Management of Commercial Banking
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Lecture-26
Use of Derivatives in ALM - I

So, after the discussion on the different type of strategy or the methods what we can use to manage the interest rate risk, mostly what we have used, we have the dollar gap and we have the duration gap, then the sensitivity of the economic value of equity and the interest rate, net interest margin.

So, in today's world they are not the sufficient enough or those strategies are not sufficient enough to actually hedge out the interest rate risk in the market or interest rate risk for the commercial banks. So, keeping that thing in the mind over the period when there is an emergence of the other kind of exotic products like derivatives product and the structural products.

So, the bankers have try to use those products to hedge out the interest rate risk in the market. So, in today's session what basically here we are trying to do, let us understand what are those derivatives instruments which are used to hedge the risk in the market, then we can move towards that how the commercial banks exactly use those instruments for hedging out the interest rate risk in the system. That is basically our focus of the study.

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So, today's discussion will be discussing about the basic nature of the derivative products which are available for the trading and as well as which are largely used by the commercial banks to minimize their interest rate risk in the market. So, already all of you might aware about this instruments which are largely available or largely consider as the derivatives instrument, they have the forwards, they have the futures, they have the options, they have the swaps

So, in today's discussion we will be discussing about certain basic concepts related to this, then the application of those things on the commercial banks to minimize the interest rate risk or to hedge out the interest rate risk, that basically we will discuss further.

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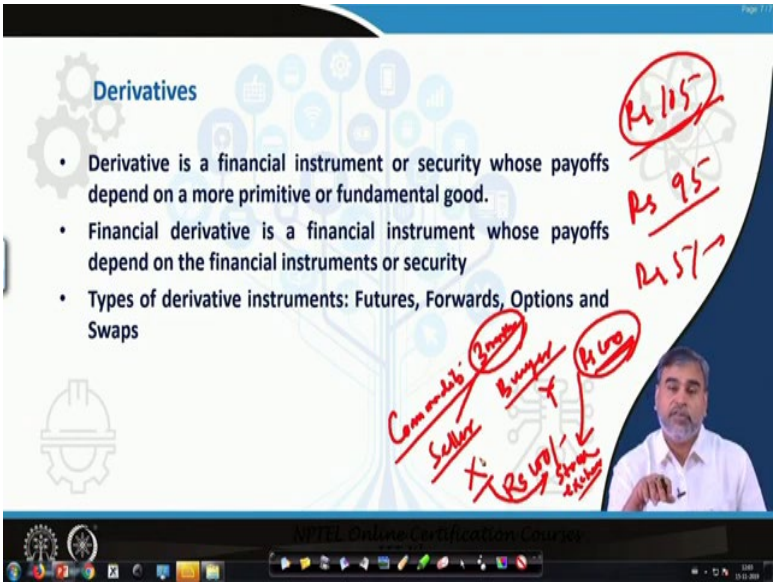

So, if you see that what exactly the Derivatives is. The Derivative is basically a financial instrument or a security whose payoff basically depend on more primitive or the fundamental good. So, whenever we talk about the financial derivative the basic underlying good is the financial goods or financial instruments, if it is a commodity derivatives then the basic underlying asset is the commodities, it can be any kind of commodity like it can be metal or it can be an agriculture commodities and all this things.

So, if you in the real sense I hope most of you might have aware about this thing, if I give a simple example that what exactly the derivative is, so let us take in this way let somebody wanted to let we can take an example of a commodity derivatives. Whenever you talk about the commodity let there is a seller and there is a buyer, the seller is producing commodity X

and there is a buyer let Y, then what happens that the seller has produced a particular commodity in his firm and the sellers wants to sell that commodity to somebody.

And what the seller does, seller wants to let sell it at a price of let this particular commodity at a price of 100 rupees per kg, per kg 100 rupees they want to sell that commodity, so the seller has send the requirement to the stock exchange or wherever this trading takes places any kind of exchange.

So, then what has happened this buyer also wants to buy that commodity, so the seller is not trying to sell the commodity now, the seller is trying to sell the commodity after 3 months. So, after 3 months the seller is ready to sell that commodity at a price of 100 and the buyer who needs that commodity after 3 months he has send this requirement to this particular exchange and he or she is ready to buy that particular commodity at a price of 100.

Then what happens that on that particular day, so that means there was an agreement which is sign between the buyer and seller, that on a particular day after 3 months the seller will deliver that commodity to the buyer and the buyer will receive that commodity and will pay this 100 rupees per kg to the seller.

It is a simple example, but for example in the market on particular day it is observed that the price of that commodity is available at a price of 95. So, if the market price is 95 on that day then obviously already an agreement has been signed, so the buyer has to take of that commodity, so the buyer is losing 5 rupees per kg and the seller is gaining.

But let the reverse can be possible. So, in the market in that particular day let the price is 105 rupees, then here if the sellers would have not signed that particular contract then he would have sold that particular product in the market at the price of 105, but 105, but now he is bound to sell that particular product at a price of 100 to the buyer. So, now he is losing 5 rupees per kg notional loss he is making that is 5 rupees per kg.

So, this is the way basically the derivative system or derivative transactions basically takes place, it is basically a contract. Here we have to lock the price for the future, by that any kind of fluctuations in the market due to certain reasons can be hedge out, or the risk which is arise because of that or which may be happing because of that, that thing can be reduced or can be managed whenever we have any kind of positions in the market which takes care of this particular risk in the system.

So, here popularly we have forwards, we have futures, we have options and swaps which are popularly used as the derivatives instrument in the system. And this is the way the derivatives instruments is defined.

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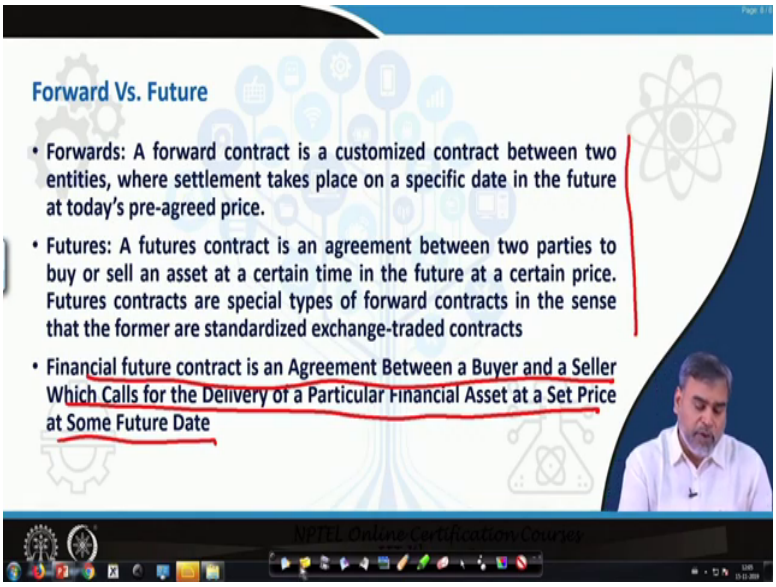

So, if you talk about that already I have told you that a future contract is if you line this below line if you see this financial future contract is an agreement between a buyer and seller which calls for the delivery of a particular financial asset at a set price at some future date. But here if you go by the definitional aspects or the characteristics of those kind of assets, even if the nature of that particular contract is same or may be the objective of these two contracts are same, but there is a difference between the forwards and the futures.

So, if you go by a forward contract, a forward contract is customize contract between the two entities, where the settlement basically takes place on a specific date in the future at today's pre-agreed price. So, in our previous example the pre-agreed price was 100 rupees. A future contract is the same it is again an agreement between the buyer and seller or between the two parties to buy or sell certain time in the future at a certain price.

But the difference is the future contracts are more standardized and these are basically traded in the stock exchanges or exchange traded contracts. But whenever we talk about the forward contracts these are basically not the exchange traded contracts, these are the instruments over the counter markets. Where the one to one interaction happens to have this kind of contract or making this kind of contract.

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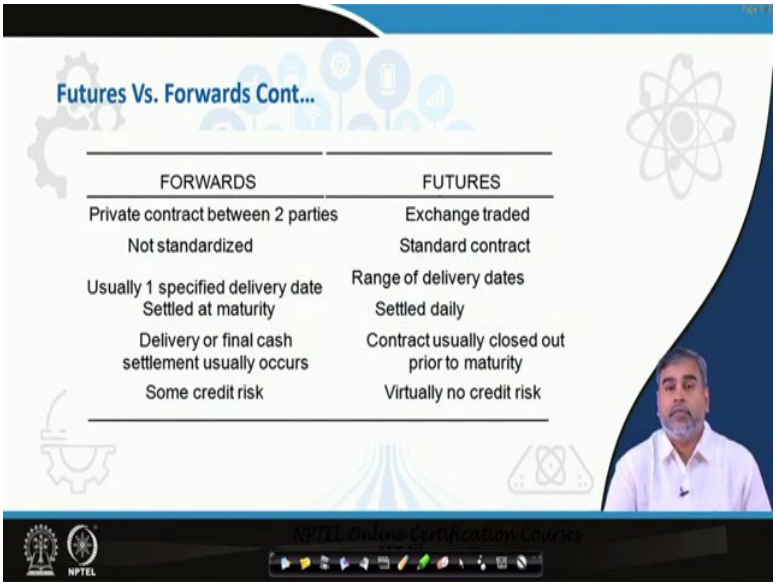

So, formally, if you want to make a distinction between what is forward and what is future, so these are certain kind of differences what you can observe, forward contract is basically a private contract between the two parties, but the future contract is exchange traded, forward contract is not standardized, but future contract is standardized, forward contract is usually one specified delivery date, forward contract one specified delivery date and settled at maturity before the maturity it cannot be settled.

But whenever it is a future contract there is a range of delivery dates, it is not the single date and it is settle daily. And whenever it is a forward contract delivery or final cash settlement usually the cash settlement occurs in the forward contracts, but whenever you go for the future contracts, futures contracts can be closed out prior to the maturity.

Forward contract obviously it is between the two parties, there is no third party involved in that, because of that there is a probability of high credit risk, but in the future contract the credit risk is almost nil because this is highly standardized and this particular contract is made with the help of a third party that is the exchange. So, this is the basic difference between a forward contract and the future contract.

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If you see that we have two things here always we observe, one thing is, a buyer of a future contract is said to be a long futures, buying means long and selling means soft that is the concept word we use in the derivatives market. So, a buyer of future contract is said to be the long futures and in that context they agree to pay the underlying future price or take the delivery of the underlying asset, buyers gain when the future price is rise and loss when the future price is fall. So, this is basically your concept of the long futures.

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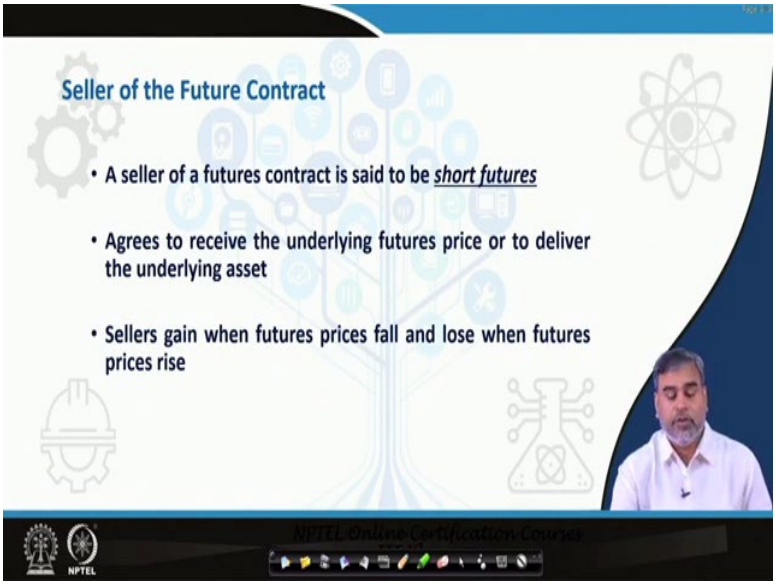

And we have the short futures. A seller of a future contract is said to be the short futures. Agrees to the received the underlying futures price or to deliver the underlying asset. Sellers

gain when the future prices fall and they lose whenever the future prices rise. So, these are already we have explain through this example that if the price in the market is going to increase or decrease accordingly the particular profit or the pay off what basically we are expecting from this that basically depends upon the market price of that particular asset in the future. And accordingly whatever positions you are taking whether you are gaining or you are losing that will be decided accordingly.

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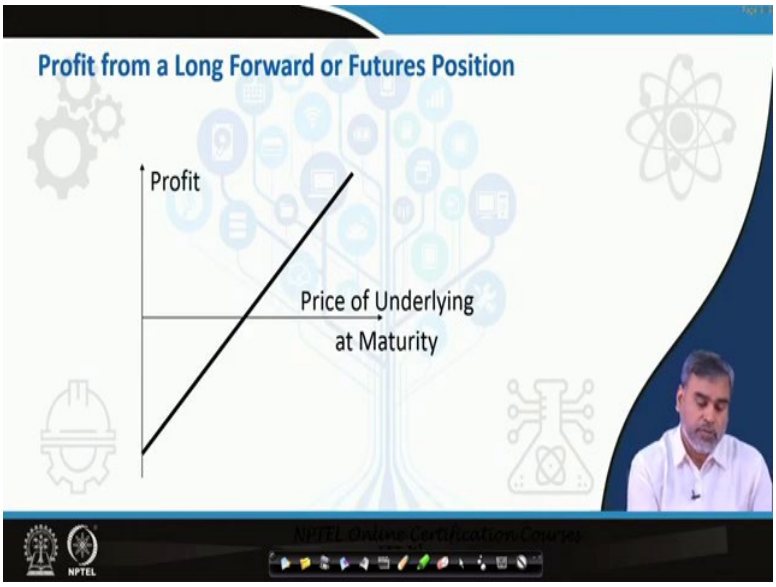

So, if you go for a payoff diagram for a long forward or the future position, then once your price goes up your profit basically is increasing.

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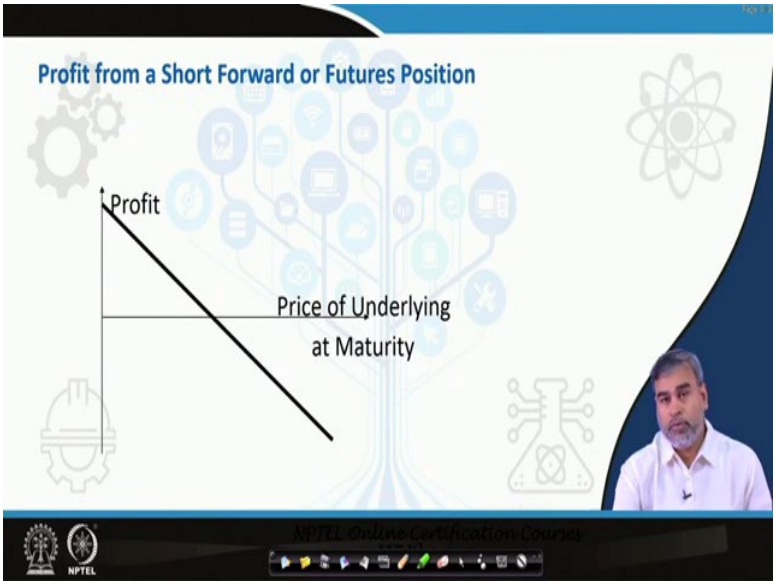

So, the reverse curve you can observe whenever you are going for a short futures. So, if your market price is declining then basically you are gaining in the market.

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So, now there is a relationship between the future price and the spot price. So, how that relationship between future price and spot price can be established, that is basically called as the basis. So, whenever we talk about the basis, the basis is nothing but the difference between the current spot price and the future price, the current spot price minus future price that is called basically basis.

And in a normal market conditions always if you will observe the prices for more distances futures are higher than the nearby futures. That means your future is always greater than the spot price that is the condition in a normal market. But if it is an inverted, that means we are expecting that because of some riskiness in the market the future price should be more than the spot price.

But if you go for an inverted market, then the distance future prices are lower than the prices for the contracts nearer to the expiration, the contracts which are going to be matured in the short period of time their prices basically will be higher than the particular contract which are going to be matured in the longer period of time.

So, in general if you want to observed it in an inverted market the future price is always less than the spot price. So, when the future contract is at expiration? The future price and spot

price of asset must be same that means there should be convergences between the future price and the spot price. And the basis risk should be 0.

That means the difference between the spot price and future price should be equal to 0 and this is basically called the behaviour of the basis over time is known as the convergence. So, even if over the period that is fluctuating but when this contract is going to be matured then obviously you will not find any gap between the future prices and the spot prices. So, there is convergence which can take place in that particular context to make that particular basis equal to 0.

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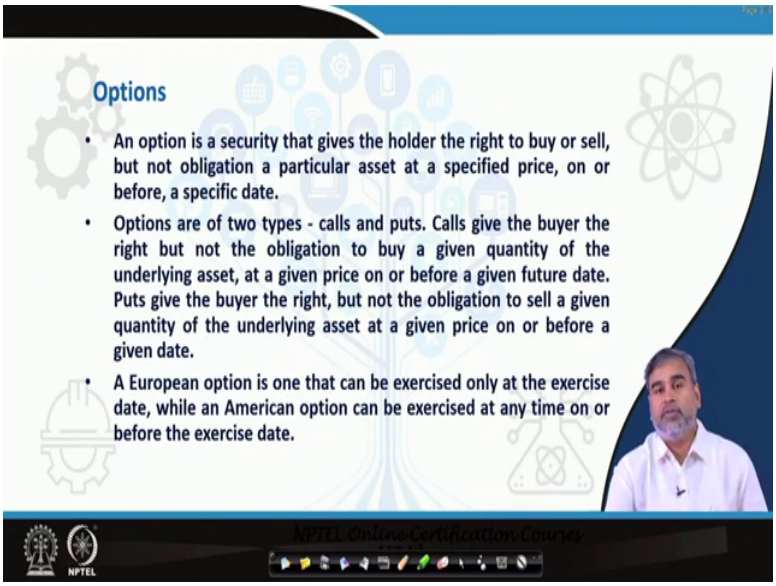

Then we have another instrument what we use that is called the Options. So, what do you mean by option? The option is basically what that gives the holder the right to buy or sell, but not the obligation, so you have the right to buy or sell depending upon the nature of the option, but you are not obelized to do that, a particular asset at a specified price, on or before, on a specific date.

You may go for materializing that contracted or you may not be going for that particular contract, but you have the right to exercise that contract, but you are not obelized to make that contract against that you have to pay certain premium to the seller, if you are the buyer of that option then you are paying some premium and that premium has to be forgone, you cannot get back that particular premium but you have the right whether you want to exercise it or do not exercise it.

So, there are two types of options depending upon their positions or the nature one is put option, another one is call option, so if you talk about a call option, the call option basically gives the buyer the right but not the obligation to buy a particular asset, at a given price on or before a future date. But whenever you talk about the put option it basically gives the buyer the right, but not the obligation to sell a given quantity of underlying asset at a given price before or a given date.

So, for call option means the, you are basically buy it gives the right for the buying and if it is a put option it is basically giving right for the selling. Another way whether it can be call and put these are the two broad categories of the option. So, within the call option you can have an American option and you can have a European option, in the case of put option also you can have an American option you can have a European option.

So, what is the basic difference between European option and American option? The European option is the, it can be exercised only at the exercise date, this particular contract can be exercised or can be matured only at the exercise date. But whenever we talk about the American option that can be exercised at any time, on or before the exercise date.

So, there is no fixed matured period for the American option it can be exercised before that, but the European option only can be exercised whenever the period is over. So, that is the basic difference between American option and the European option and this is the way the options are defined.

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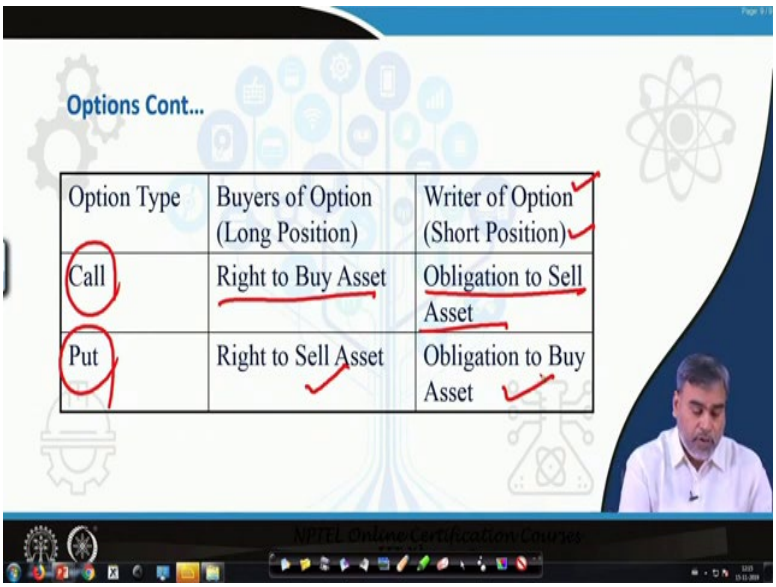

So, if now whatever we have discuss, now we have a call option we have a put option let there are two positions we have, we have a buying position buyers of the option and here we have a writer means at the seller of the option. So, long position and you have the short position in this case. So, whenever it is a call option and there is a put option, so if it a call option then you have the right to buy the asset but you have the obligation to sell the asset.

But the put option it is right to sell the asset and for the writer of the option it is the obligation to buy the asset. So, this is the way on the basis of the call and put option, on the basis of the positions we can basically say that what kind of thing can happen whenever you are defining it on the basis of the positions what the investor is taking.

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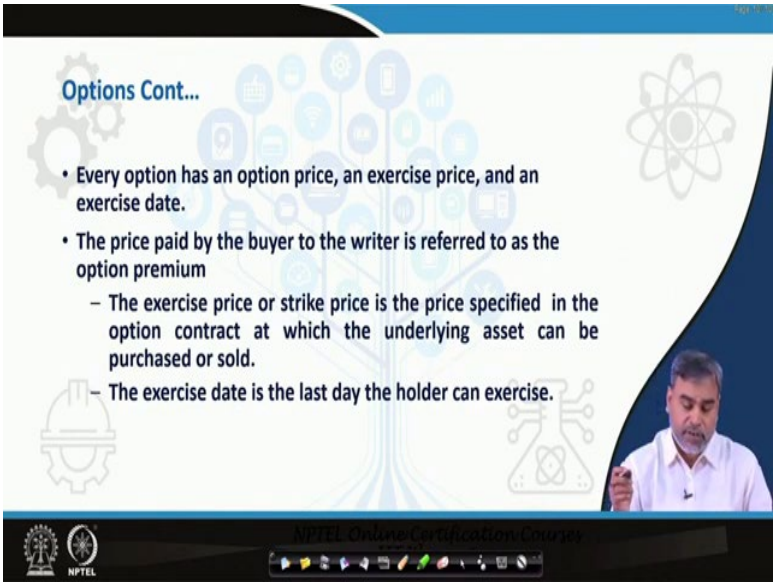

Then we have a in the call option or put option whatever it may be, every option has an option price, an exercise price and an exercise date. The option price means the particular price, which is the premium, which is given by the buyer to the seller. So, the price paid by the buyer to the writer, writer means if the seller is referred to as the option premium and the models what always be might have heard the Maxwell model, binomial model and all these things, the models are basically always we consider to find out or to calculate the option price or the option premium of any particular option.

So, what is the strike price? The other name is exercise price, strike price or exercise price is the price, which is specified on the option contract at which the underlying asset can be purchased or be sold. That means the pre-agreed price, which has decided while signing the contract that is basically called as the strike price and accordingly this particular contract will

be metalized in the future whenever the contracted will be exercised. The exercise date is the last day the holder can exercise, that basically is consider as the exercise date.

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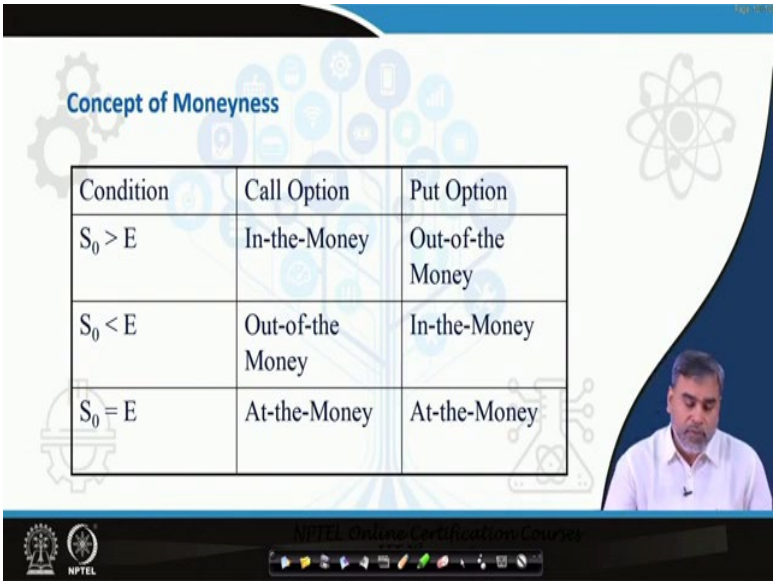

So, there is a concept in the option market we called it the Moneyness, what do you mean by the moneyness? Just now, I was sharing with you that example, if the market price is increasing and the strike price is lesser than that then obviously the particular option holder is going to exercise that option.

But if the market price is lower than the strike price, then obviously the option holder who is buying that option, if it is a call option then obviously he will not go to exercise that option he or she will try to buy that particular thing from the market. So, if so in the context of call option, if your spot price of that particular underlying asset will be more than the exercise price we can say that the call option is in the money that means that will be exercised.

But if it is a put option that means the seller point of view, if it is a selling side we are talking about then it is out of the money that means the option will not be exercised. But if the strike price is greater than the spot price then call option will not be exercised, because of that it will be out of the money and the put option will be in the money, because it is profitable for the put option holder, then because he has the right to sell that asset.

Then if strike price is equal to the exercise price then both are at the money, so there are 3 concepts we use in the option market, one is in the money, then we have the out of the money, then we have the at the money. So, all those concepts are basically discussed with

respect to the relations between the strike price or exercise price and the market price which is prevailed on that particular day for that particular option.

So, in this context this particular mechanism can be worked or the concept can be discussed. So, the money is a very important concept whenever specifically we are talking about the option trading that if unless that particular contract is in the money then the investor will not be interested to exercise that particular option because it will not be profitable for them.

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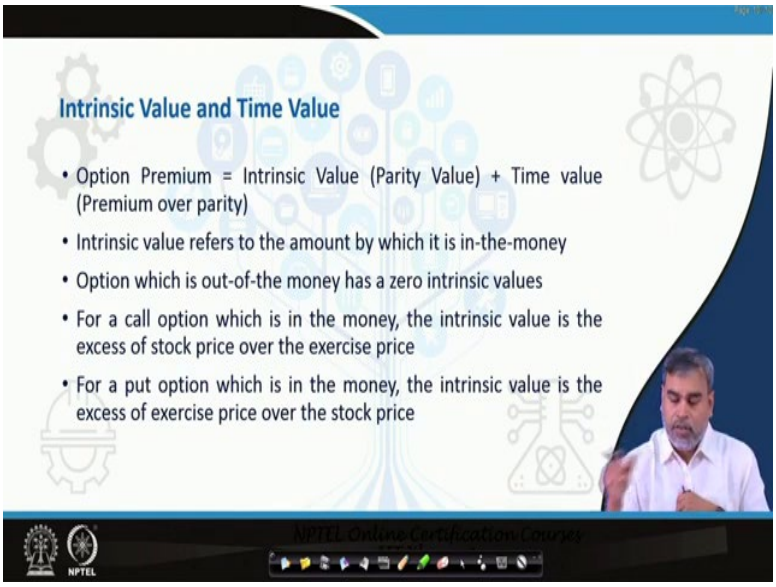

Then we have another thing that option premium whenever we are calculating the option premium the option premium has two components, one is it will have an intrinsic value or the parity value, then it will have a time value. That means wherever the option premium is decided the option premium is decided there are two things basically we consider one is intrinsic value of that particular option and the time value of that particular option.

Then what do means by this intrinsic value? The intrinsic value is nothing but it refers to the amount by which the particular option is in the money, the intrinsic value basically is nothing but it is the amount by which the particular option is in the money. And if the particular option is out of the money then it has zero intrinsic value.

So, for a call option which is in the money, the intrinsic value is the excess of stock price over the exercise price or excess of any kind of underlying asset over the exercise price. For a put option which is in the money the intrinsic value is the excess of exercise price over the underlying assets price, or here we are considering the stock price is the underlying asset.

So, in this context what basically here we are trying to see, the difference between the spot price and the exercise price that is basically the intrinsic value. And the extra whatever you have paid as the premium that is basically consider as the time value of that particular option, so that is a premium over the parity.

So, one thing is paid because we want to maintain a parity, in terms of the exercise price and the spot price and another one is paid because there is a time value of money involved in that particular context, because the money will be paid after certain period of time.

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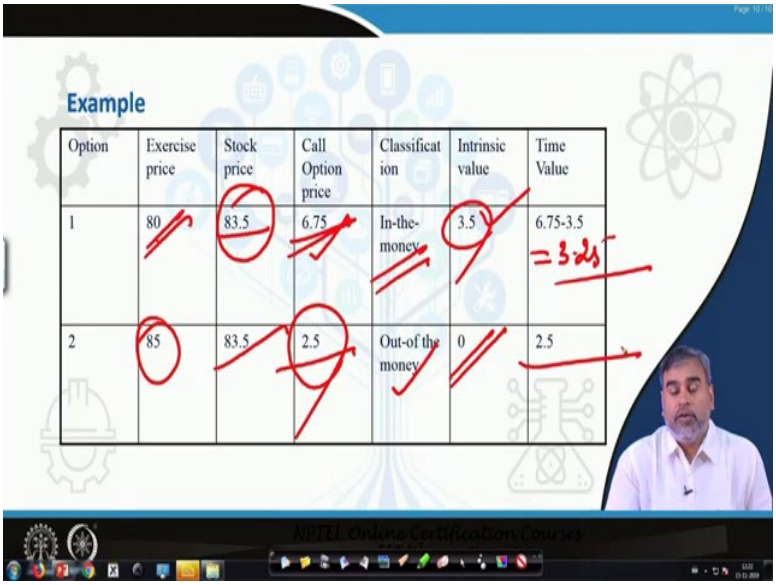

So, if you see this example let there is an option whose exercise price is 80 and the stock price or underlying asset price is 83.5 on that today, let the call option the investor has paid that is 6.75, then obviously your stock price is greater than the exercise price, so it is in the money, so intrinsic value is 83.5-80 that is 3.5 and if you are trying to find out the time value of money that is 6.75 - 3.5 that is basically 3.25.

So, that is your time value and the 3.5 is the intrinsic value. Second case if you see that the exercise price is 85 your stock price is 83.5 then let the option premium or option price is 2.5 then obviously it is out the of money the option will not be exercised because it is a call option that what this stock price is already lower than the exercise price, then obviously the intrinsic value will be 0.

And whatever is the call option that totally basically is the time value. So, the option premium is always decided the option price is all decided which is a combination of both the

intrinsic value and as well as the time value of that particular option. So, that basically you have to keep in the mind.

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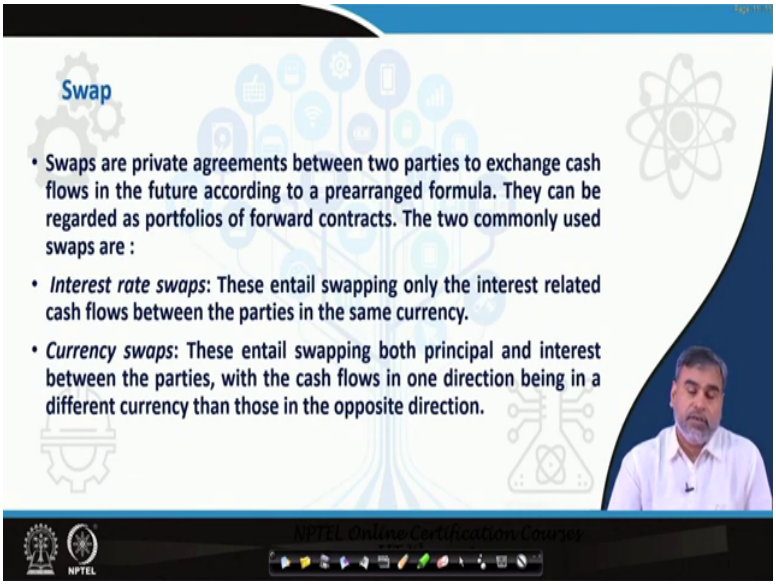

Then we have another instrument we have that is called the swap, swap is basically what it is a private agreement between the two parties to exchange the cash flow in the future according to a prearranged formula. So, they can be consider also as a portfolio of the forward contracts. And two commonly used swap basically people are using or popularly the banks also use, that is the interest rate swap and the currency swap.

And whenever you talk about the interest rate swap this basically is the swapping only the interest related cash flows between the parties in the same currency, but whenever you talk about the currency swap it is the swapping of both principal and interest between the parties, with the cash flows in one direction being a different currency in those in the opposite direction.

So, the basic objective of the swap is what to convert somebodies nature of liability and to also convert the nature of the asset. For example, somebody one bank is basically or one company is basically going towards a floating rate loans, then they want to convert from floating rate to fixed rate.

So, another bank who wants to convert from fix to the floating, so the swap can take place between these two and end of the day whenever the swaption will take place or the particular swap will take place then you will find that the particular nature of the liability has been

changed or the nature of asset has been changed. So, that we will discuss in elaborate way in the forthcoming sessions, but the basic objective of the swap is to sense the nature of the assets and liabilities that actually you can keep in the mind.

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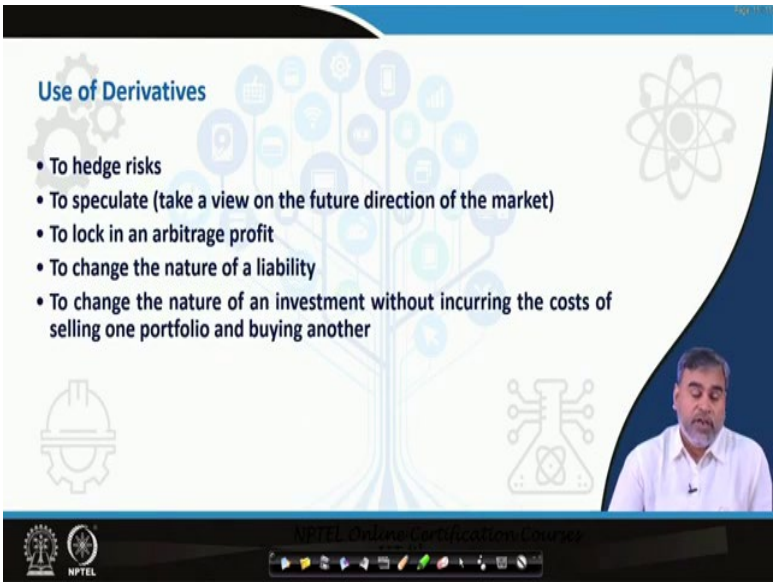

Then already we know that what is the use of the derivatives mostly the basic purpose of the derivative was to hedge the risks but in today's context people are not hedging, hedging the risk means? Either at least you should not gain in the market or you should not lose in the market, so it is just like a zero sum your total net worth or the value of that particular equity or value of any kind of asset should be intact.

But nowadays people are using the hedging instead of using it as a hedging instrument, people are using it as a speculative instrument there predicting the future market and accordingly they are putting their money in the derivatives market to get the high return, it is also can be used to lock in an arbitrage profit because if you can predict the future trend then if you are locking your particular price in the future then you can create some arbitraries profit in the system.

To change the nature of liability that already I told you the basic use of swap is that the basic nature of liability and asset that basically always you use the swap for that. And to change the nature of an investment without incurring the cost of selling one portfolio and buying another, because simultaneously you are taking the positions in both the markets by that the total risk can be hedged out or the value of equity can be, you can always minimize your loss in terms of the value of the portfolio what you have hold.

So, basically holding in that particular point of time, so these are the different use of the derivatives, but the most important use of the derivative is the hedging the risk. For the commercial banks use the derivatives instrument mostly to hedge the risk, but there are different firms like hedge funds and other things, they are using the derivatives instrument for the speculative purposes worldwide.

So, in this context mostly we will see how that hedging takes place and how the commercial banks use that hedging to minimize their interest rate risk in the market in the different conditions. That we will discuss in the next session.

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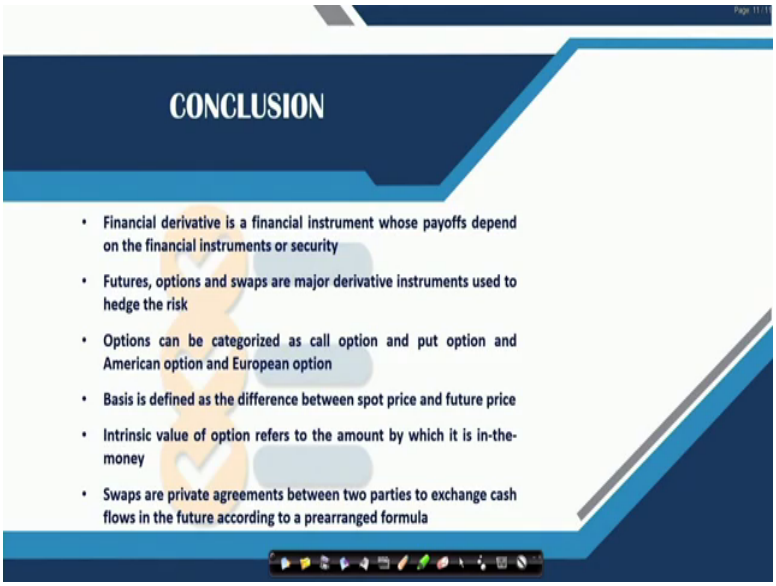

So, this are the conclusion, these are financial derivative is a financial instrument which pay off depends on financial instruments or security. Futures, options, swaps are the major derivatives instruments used to hedge the risk. Options can be categorized as call option, put option, American option, European option. Basis is nothing but the difference between the spot price and the future price.

And the intrinsic value of option is nothing but the amount by which the option is in the money. And the swaps are basically the private agreements between the two parties to exchange the cash flows in the future according to the pre-arranged formula. And mostly the swaps are used to change the nature of assets and liabilities in the system.

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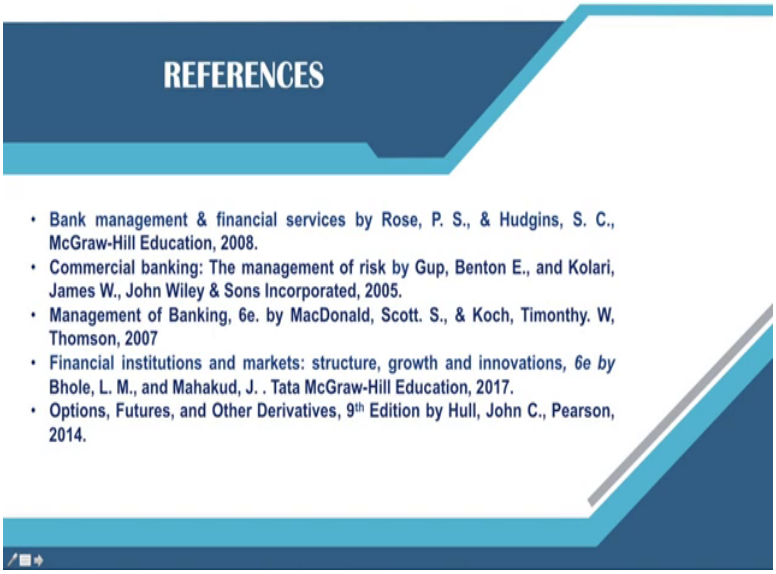

So, these are the references you can go through some of things and thank you.