Quantitative Investment management
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Lecture 02
Hybrids, Derivatives

So, let us continue, but before we proceed with the hybrid instruments, let us make a brief mention of what we were discussing before lecturer, would like you to please refer to the NPTEL material on security analysis and portfolio management, where it has been explained the relationship between debt and equity in a lot of detail. Basically, what happens is that, the amount of equity that you have in a company acts as a cushion for lenders.

So, if the cushion is larger, if the cushion is fatter, that means, the risk of lenders is less and as a result of it, they can lend money at lower rates, but if the company incurs losses and that cushion is wiped out or that cushion is squeezed, then the amount available as cushion for the lenders becomes less The lending becomes more risky in that company. And as a result of it, the rate of lending also increases, people are reluctant to lend money to the company and you have to pay more to attract borrowing into the company.

So, that is the relationship between debt and equity, equity acts as a cushion for lenders. But as I mentioned more of it in that particular course on security analysis and portfolio management, the beginning of that course, first few lectures are devoted to this particular aspect. Let us now move to hybrid instruments.

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PREFERENCE SHARES Preference share capital means, in the case of a company limited by shares, that part of the capital of the company which: (1) carries a preferential right to payment of dividend during the lifetime of the company; (2) carries, on a winding up, a preferential right to be repaid the amount of capital paid-up.

Now, Hybrid instruments are best optimized by the concept of preference share. So, what are preference shares, preference share capital means, in the case of a company limited by shares, I have already explained that concept, concept of limited liability, that part of the capital of the company which carries a preferential right to payment of dividend during the lifetime of the company. That means it has a preferential right it is a preemptive right.

As far as payment of dividend is concerned again, I will come back to it carries on a winding up a preferential right to be repaid the amount of capital paid out. So, as long as the company is running, if it is generating profits, then the preference shareholders have a preemptive right to have a preferential right in so far as the dividend is concerned. And on the binding of the company. Again, the preference shareholders have a preemptive right preferential right. In so far as a distribution of assets are concerned, the claims or the preference shareholders must be met before any payment is made to equity shareholders.

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DEBT RELATED FEATURES Fixed returns as dividend Pre-emptive right to (i) dividend (ii) return of capital No voting rights Voting rights only if the company is in default of preference dividend for 2 years or more (sec 47 of 2013 Act).

So, debt related features or preference shares, they have usually a fixed rate of dividend. Usually, the preferred shares enjoy a fixed rate of dividend just like lenders who have a fixed rate of interest. But please note, here the word is dividend. There the word is interest. In the case of debt, we use the word interest in the case of preference shares, we use the word dividend, and we will check it later. Preemptive right to dividend in eternal capital.

I have already explained that preference shares are under normal circumstances do not have any voting right on resolutions with that are on the table on the shareholders meetings. As far as the operations of the company are concerned, however, in certain special situations, no voting rights to do our voting rights are enrolled or preference shareholders by the Companies Act 2013. If the company is in default, a preference dividend for 2 years or more. This is Section 47 of the 2013 companies act.

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EQUITY RELATED FEATURES

- Dividend is discretionary
- Dividend is appropriation of profits
- · Dividend is not a charge against profits
- No tax shield on dividend
- Voting rights in case of default of dividend

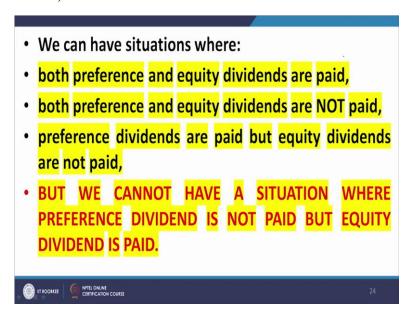


As far as equity related features no headlines, the reason why we call the return on preference shares as dividend and not as interest, dividend is discretionary. In other words, the company has a discretion and so far as the payment of dividend is concerned even on preferential shares. It means that a company may have profits even and even then, it may decide not to pay dividend to preference shareholders.

However, if as far as interest is concerned, as we mentioned time. And again interest is a mandatory payment, the company must pay interest irrespective of the outcome of operations of the company. So, dividend is discretionary, interest is mandatory and here preference shareholders dividend is also discretionary.

Dividend is an appropriation of profits just like equity dividend is a distribution of profits. Dividend is not a charge against the profits, because a dividend is discretionary. So, it is not taken as a charging as the profits and have because dividend is not a charge against the profits. No tax shield is available on preference dividend as well. See how logically one property follows from the other dividend is discretionary, dividend is not a charge against the profits and therefore dividend does not enjoy any tax shield even for preference dividends. Voting rights in the case of default.

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Now, therefore coming back to it what is the relationship between equity dividend and preference dividend. The important thing is both the dividends, equity dividend and preference dividend are discretionary both of them are discretionary. But if equity dividend is to be declared and paid, preference dividend must be paid and declared and paid before any equity dividend is paid, if the preference dividend is at a fixed rate than the entire fixed rate dividend on preferred shares must be completely paid before any equity dividend is paid.

In other words, we can have situations where both preference and equity dividends are not paid, we can have that situation irrespective of the company being in profits and losses, but we cannot have a situation where preference dividend is not paid, but equity dividend is paid. So, we can have situations of preference and equity dividend both are paid, we can have situations where both preference and equity dividends are not paid.

Notwithstanding the fact that the company has no profit, we can have situations where preference dividends are paid, but equally dividends are not paid, but we cannot have a situation where the preference dividends are not paid and equity dividend is paid, we cannot have that situation that is the implication of the definition of preferences.

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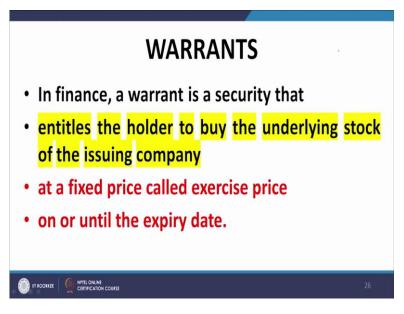


 and then can be converted into shares of common stock.



Then we have other hybrid securities typically convertible securities and warrants as well convertible securities are issued securities, they may be preferential they may be bonds with a convertible right with a sweetener in the form of the convertible right, which gives the holder of that security the right to convert that particular security into equity shares in the company at a price and at a particular point in time as specified in the offer document.

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Warrants are similar except the fact that warrant is tradable is it in its own right and the holder of the warrant gets the right to subscribe to the equal shares of the company on payment terms contained in the offer document, please note a convertible instrument is part. All of that instrument must be converted to equity shares the word is convertible.

So, part or whole of the instrument like preference shares or like bonds gets converted to equity shares may be part maybe whole, but in the case of warrants, it is an independent instrument and it is can be traded with tradable as well it can be traded in its own right and it has to be surrendered to the company together with the exercise price at which the company allots equity shares to the warrant holder on the warrant holder surrendering the warrant.

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DERIVATIVES

- Derivatives are securities whose value is based on the price or value of an underlying asset.
- The underlying asset may be stock, stock index, T-bill, T-bond, exchange rate, interest rate, commodities, real estate etc.
- Examples: forwards, futures, options, swaps, future options, etc.



Now, we talk about derivatives the final segment that is derivatives. So, derivatives are a variant of financial instruments where we have a slightly complex situation, we have an underlying asset, an asset like let us say we have equity shares, let us say we have these shares of RIL, and then we have a contract, which the contract is such in nature that the value of that contract varies in relation to there is a functional relationship between the value of the contract and the price or value of the underlying instrument, for example, the (())(8:55).

So, if you have a derivative on the RIL shares, then the value of the derivative contract derivative is a contract in fact, so, the value of the derivative contract will change in relation to the changes in the value or price of the underlying asset. So, that is what a derivative is. There is a functional relationship between the contract and the underlying instrument which implies or which results in the value of the derivative changing in relation to changes in the value of or price of the underlying asset.

So, it is two Folder relationship. The underlying asset as I mentioned, maybe shares but it is not restricted to share certainly, we can have stock indexes like the we have for futures on a Nifty, we have futures on the S&P Sensex, and we can have interest rate futures as well

interest rate derivatives where the underlying instrument is our treasury bills. We can interest rate instruments on Treasury bonds as well. Exchange rates can be underlying instruments, interest rate, commodities, real estate, etc.

So, there is a multitude of variety of derivatives, derivative contracts have been written on literally, everything under this under the sun, the typical examples of these derivative contracts. And again, take it up in this second segment of this course, the typical examples of the building blocks of derivatives are forwards, futures, options, and swaps. So, let us, let me briefly explain the salient features of these types of contracts.

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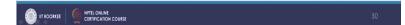
- The individual selling the derivative doesn't need to own the underlying asset outright.
- Derivatives may only require a relatively small down payment in relation to the maturity payoff.

So, before I get into that, the individual selling the derivative does not need to own the underlying asset outright, derivatives may only require a relatively small down payment in relation to the maturity of this, this point is very interesting. This enables the derivative holder by virtue of using the derivative to leverage his position, and so far as investment is concerned.

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IFRS DEFINITION OF "DERIVATIVE"

- IFRS 9 defines a derivative as a financial instrument with all three of the following characteristics:
- Its value changes in response to the change in an underlying variable which may be price, interest rate, index of prices or rates, credit risk or the like.
- It requires no initial net investment or a smaller initial net investment relative to other instruments having similar risk-return characteristics.
- · It is settled at a future date.



IFRS definition of derivative. IFRS 9 International Financial Reporting Standards IFRS. This is the formal definition of derivative the technical definition of derivative, so let us quickly run through it. IFRS 9 defines a derivative as a financial instrument with all 3 of the foreign characteristics IFRS 9 defines the derivative as a financial instrument with all 3 of the following characteristics.

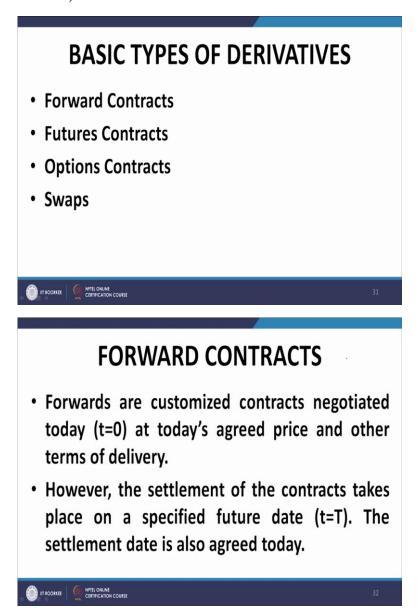
Its value changes in response to the change in an underlying variable, which may be price, which may be interest rate, which may be an index of prices, or rates, which may be credit risk or the like. So, the underlying asset, there is a huge spectrum a wide spectrum of underlying assets on which derivative contracts have been written. As I mentioned, it could be price of some commodity, price or some financial asset like stocks bonds, it could be the interest rate, it could be the exchange rates, it could be index prices, could be credit risk as well, we have credit default swaps, we will discuss in later.

It requires no initial net investment or a smaller initial net investment relative to other instruments having similar risk return characteristics, it is settled at a future date. Now, the important thing here is that in the case of derivatives, you take a position in a derivative, your upfront cash flow is very small.

However, the cash flow at maturity of the derivative, which is at a future date, naturally, may be significantly more. So, in some sense, it magnifies the cash flow, but again, it magnifies subject to certain conditions. And therefore, derivatives are sometimes termed as contingent

claims as well. The basic types of derivatives already mentioned, we have forward contracts, we have futures contracts, we have options and we have swaps.

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Forward contracts. Let me try to explain this with an example. Normally, suppose you have to buy some commodity in the market. So, you have to buy a calculator from the market, what would you do, you would go to the market, you select the calculator, and you will pay the price and the vendor would hand you over the calculator that you have selected, this is precisely what we have in the normal course of events normal sale purchase deal, this is called a spot transaction because the contract is settled.

In other words, the payment is made and the goods are received immediately with that negotiation. You negotiate the price, you identify the desired calculator, you negotiate the

price, you pay the price and you receive the calculator. So, everything is literally spontaneous. And that is why it is called a spot transaction. It is also called a cash transaction. However, they let us modify the situation a bit, you go to the market, and you select a calculator. You negotiate the price today.

And then you say, Okay. I will buy this calculator from you. I promise that I will buy this calculator from you. But I will buy it one month later when I get my stipend. One month later, when I get my stipend on the first of next month, I will come back to you and make you the payment and I will take the calculator from you. The shopkeeper or the vendor also agrees, so this is called a forward contract.

Where the negotiation is done at an earlier point in time, let us call t equal to 0. However, the actual settlement of the contract that is the delivery of the underlying asset and in making up the payment is done at a later point in time, which is called the maturity date of the forward contract, let us call it t equal to capital T, this symbols, would be used literally universally during this course, t equal to 0 is today, t equal to capital T to preserve the majority of the instrument.

So, forward are customized contract there is another feature which is customized. I will come back to it forwards are customized contracts negotiated today t equal to 0 at today's agreed price, everything is agreed today, the quality of the calculator, the type of the calculator, the price that is to be paid, how the delivery is to be met, all the things that pertain to the unambiguous settlement of the contract as at maturity are all agreed at t equal to 0, but the actual execution of the contract, the settlement of the contract takes place at a specified future date t equal to capital T, the settlement is also agreed, the settlement date is also agreed today.

So, this is the difference between a spot transaction and a forward transaction. The first half of this spot transaction as far as the negotiation part is the same as it is for the forward it is the execution part, it is the settlement part. In the case of spot transaction, it is spontaneous with the negotiation. In the case of the forward contract, it is at a later date. But please note that later date is also agreed upon t equal to 0.

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- Cash flow occurs in the future. No cash flow now except margin.
- Since forwards are private contracts, they are susceptible to default risk.

Cash flow occurs in the future that is what I said the payment, the cash flow due to the payment of the price also occurs on the date of maturity of the forward contract, no cash flow, now except margin. For example, the shopkeeper who is having that calculator, it may be a singular calculator which is not easily available. And the shopkeeper may say, Okay, I will keep it for you for one month. But as token of my undertaking to keep it for you for one month, please pay 10 percent of the purchase price as a token of your commitment to come back to me after one month with your stipend and taking the calculator that is called margin.

And that may be stipulated depending on the negotiation between the 2 parties, the seller and the buyer of the goods. Forwards are private contracts that is a very fundamental property of our contract that they are private contracts you and the shopkeeper have agreed to a certain price and other terms so far as the delivery of the contract delivery of the calculator is concerned. Now, the important thing is, this is singular to you and the shopkeeper.

The world at large is not involved in this particular transaction. It is a transaction between 2 parties, isolated parties, the buyer and the seller. And therefore, both of you are susceptible to default risk. The shopkeeper may say may get a higher price for the calculator tomorrow and may decide to sell off that calculator without waiting for you. And when you come back after one month, he will say that No, no, no, I do not have the calculator.

I have sold it or you may decide not to come you may get the same calculator at a cheaper price from a third party from a third, another second shopkeeper and you may say that you will buy it from there and you will never turn up with your stipend to buy the calculator from the original shopkeeper. Now, this kind of default possibilities very much they are in forward contracts. Now, this is called default risk.

And but the important part is, important part is because this contract is singular to you and the shopkeeper number one and the first shopkeeper. Both of you have interacted amongst yourselves. Both of you have seen in the sense both of you are acquainted yourself with the other and as a result of which both of you have had that opportunity to assess the risk profile of the other what is the possibility of you are not standing up for buying the calculator and on your part, what is the possibility of the shopkeeper selling the calculator to some other party without waiting for you.

Now, that is the important part that is the fundamental part you get opportunity to assess the possibility of default and as a consequence there to you as well as the shopkeeper can take adequate remedial measures. For example, as I mentioned, the shopkeeper may demand 10 percent of the price of the calculator as a margin. So, both of you have the opportunity to take remedial measures to protect yourself in the event of default by the other party. This is very important, why it is important. We will come back to it.

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Now, why it is important is explained in this slide, contracts which are very similar but not exactly the same as forward contracts are called futures contract. They are very similar to forward, they are very similar to forward contracts in the sense that they also entail the delivery of the underlying asset at a future date on terms which are negotiated at t equal to 0.

And the payment of the price also is as per the forward contract. This is the basic feature of the futures contract. But there is a host of differences as well.

The fundamental differences as I mentioned, just know forward contract is between the shopkeeper and you, between the shopkeeper and you, the world at large is not involved, you can negotiate with the shopkeeper, the shopkeeper can negotiate with you, the terms can be agreed upon, the risk can be assessed precautions protection for default or in the event of default can be incorporated into the contract. So, everything is between the 2 parties is private to the 2 parties in the forward contract.

However, the futures contract have a different feature, the futures contract are tradable the power contract because they are private to you, they are not tradable, you can assign that forward contract you can assign your lack of the forward contract to me, but you can only do so with the consent with your shopkeeper, instead of me, he will come down and he will buy the calculator.

So, assignment can be done, but it has to be done with the consent of the other party. In contrast, they are 2 in the case of futures contract, they are freely tradable. I repeat a reiterate the word freely tradable at exchanges, which are set up for the trading of such futures. For example, we have trading of Nifty futures on the NSE exchange, we have the trading of BSE Sensex, futures S&P, BSE Sensex futures. Also, on the exchange on the on the NSE, we have futures on a host of other products. A host of other equity shares also tradable on the on the national stock exchange.

So, futures are tradable forwards are not tradable. At best, they are assignable. With the consent of the other party, futures are freely tradable, you do not need the consent of the other party. No because of this feature. Because of this feature that the futures contracts are freely tradable or have to be made freely tradable, because they are designed to be freely tradable, we need to have 2 fundamental properties embedded in futures contracts.

The first property is that they need to be standardized, it is only then that they will have adequate liquidity in the market buyers will be able to identify sellers and sellers will be able to identify buyers, you see, if you have a very similar kind of exposure, for example, you need 2,352 dollars then it is very difficult to find a counterparty with a similar kind of availability of 2,352 dollar in an open market.

So, the net result is just as we have a standardization of currency, standardization of various other items, like trading lots of shares, we need to have standardization of futures in order that we have adequate liquidity prevailing in the market insofar as credibility of futures is concerned, that is one part.

The second part arises from what I said about risk in the case of forward contracts, forwards are not default free, either party to the forward can default on the contract, but as part they are 2, I also mentioned I also mentioned that in the case of forwards what we have is that the 2 parties interact among themselves and as a result of which they have an opportunity to assess the risk profile of the other, the possibility of default and to take remedial measures therefore.

Now, in the case of futures, that the situation is not fiber, why because futures are freely tradable. So, if A and B are in a futures contract, and B sells it to C, A does not get an opportunity to interact with C, B can dispense with this take without getting the consent of A and therefore, in order that this kind of transaction is uninhibited it is freely done, we need to ensure that the futures are default to free.

In other words, in order to facilitate, facilitate an inhibited trading in futures contracts, we need necessarily to have that the futures contract should be free from default risk and this is done by the exchange, it is done by the clearinghouse of the exchange which intervenes between the 2 lacks of the future.

If A and B are in the future, then it is split up into 2 contracts A and clearing house and B and clearing house and as far as the Clearing house is concerned, or as far as A is concerned, A is guaranteed performance of B by the clearing house and B is guaranteed performance of A by clearing house as a result of which, insofar as A and B are concerned, the contract becomes a default free process, clearing house protects itself by the twin process of marking to market and margining what are these terms, we shall come back to it later part of this course.

I repeat this a try to understand what is happening is that the Clearing house is acting as an intervening party which is guaranteeing the performance of both the lack of the contract. So, it is that clearing hospital which becomes susceptible to the default risk of either party to the futures contract. And as a result of it, the clearing house has to evolve a mechanism whereby it can protect itself in the event of detriment on due to default of A or due to default of B. It does so by introducing the twin mechanism of marking to market and margining. But what exactly marking to market and margining is, we shall come back to it.

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FORWARDS VS FUTURES

- Forwards are private contracts
- · Forwards are customized
- Forwards carry one specified delivery date usually
- Forwards are settled at maturity by delivery or cash settlement
- · Forwards carry some credit risk



Now, forwards are private contracts, forwards are customized as I mentioned, forwards carry one specified delivery date these are some features of forward contracts. Forwards are settled at maturity by delivering or cash settlement you can have either settlement by delivery or cash settlement forwards carry some credit with some default risk.

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FORWARDS VS FUTURES CONTD...

- · Futures are exchange traded contracts
- Futures are standardized
- Futures may carry one or a range of specified delivery dates
- · Futures are settled daily by MTM
- · Futures are usually closed out before maturity
- · Futures carry virtually no credit/default risk



As far as futures are concerned, futures are exchange traded contracts. Futures are standardized, futures may carry one or a range of specified delivery dates. Futures are settled daily by MTM, I mentioned these 3 terms, but I have not explained it. I will explain it in due course, futures are usually closer before maturity, and futures carry virtually no credit or

public default risk. As I mentioned, both the lack of the futures contracts are guaranteed by the clearing house of the extent at which these futures contracts are traded.

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OPTION CONTRACTS

- Option contracts are contracts whereby the holder of the option acquires a right to buy/sell a certain asset by/on a certain date for a certain price.
- The seller of the option has the obligation to honor the option if the holder decides to exercise the option. He has no discretion.
- Option contracts that give a right to the holder to buy (sell) the underlying asset are called calls (puts).



Now we talk about options. Now, the important part which differentiates the forward futures with service options is one fundamental property. In the case of forwards as well as in the case of futures contracts, what happens is that both the parties to the contract that is you as well as the shopkeeper, both of you have obligations under the forward contract.

In other words, it is your obligation that you go to the shopkeeper whenever you receive your stipend on the first of next month and go off to the shopkeeper for purchasing the calculator or it is the shopkeepers obligation that he makes the calculator available for you for purchase, as on that for delivery that particular get that is first of next month.

Now, similarly, in the case of futures, the position is pretty much similar. So, I like to take it up basically, both the parties to the contract have obligations. Of course, the clearing house acts as an interview. But that does not absolve the 2 parties from honoring their lack of the contract. The basic thing is that both in the case of futures and forwards both parties and undertake obligations under the substratum of the contract.

However, when we talk about options, the situation is different. Again, we have 2 parties to the contract party A party B, party A let us say is the party who is the holder of the option. The party A was bought the option, let us say who is long in the option in technical terminology, and then party B who is the writer of the option who is shot in the option who

has sold the option. So, there are 2 parties, party A buys the option contract, party B sells the option contract.

What is the option contract? Option means what option means choice, options discretion, and option means election. So, the basic when we talk about the option contract, one of the parties, one of the parties, that is which party, the party was bought the option contract. The party who has bought the option contract has the discretion has the privilege, has the prerogative to decide.

Whether to exercise the option contract or to let the option contract lapse, as on the maturity of the contract, as per the terms of the option contract, let me repeat the holder of the option, the person who is bought the option, the person who is long in the option has the discretion has the right has the privilege, either to exercise the option, whatever that option may entail, or to let the option contract lapse. Back. As far as party B is concerned, the party who has sold the option count contract.

As far as party B is concerned, it is mandatory, it is obligatory what party B, it is obligated for party B to honor his lack of the contract. For example, if it is a call, or it is an option to buy an asset, then it is mandatory for the party B to make that asset available for purchase. Option B, the party B cannot offer his own escape from the option contract. He has the obligation party A has the right party B as the obligation.

They are on different pedestal and to call a to compensate party B for being at a lower pedestal for being or for carrying an obligation in contradistinction to A who has the right party a gives a certain sum of money to party B, which is called the premium of the on buying the option or the price of the option. So, party A gives a certain price of the option in order to buy that contract.

And what does the contract give you it gives you the right the either to exercise the contract or exercise the option under the contract or to let the option lapse. Party B on the other hand, who has sold the option who has got the premium was received the premium, it is mandatory for party B for to honor his lack of the contract. Of course, if A allows the option to lapse, then B go scot free and he pockets a premium. But if A decides to exercise the option, B must honor his lack of the contract. This is will be continued in the next Lecturer. Thank you.