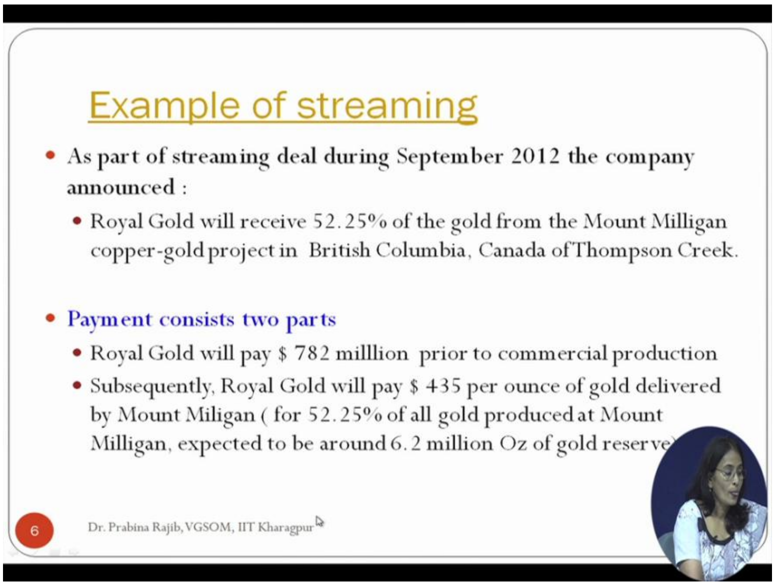


Let us see, so this is an example of a steaming contract, so you have company called Royal Gold and Mount Milligan is a company which is into gold mining and copper mining based at Toronto and this Royal Gold has paid 782 million US dollar to Mount Milligan, the owner of the Mount Milligan mine, that is Thomson Creek, so Thomson Creek, Royal Gold has paid 782 million dollar upfront fee before the this particular min has gone into commercial production and Mount Milligan has used this is 782 million dollar for a development of the mine.

Now, what is the agreement, once the commercial production starts, Mount Milligan is going to pay gold, not pay any interest amount or anything, it is going to pay gold to Royal Gold and what how many ounces or what amount of gold will be paid by a Mount Milligan to Royal Gold. It is 52.25% of the total gold which will be produced by Mount Milligan, so during the mine functional functioning stage, whatever gold it is going to produce, 52%25% of the total gold will be delivered by Mount Milligan to Royal Gold and Royal Gold in turn will pay 435 ounce per sorry 435 dollar per ounce of gold it receives from Mount Milligan.

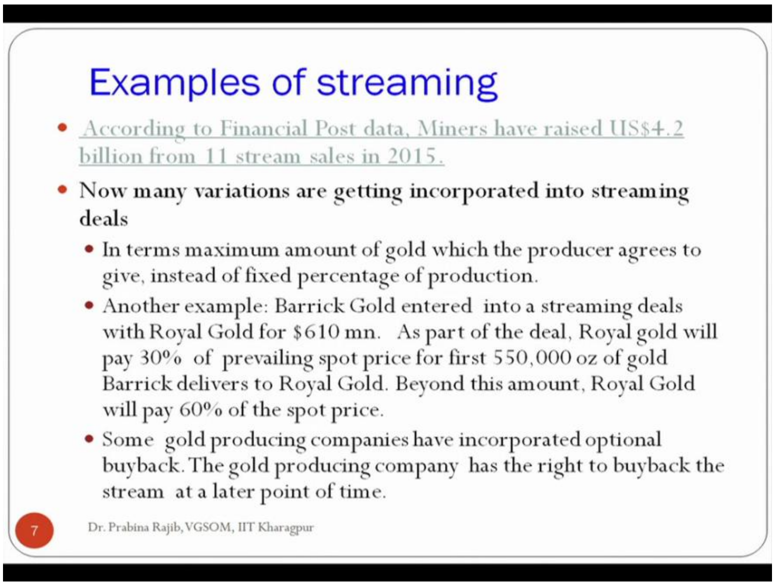
So this is an example of a streaming deal. Now, let us go to this particular slide. Some other streaming deals which have been entered. See table shows there is a company called Silver Wheaton and who is the stream seller, stream seller is Glencore and what is the project? Project is your Antamina silver project and value is 9 dollar how many million dollar so Silver Wheaton has paid an upfront fee of 900 million dollar and this announcement date is 3rd November 2015. And subsequently, once the project comes to an end, comes to functional stage, this Antamina silver mine Glencore is going to deliver silver to silver Wheaton and please go to the internet if you want to read more about this particular deal. The public announcement with respect to this streaming deal is available in the internet, you can read that so this table also shows the other streaming deals which have been signed by buyers and sellers and if you can see, you have Royal Gold which has entered into Barrick Gold and Royal Gold also has entered in Teck Resources and Royal Gold has entered into New Gold.

(Refer Slide Time: 19:21)



Now this part I have already explained example of a streaming and let us go to let us go to the other varieties of streaming deals which are being signed by the gold mining companies and the stream buyers.

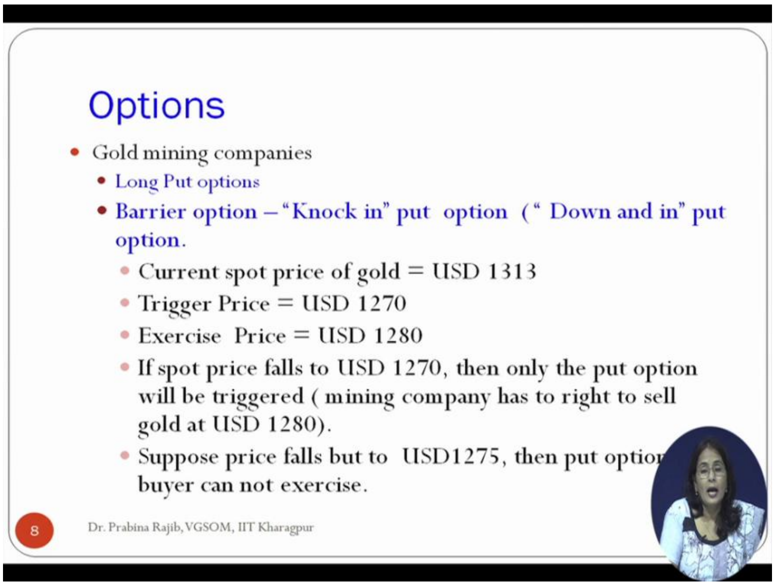
(Refer Slide Time: 19:46)



Let us see this particular slide show the some other examples, see recall in case of a Mount Milligan mine, the Royal Gold is going to pay 782 million up front and is going to receive 52.25% of the total gold produced by Mount Milligan in return for 435 dollar an ounce, but Barrick Gold has modified this stream streaming deal to its advantage and what is the advantage? Barrick Gold has entered into a streaming deal with the same company Royal Gold and Royal Gold is paying 610 million dollar upfront fee, however Royal Gold is Royal Gold is buying gold from Barrick Gold but not at a fixed price. For up to 550000 gold which Barrick is going to Barrick Gold is going to deliver to Royal Gold. Royal Gold is going to pay 30% of the spot price, not a fixed price so if spot price increases Royal Gold is going to pay a higher price to Barrick Gold and vice versa.

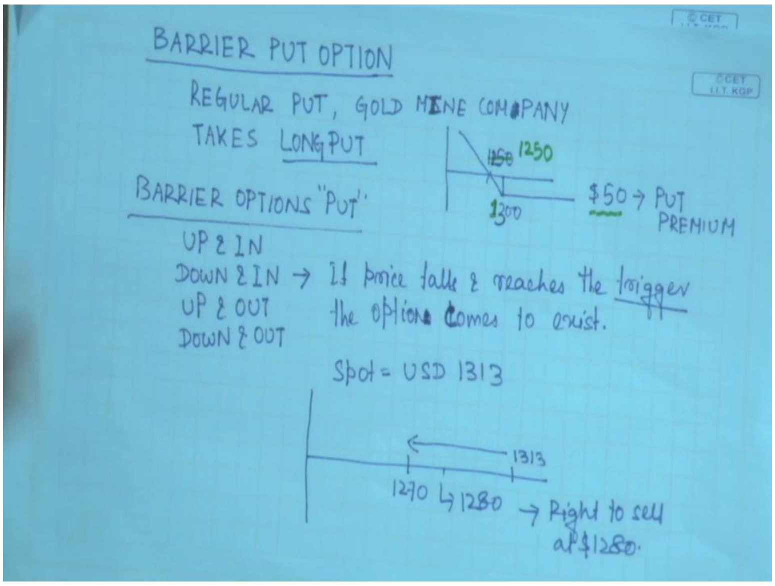
Similarly, beyond this 550000 ounces, Royal Gold will buy gold from Barrick Gold by paying 60% if the spot price. Similarly, some other streaming deals are being signed by both stream buyer and stream seller in which the stream seller that is the companies which are selling the underlying mining product so or the gold or silver or copper mining companies, they are including a contract into the including a clause into the contract in which they have the right to buy back at a certain point of time. So instead of completely giving the more power to the stream buyer, they are keeping some power in their hand and if they decide to go for buy back, they can go for buy back depending upon of course an underlying movement of the underlying commodity price.

(Refer Slide Time: 23:08)



And if you see as per the Financial Post data, mining companies have raised around 4.2 billion dollar from 11 stream sales in 2015 alone so in the year 2015, 11 mining companies have sold or have entered into stream deals which is equivalent to 4.2 billion dollar. Now, all of us many times we have discussed what is a option contract and in case of a option contract, exchange traded option contract, you have the underlying as the futures contract but in case of a OTC contract, the underlying is the gold. So if a gold mining company fears that price is going to go down, it can enter into a long put option. Now many gold mining companies are entering into another kind of option contract that is known as your barrier option or knock-in option so what exactly is a knock-in option?

(Refer Slide Time: 23:51)

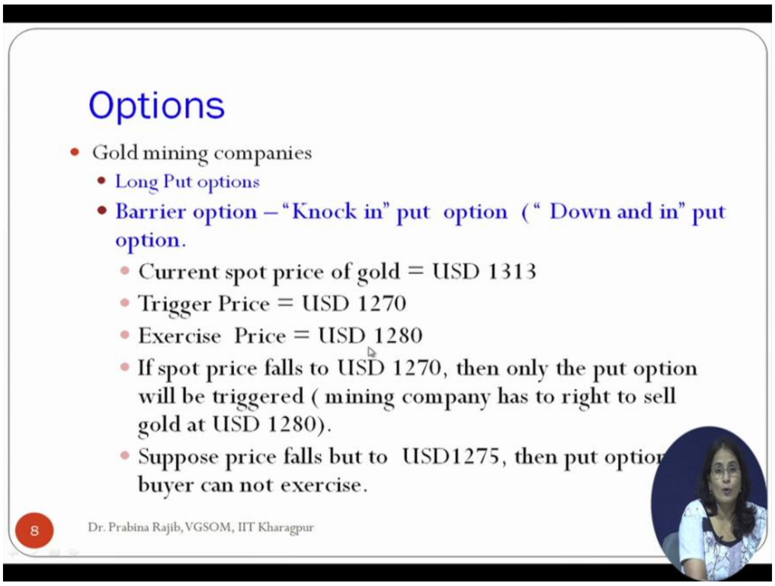


So this you have a barrier put option so if you recall a regular put option in a regular put option, Gold Mine Company will take a long put position and by entering into the long put position, it has a right to sell gold at a later point of time at a fixed price. Let us say it enters into a long put option at a price of 1300 dollar and pays a upfront premium of dollar 50 as a port premium so when it will start incurring profit from this particular option contract, when the gold price is less than is 1250, so any range in this, this company is going to make profit, so this is a typical regular put option contract. Now, let us go to what exactly is the barrier option put contract. Barrier option can be many types so barrier option put can be up ending, it can be down ending, it can up and out and it can be down and out, so if you go to any any textbook which has a chapter on exotic derivatives, exotic option contract, you will definitely get to see what exactly is a barrier option.

So these 4 options, I have mentioned with respect to put, you can also have a up and in call option, down and in call option, up and out call option, down and doubt call option. Here we are talking about a put option because the gold mining company owns the asset and it is fearing that the price is going to go down and hence it will be entering into the put contract and in the put contract, it will be entering into down and in. So what is the meaning of up and in, up and in means if price increases then put option comes to existence. Down and in means if price, the spot decreases then only the option comes to an existence. Similarly, up and out means, if price spot price increases, the option become option expires and if down and out, if price falls, the option expires.

Now, with respect to down and in contract, let us say so what will be the option features? So what will be the option features, you will have strike price, you will also have a trigger price so what is the strike and trigger price. This is let us say our spot price, 1313 as spot price and the it says that if the price falls to 1270, that is that is the trigger price. If the price falls to 1270, the option will the option will come into existence with a strike price of 1280, that is the gold mining company will have the right to sell gold at 1280. Let me repeat, if price falls from the current spot to 1270 so if price goes down, then only and reaches 1270 then only the option will come to an existence and if the option comes to an existence, what is going to be the exercise price. The exercise price is going to be 280; so many gold companies have entered in this kind of a barrier put option.

(Refer Slide Time: 28:08)

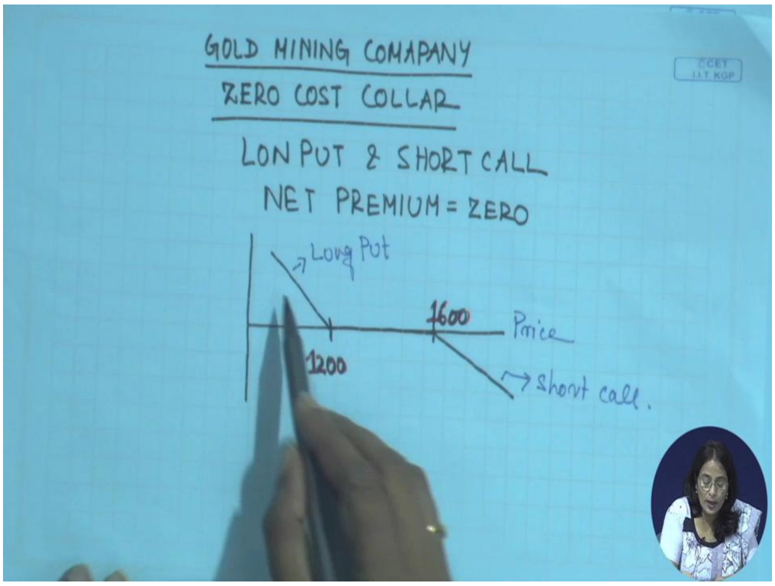


Now, this, quickly, I have already discussed this. If you see current gold price is US dollar 1313, trigger price is 1270, exercise price is 1280 and if spot price falls to 1270 then only the option comes into an existence. Suppose the trigger price does not come to 1275, gold price comes, falls down but it remains 1270. During the life of the contract then this contract will never come into existence.

(Refer Slide Time: 28:35)

Now, let us go to collar and gold so we have already last class, we have already discussed about it. I will just quickly show you what a gold mining company is. It will be beside a long put, it will take a short call such that the net premium is zero.

(Refer Slide Time: 28:49)



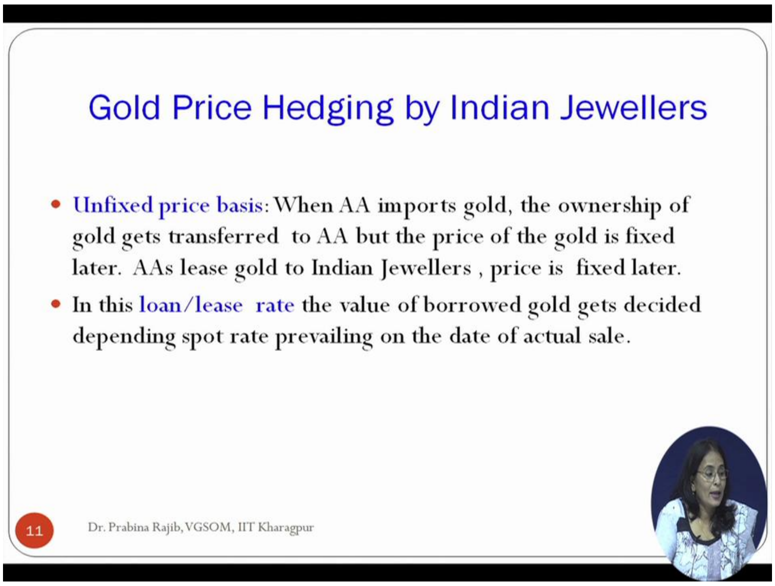
So this is the payoff for long put, this is the payoff for short call and this company will benefit if the gold price is within this range and he will start company is going to incur if it is gold price is above 1600, so between any gold any price less than 1600 this company is going to benefit in the sense it will be able to sell gold at the prevailing market price.

(Refer Slide Time: 29:31)

Uh quickly I will just take you through RBI's gold input rules and regulations. At this point of time, I would like to say that India has only 1 gold mining company, Kolar Gold and it does not have any it does not produce any gold and it has been non functional since 2001. India is the largest importer of gold and India second largest importer of the gold after China and a majority of import happens through authorized agents. So who are the authorized agents, so if you see the details mentioned here, RBI or government of India has permitted company such MMTC, SBI, State Trading Corporation, Kotak Mahindra Bank, ICICI Bank and Bank of Nova Scotia, etc so act as a authorized agents so what are the roles of authorized agents, these agents can import gold from overseas suppliers.

So as far as the import deal is concerned, these companies can buy the gold outride basis or they can borrow gold or borrow the gold on a lease basis and they do not fix the price. Sometimes these authorized agents, also import gold on consignment basis in and we know in case of a consignment deal, the ownership of the gold stays with the consigner or the overseas supplier and so how exactly the gold reaches the jewelers or jewelry houses which use the gold to make gold jewelry. Similarly this gold jeweler, gold jewelry houses or companies, they take gold own lease. They do not buy gold normally, they buy they borrow gold from these authorized agents.

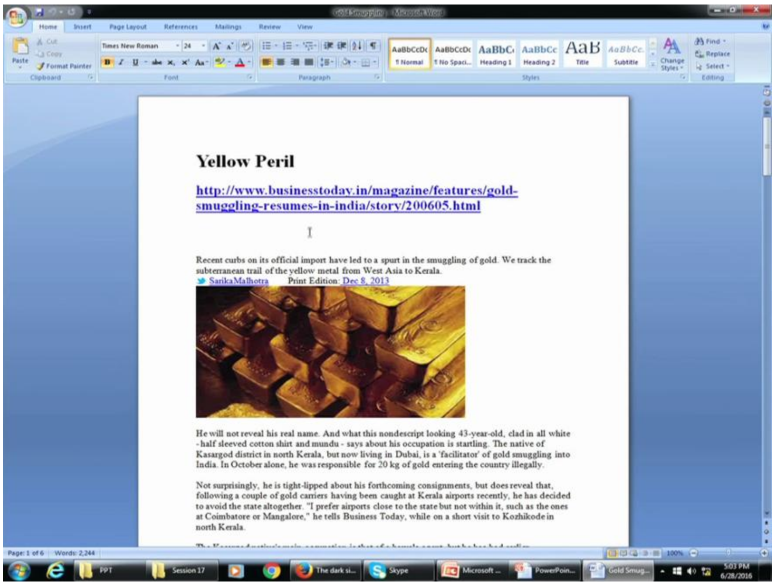
(Refer Slide Time: 32:04)



Basically authorized agents borrow gold from the overseas suppliers and the jewelers borrow gold from these authorized agents and what is the borrowing rate, the borrowing rate gets determined based on the price prevailing on the day on which the jeweler sells the jewelry. So when A-A, see please see this one, there is unfixed price basis when A-A imports gold that is authorized agent imports gold, the ownership of the gold gets transferred from the authorized agent but the price of the gold is fixed later so price is not fixed till the jewelry company sells the gold to people like you and me.

So in fact if you see the price risk remains with the overseas supplier and India, all of that India has a lot of gold gets smuggled into India through Singapore and Dubai and because of government of India's high custom duties so evade custom duty, lot of people smuggle gold to India and it is believed that many jewelry houses buy gold from a smuggled gold so that is why are they are very they are very cautious about whenever you ask what is your source of you are buying, from where are you buying. They the typical answer probably a typical answer would be "Hum to staff hai, babu ko pata hai aap babu se baat kariye" so all those kind so it is what I am driving at is that India's gold market is very open.

(Refer Slide Time: 33:45)



And this particular link which is gold smuggling in India, this is beautiful article which is published by Business Today a dated article in terms of it is 2013 December 8 2013, but it very nicely explains the modus operandi of how gold smuggling happens in India so this is this I will be making it available so if you must read this one.

(Refer Slide Time: 34:10)

So I will this today’s discussion by showing you 2 cartoons so this is summarizes the gold smuggling scenario in India. Yeah so this is your gold smuggling in India so this is on lighter note.

(Refer Slide Time: 34:30)

Just to summarize what is the key relations, let me quickly go through so why gold is considered as a safe haven asset, how gold spot price is arrived, why gold is going into backwardation because as we understand gold should always be in Contango, what are good delivery bars, why and how Barrick Gold un-winded its forward sale of gold, what is streaming and how it is different from forward hedge and what are knock-in barrier option and how gold mining companies are using these. So this with this we come to an end on our discussion on gold, so we will starting with our discussion on electricity derivative market in the next session. Thanking all of you.