Security Analysis and Portfolio Management

Prof. J. Mahakud

Department of Humanities and Social Sciences

Indian Institute of Technology, Kharagpur

Module No. # 01

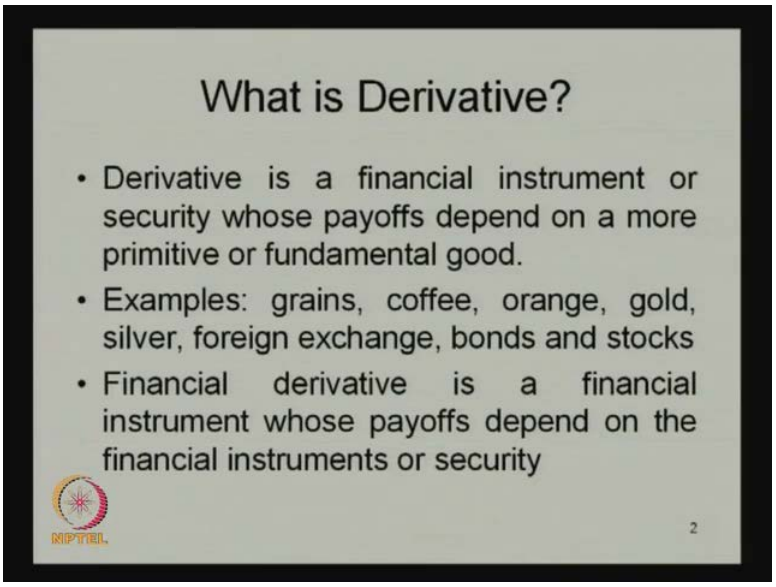
Lecture No. # 37

Derivatives- I

After discussing about the equity portfolio management and the instruments related to the fixed income like bonds. So, today we will be discussing about another type of financial instruments which are used in the market for investment, which is defined as the derivatives.

So, before going to use it as an investment alternative, let us see that, what exactly the derivative is, whenever we talk about the derivatives. In general derivative is basically is not an instrument, which is totally different from the other instruments which are available in the market.

(Refer Slide Time: 00:47)



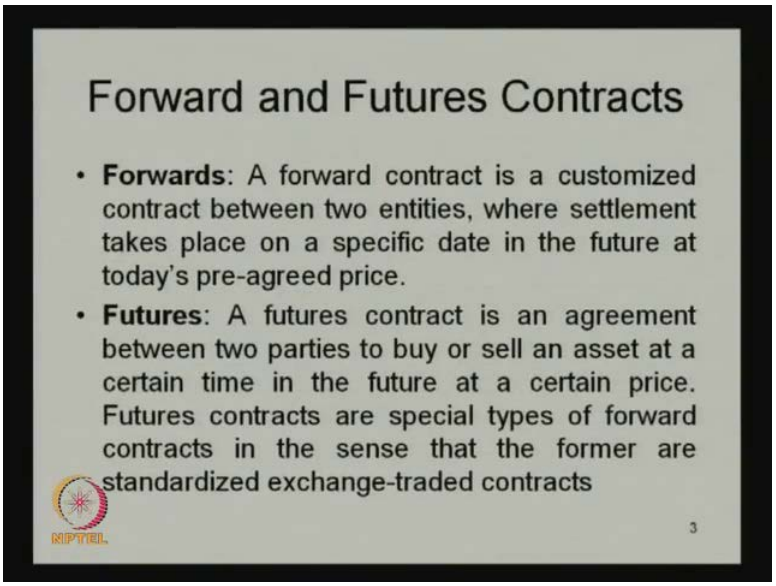
And basically this particular instrument, the price and other characteristics are derived from the other existing instruments in the financial market like either with the physical

assets like grains, coffee, orange, gold, silver, etcetera and also we have the bonds and stocks. That means all the characteristics and the price of those assets will be derived from another financial assets, which really exist in the market.

So, that is why what we can say that derivative is a financial instrument or security, whose payoffs depend on a more primitive or fundamental good. That means, the price and the other characteristics are derived from another asset and another asset can be anything, it can be a physical asset or it can be a financial asset, which are already having discussed in the class, in the previous sessions like bond securities etcetera.

Therefore, in general, whenever we talk about the financial derivative, the financial derivative is basically is the financial instrument, whose payoff depend on only the financial instruments and securities like the payoffs of the equity or payoffs of the bond. So, therefore, if you talk about the financial derivatives, then basically in the back up of the mind, we have the assets like equities and bonds, which are largely used for the investment in general case.

(Refer Slide Time: 02:25)



So, then, which are the different types of derivatives we have? We have the different types of the derivatives if you are aware about, these are the words or the common words used in the financial market. These are like the forwards, like futures, like options

etcetera, but let us see what exactly the forwards, futures and options and so and so are like this or how it is defined.

In this context, if you go by one by one, let us see what exactly the forward is? A forward contract is a customized contract between the two entities, where settlement takes place on a specific date, in the future at today's pre-agreed price. That means, if in this case if I take example, let one particular producer wanted to sell certain amount of the potato on this particular date.

So, what he feels? Let he wants to sell the potato on December after the production, then he says that he feels that the price of the potato can go up to maximum let per kg 10 rupees. Then what he used to do? He sends this quotation to the concerned stock exchange that, I am going to sell certain amount of the potato; let we can say 10 tons of the potato on a particular date, on a particular month and the price should be 10 rupees per kg.

So, in that time, another buyer who basically needs the potato let us take the example of a particular company who produces the potato chips, let it is ITC or some other company who needs 10 ton of potato on December and according to his opinion, if the potato price can go above the 10 rupees. So, if he can make a contract today at the rupees of the 10 rupees, then he will be in a profitable position, that is why this potato producer wanted to sell the potato at 10 rupees per kg and the potato buyer wanted to buy this potato at 10 rupees particular per kg and on the December month.

So, then this contract has been made today and what the particular settlement and all this things will be carried out on that particular month or particular day, when this particular potato seller is going to sell the potato or going to deliver the potato to the potato buyers. So, that means, let the transaction does not takes place now, but settle this particular contract has been made between the buyers and sellers today and the agreeable price between them is 10 rupees.

That time in general, if you say the price of the potato will be more than 10 rupees, then the particular buyer will be in the profitable position, but if the potato price is less than 10 rupees, then the seller would be in the profitable position because, even the market price is 9 rupees or 8 rupees, but according to this contract he will sell this particular

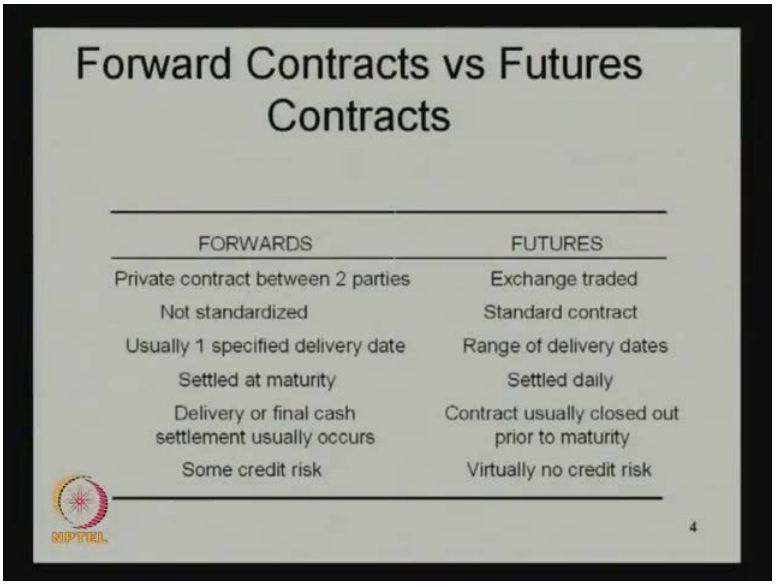
potato amount of the potato at the 10 rupees per kg. So, this is a normal example or one of the examples, what we can take about the forward contracts.

And then if you talk about the futures, a future contract is an agreement basically two between the two parties to buy or sell an asset at a certain time in the future, at certain price. And future contracts are special type of forward contracts in the sense that, the former are standardized exchange-traded contracts.

Basically what we can say that, on the future contracts forward and future contract characteristics are same, but the future contract is basically in standardize in nature. That means there is certain organized stock exchange will be responsible for this, but in the forward contract basically is carried out the transaction and settlement is carried out on informal basis.

So, therefore, what we can say? Although the characteristics between this two are same, the forward contract is not standardized, but the future contract is more standardized in the market for the settlement.

(Refer Slide Time: 06:38)



The next is if you say exactly, what is the difference between this forward contract and future contracts? Between them is you can see that, forward contract basically the private contract already what I told, it always happens between the two parties and it is not standardized and usually it one specified delivery date and a particular date will be

mentioned that let December 31st or December 2nd, the potato has to be delivered to the seller. So, therefore, this particular in the contract, the exact date has been mentioned from the beginning, and then they settle at maturity, once this particular settlement is made, we have to settle it in the maturity basis on that particular day.

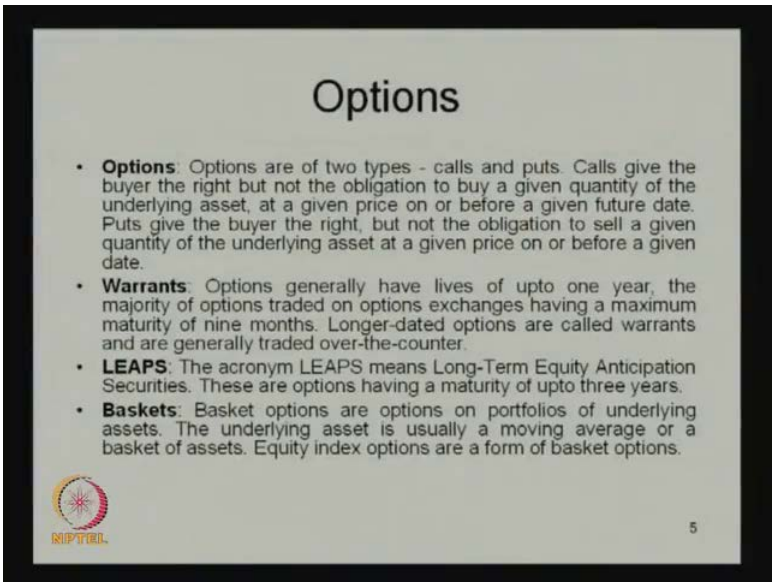
And delivery or financial or the final cash basically settlement usually occurs, final settlement will be occurs on that particular day at the time of delivery and some credit risk is involved in that, because it is not standardized, it is not regulated or governed by the standardized body like stock exchanges or any other, that is who are responsible for trading in the market.

But, if you talk about the futures, futures are exchange traded, already what I told because we generally send this particular quotation, particular requirement to the stock exchange. And the stock exchange will find out a suitable candidate who are ready to pay this much price. So, that is why there is a process in between and this particular process should be perfectly matched with buyer's obligations and the seller's obligations.

That's why we call it, it is a standard contract and instead of talking about one delivery date, sometimes you have seen that the range of delivery dates, within this dates to this date, this date this particular delivery has to be made.

And it is settled daily, construct usually the particular contract when we talk about, it usually closed out prior to the maturity and virtually no credit risk because the role of the different organized or standardized bodies are there; whenever the settlement and other things takes place between this two assets, between the two stake holders like buyers and the sellers.

(Refer Slide Time: 09:01)



Then we have another type of instrument, derivative instrument what we use that is called options and if you see that options are of two types, these are the call option and the put option. And call option give the buyer the right, but not the obligation to buy a given quantity of the underlying assets. It gives the buyer right that I have the right to buy this particular product or particular asset in so and so date.

But, I do not have the buyer does not have an obligation to materialize that particular transactions or to realize that particular transactions in so and so date. That is why they do not have any obligation to buy a given quantity of the underlying asset at a given price on or before a given future date.

And the put option basically gives the buyer the right, but not the obligation to sell a given quantity of the underlying asset at a given price on or before a given date. That means, what we can say? That option is little bit different because, the option basically again is this the contract has been made for a future date.

But here, the buyer has the right to realize that particular transaction to materialize the transaction, but the buyer does not have any obligation to materialize that particular transaction. Therefore, option is little bit different from the future and the forward contracts.

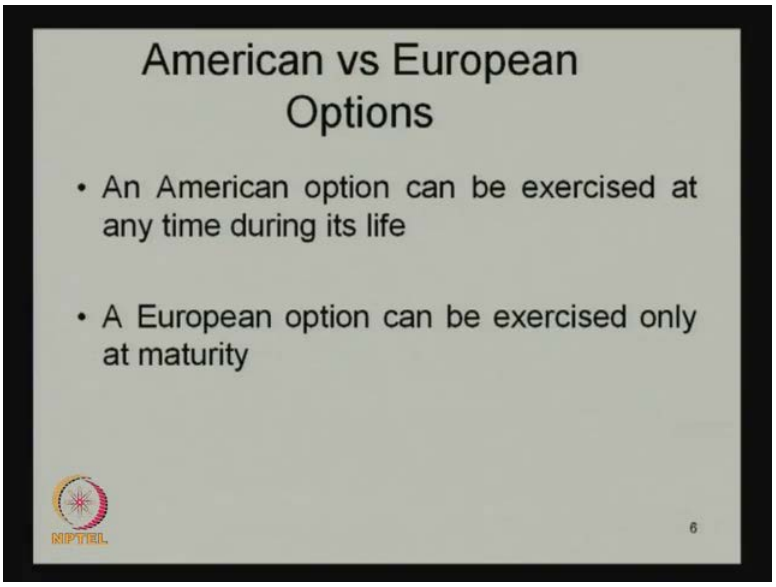
Then we have another type of instrument what we use that called warrants. Options, it is one type of options, basically the options generally have lives up to one year and the majority of options traded in the options exchange, having a maximum maturity of nine months and longer-dated options are called warrants and are generally traded over-the-counter market.

We have the two types of market already we know that, we have a OTC market over-the-counter market and exchange traded market and warrants are basically the long term in nature it has it is involved the long period and it is basically the one type of options what we can talk. And here, these kinds of instruments are basically traded in the over-the-counter market not in the exchange-traded market.

Then we have the leaps; the leaps means, basically the long term equity anticipation securities and these are the options basically having a maturity up to 3 years, again this one type special type of options, where the maturity is 3 years. Then we have the baskets, basically basket options are the options on portfolios of underlying assets and the underlying asset is usually a moving average or a basket of assets and equity index options are the form of a basket options.

We have the different type of options and out of them, if your particular instrument is not based on a single asset, if it is based on the certain portfolio or a bunch of assets or the basket of assets, then we can say it is a basket option or the example is already we have said here that, equity index option is one type of basket options, whatever we can see in the financial market for derivative trading.

(Refer Slide Time: 12:24)



So, therefore, these are the different type of options what we really see and which are the different type of options on the basis of their maturity. If you talk about their maturity and the exercise, we have two types of options always we can see. That is your, one is your American option and another one is the European option and basically American option is nothing but, it can be exercised at any time during its life.

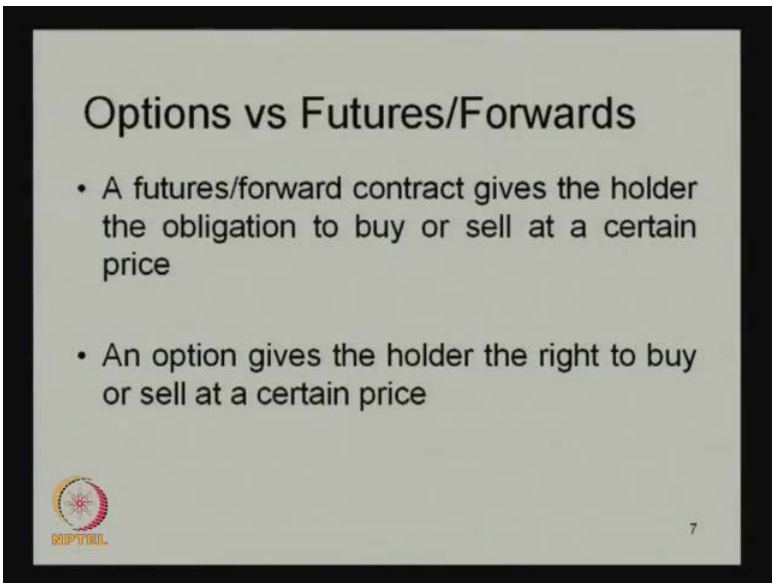
Let we can say we have made the contract that, the particular contract will be exercised on so and so date, that we have assigned this date that December 31st is the date on which the particular contract would be exercised. But, if it is American option, then it can also be exercised before the maturity date. So, there is no straight forward rule that, this particular option has to be exercised on 31st December.

But, if it is European option, then the option has to be exercised this particular contract has to be materialized on that particular date; that means that is the 31st December. There is no such kind of there is a restrictions that this particular contract can be materialized before the 31st December. So, the realization of the exercising this particular contract has to be made on that particular date, the date at which mentioned in the contract whenever the contract has been signed.

So, therefore, what we can say it is little bit different, the American option has more flexibility, that any time this particular option can be exercised and that particular

contract can be exercised, but whenever we talk about the European option, it cannot be exercised unless we do not reach on that particular maturity date. So, therefore, we have a difference between the exercising this particular contract in a particular time period.

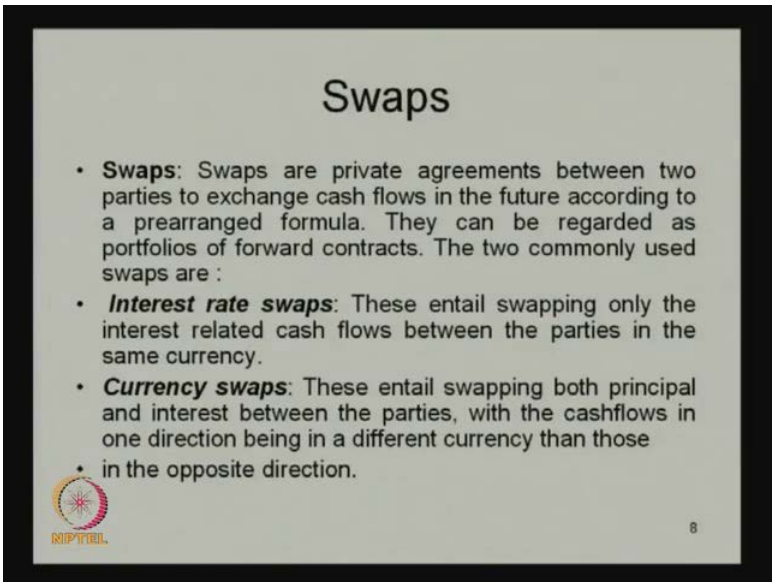
(Refer Slide Time: 14:09)



Then if you compare between the options and the future and or the forwards, if what kind of difference we can see, the difference is that, either it is a future or forward contract, it gives the holder the obligation to buy or sell at a certain price. It has the obligation once the contract has been signed, it is the right as well as obligation to buy this particular thing or to exercise this particular contract in a particular date or particular time, but an option gives the holder, the right to buy or sell at a certain price.

It has no obligation, it has the right of the buyer that this particular contract should be exercised and it has to be realized, but whenever we talk about the future and forwards, it has the obligation, this contract should be exercised at particular date.

(Refer Slide Time: 15:03)



Then we have another type of instrument, what we generally see that is called the swaps. Swaps are basically the private agreement between the two parties to exchange cash flows in the future according to a pre-arranged formula. They can be regarded as portfolios of forward contracts, the two commonly used swaps in the world wide are basically the interest rate swap and the currency swap.

What basically this two things say is that, this interest rate swap basically entail the swapping only, the interest related cash flows between the parties in the same currency and currency swaps, which basically talks about the swapping between the both principal and interest between the parties with the cash flows in one direction, being in a different currency than those in the opposite direction.

What it exactly means? It exactly means that, whenever we talk about this instruments which is related to the swap. Basically, we find out a different customer in this, that let you take you, I anticipate that interest rate will go up and another stake holder or another investor is there, who it is anticipating the interest rate will go down. Then we can exchange or we can swap between the two instruments and on the basis of our objectives and by that, we can hedge the risk in the future using or by swapping this instruments whatever we are holding now, for the investment that is basically called the swapping.

That means on the basis of the requirement, let I can hold a certain bond and he can hold a long term bond and now the swapping can takes place, swapping can take place only on the basis of the mutual understanding between the two parties depending upon their predictive power in the market and what is going to happen. And this is more generally happens, whenever the cash flows is related to the interest rate within the same currency within the same country and whenever we talk about the swapping in terms of the currency swap, swapping in terms of the currency. Then basically, it happens in terms of between the two countries depending upon their exchange rate and etcetera and depending upon the forecasting of the market. So, then these are the broadly different type of instruments what we have seen.

(Refer Slide Time: 17:30)

Then there are different ways through which the derivatives are used, why generally the derivatives are used? Some of the investors and some of the people or the researcher have argued that, the derivative instruments are used for the risk management and basically to hedge the risk in the market, that if there is a risk in the market or there is price risk or there is a reinvestment risk in the market and we can hedge this kind of price risk on the reinvestment risk for that particular asset in the market by taking a position in the future market, which is basically a virtual market which is not existing.

And that will be materialized only after a certain period and they generally take the position in such a way that and they take the position on the basis of their predictive

power on that basis, they can hedge the risk what they are going to face today. And this risk can be offset to the particular risk, what they are going to face today and what is the risk they are going to face in that particular date. Therefore, they generally hedge their risk by taking a position in the future market, depending upon the moments of the fundamental factors or fundamental assets on which this particular derivative is relied, derivative is derived.

Other people said that, to speculate it basically we can gain something from the market is because that go back to the example. If you are I am looking that the interest rate is going down or going up, the price of the potato is going up, and then basically my prediction is that the price can go up to 10 rupees, but his prediction is price may go above the 10 rupees.

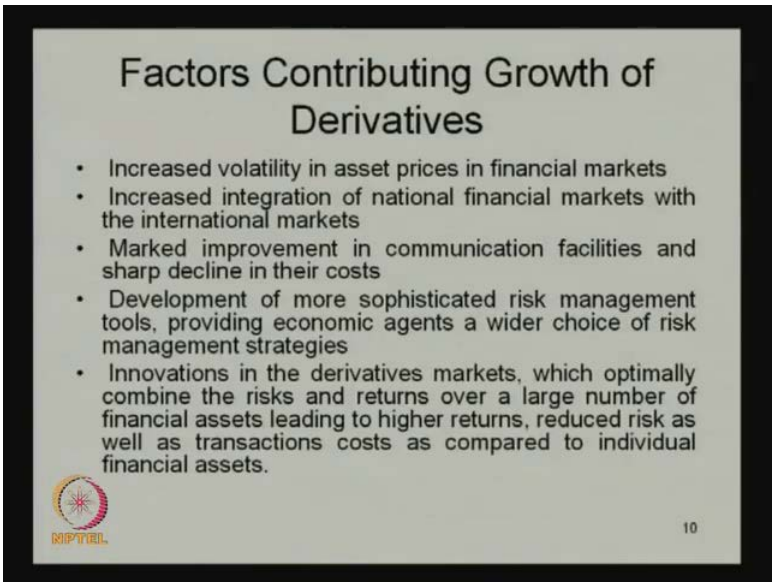
In this case, he is speculating that the how the price will be there in that particular date? Therefore, I am speculating to maximize my return in the market by taking a position in the forward or the future market. Therefore, some of the people say that the derivative instruments are used to speculate in the market.

And another people said that to talk to lock in an arbitrage profit, basically if there is already you know what arbitrage is, there it should not be. If there is arbitrage opportunity, the price of the single product cannot be have cannot have the different price in different markets at the same time.

But, to lock this particular arbitrage profit in a particular time, what this investor does? He takes a position in the future market that is why, they can lock the arbitrage profit by which this price realization or the return maximization can be taken place.

And to change the nature of the liability, on the basis of the future liability, what the investor has and to change the nature of an investment without incurring the cost of selling one portfolio and buying another. It is basically one way of the general notion or general notion of use of the derivative instruments in the financial market.

(Refer Slide Time: 20:32)



Then, how generally this importance and why the importance of the derivatives has gone up in the recent period. If you have observed in the financial market, it is the most emerging instruments or most emerging financial asset which is used for the investment by almost all the investors in the worldwide and why basically it happens? It happens it is because that increased volatility in asset prices in financial market.

Because the riskiness in the financial market, the investment in the financial market now become more risky because the financial market are markets are more volatile and every day the asset price is like housing prices, equity prices, bond prices etcetera all those things are changing frequently and it changing because of the changing nature of the market, changing perception about the market and as well as the changing predictive power of the investors or the stake holder who are operating the market.

That basically motivates the investor to take some position in the future market by which this particular risk can be hedged. Therefore, the increased volatility in the asset prices is one of the reasons to increase the importance of the derivatives in the financial markets. Then they have increased integration of the national financial market with the international markets because, there is a pure integration between the different market because of the globalization and the privatization process.

In the liberalization process, all the markets now move together, there is an effect contagion, effect between the two countries and if one country some policy variable changes, it will have a spillover effect in another country. So, because of that, again the riskiness of the market or investment, the risk what the investor feels in the financial market will be more. So, therefore, to hedge that kind of risk also the investor takes the position in the derivatives market or the future markets.

Then the marked improvement in communication facilities and the sharp decline in their cost, now the transaction cost go down therefore, depending upon the technology depending upon the other communication and the other facilities, almost everything is based on the internet based or we can say the online based. Therefore, everybody has the very high level of data and using this data they want to take the position, take the position in the different market by which the total risk of the investor can be minimized. Therefore, it is also one of the reason through which the importance of the derivatives has gone up.

Then, the development of more sophisticated risk management tools provide economic agents, a wider choice of risk management strategies. We have the different tools basically what we use to measure the risk and we know that, if you take a position in the future market is again it is risky, but still we want to take the position because the predictive ability of the investor has gone off because of the deployment of the sophisticated risk management tools.

That is for example, you take the value at risk, you take the example of the different methods like stress testing etcetera, which helps this investor to know, what kind of risk he is going to face in the market.

So, therefore, now if we he can predict that using this different tools he can predict what is going to happen probably in the future, then accordingly he takes the position a, say position today to know that or to hedge their total risk in the market by which the total return of the investor can be maximized.

And after all this is again another factor, which is the innovations in the derivatives market, which optimally combine the risk and returns over a large number of financial assets leading to higher returns, reduced risk as well as the transaction cost as compared

to the individual financial assets. That is basically different products are developed in the derivative market depending upon the requirements of the individual investor.

So, if you have the different innovation, different alternatives, which is suitable for my objective in the in terms of the return, what I am going to get from the market? Then obviously, what people will feel that it is better to have the position in the derivative market by which the total risk minimization can take place. So, the innovations also are one of the factors, which basically plays the significant role for improvement or the importance of the derivative markets in all over the world.

(Refer Slide Time: 24:59)

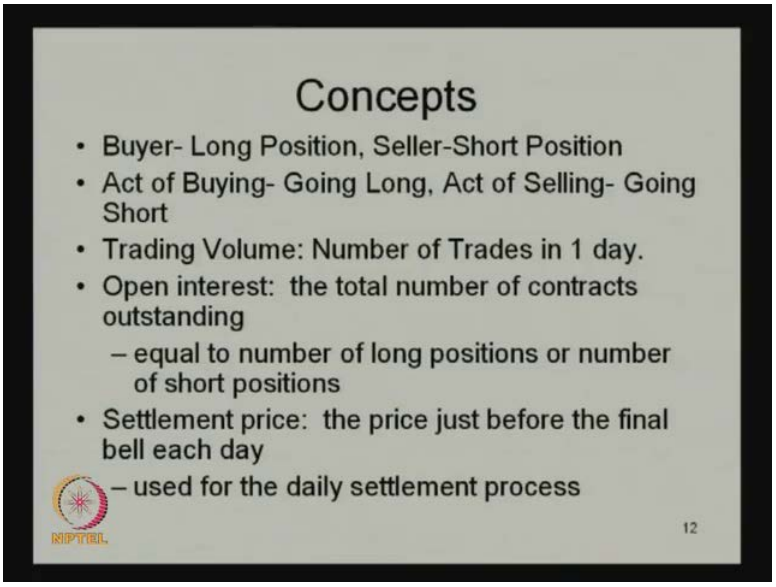
So, now if you see that one by one how this particular contract basically takes place, let us see that what exactly happens in the future contracts? Whenever we talk about the future contracts, already I told you that, the future contracts can be made or it can be derived on the basis of the equity or the another asset is bond or it can be interest rate or it can be also the physical assets. So, therefore, there are wide range of underlying assets are available in the financial market.

Then second thing is future contracts are exchange traded, it is more standardized in nature and which are the things is required to make a future contract is that, what can be delivered, where it can be delivered and when it can be delivered. If you make the

contract on the basis of a future contract, then there are three things always we should know.

The three things are what to be delivered, which are the instruments has to be delivered and where it should be delivered. If it is a physical contract, the place should be mentioned there, then when the when the time period, when basically the contract has to be delivered and the space and date should be mentioned there and another advantage is we have this particular contract is the pricing and other things is settled daily; that means, there is a daily settlement for the future contract.

(Refer Slide Time: 26:28)



Then you should know certain concepts basically, which are the different concepts we can use whenever we deal with the future contracts. You should remember that, whenever we talk about the buyer, always buyers have the long position whenever we talk about the long word is used in the derivatives market, basically we refer to the buyer and whenever we talk about the short position, it basically the seller. So, the buyer has always a long position and the seller has always a short position in the financial market for the regular transactions or regular future contract case.

That means if you say that, somebody is going long; that means, we can say now he is buying, that is why you call it act of buying is basically we refer to going long and whenever we talk about act to selling, it basically talks about going short.

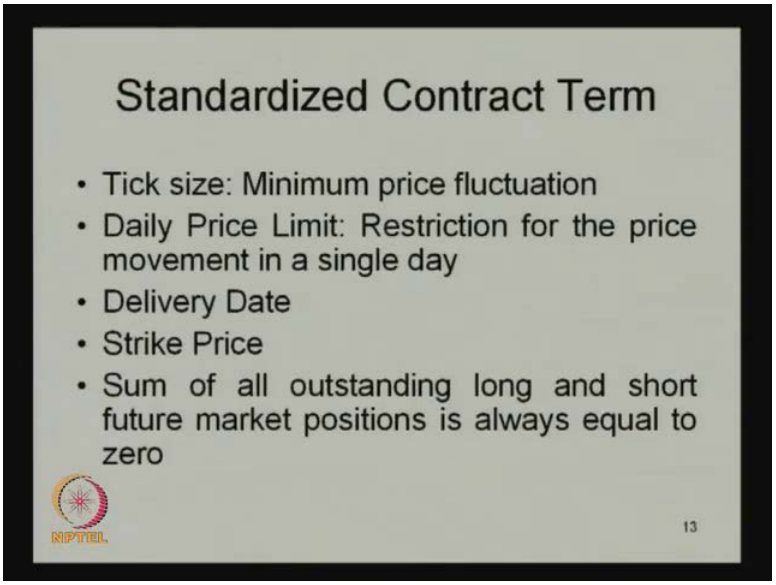
If we say the investor is going short; that means, he is going to sell and if we say talk about that he is going to he is take his act of basically going long, then we can say that he is in the act of the buying.

And another concept we also is used in the financial market in terms of derivatives, that is called the trading volume. What do you mean by the trading volume? It is basically the number of trades in one single day. How many trades have been taken place on that particular contract in a single day that is defined as the trading volume.

Then we have the open interest, open interest is basically the total number of contracts outstanding, then it is basically equal to number of long positions or number of short positions. The total contract we are talking about, either it is a long position or it is the short positions. Then we have the settlement price, the settlement price is basically the price just before the final bell each day and used for the daily settlement process.

Then what is the price, on what price this particular contract has been settled? That basically talks about settlement price. So, that is why it is the price just before the final bell each day in the stock exchange, that is why we call it the settlement price and it is used for the daily settlement for that particular contract in a particular market in a particular time.

(Refer Slide Time: 28:48)



So, whenever we make the contract, we have some standardized contract term, how the contract has been made? The contract should have a tick size, tick size means whenever the buyer takes their position or the buyers basically talks about his requirement, then what he says, that he talks about the minimum price fluctuation, let the price should fluctuate between this to this.

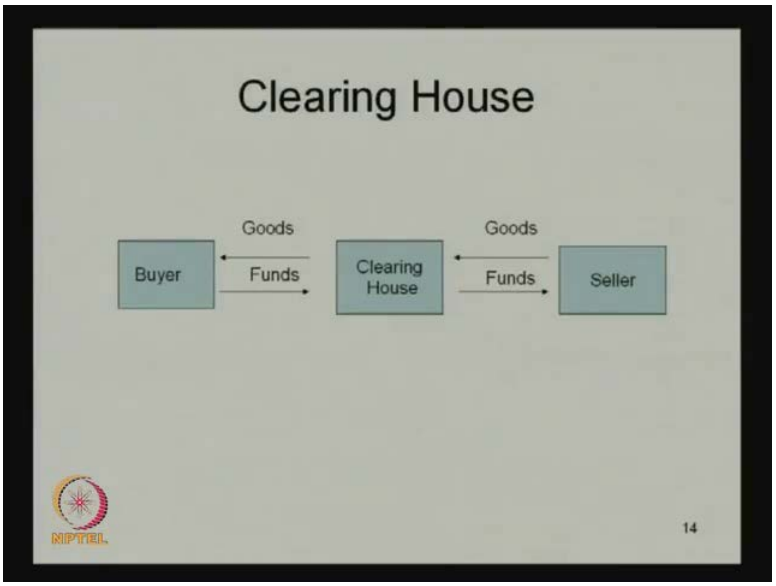
But, he decides that, up to what level this particular price fluctuation can be accepted by this particular investor. So, that we call it the tick size. So, that is why it talks about the minimum price fluctuation what can be accepted. Then the daily price limit, which talks about the restrictions for the price movement in a single day; that means, second thing is one is tick size, which is the minimum price fluctuation.

Then the daily price limit, which talks about, on a single day how much price fluctuation can be accepted by this particular investor and up to this much only the investor can take it up, after that the investor will not be interested for that particular contract.

And the delivery date, then the strike price, strike price means the price at which this particular contract has been signed, let 10 rupees what we have taken the example in that case, that basically it is the agreeable between the buyers and sellers on which this particular transaction should be taken place.

And another one is the sum of all outstanding long and short future market position is always equal to zero; that means, this total buyer and sellers the contract, the market position basically always equal to zero, that has to be taken care by the stock exchanges.

(Refer Slide Time: 30:33)



Then, how this particular contract or particular trading takes place whenever we talk about the derivatives? It is basically the buyer who basically, first of all makes the order and whenever the settlement takes place, he provide the funds basically to the clearing house and clearing house charges the money on that and finally, the funds will be delivered to seller. And the seller basically provides this goods, underlying goods to the clearing house and the clearing house will provide these particular goods to the buyer.

So, that is the mediator role of the clearing house in between two, for this daily settlement or the settlement of contracts, whenever we deal with this derivative instrument.

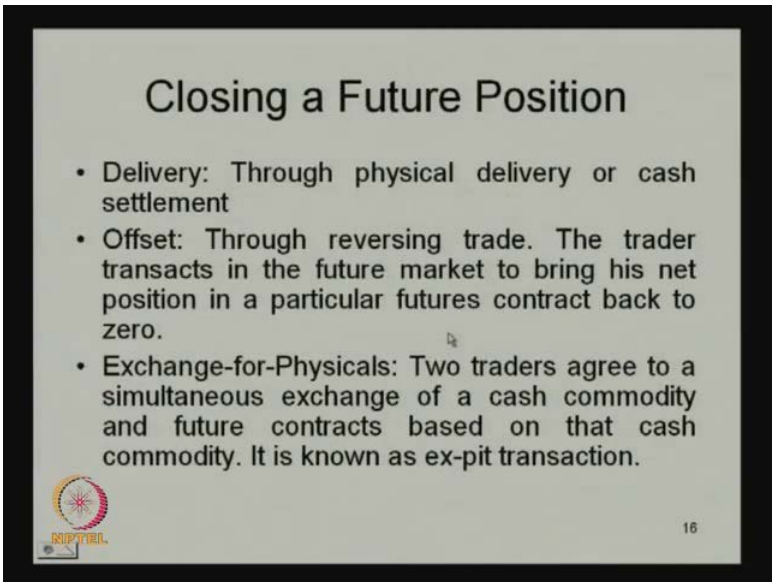
(Refer Slide Time: 31:23)

Then how this obligation in the future market takes place? If you talk about the obligations in the future market, how generally it happens? There are 2 parties, there is a party 1, there is a party 2 and what party 1 let us says buys one September contract for gold at rupees 1000 per gram and in that party 2 sells one September contract for gold at 1000 per gram.

And party one buys this September contract or the 1000 rupees per gram and the clearing house basically agrees to deliver to party 1 a September contract for gold at a price of 1000 per gram. That means, he wants to buy, he wants to sell that is why the clearing house now on behalf of the party 2, he agrees to deliver this month's amount of contracts on September, where the price is 1000 per gram.

Then what has basically happened? What basically happens in the market, the party 2 sells this September contract for gold, which is basically price a in 1000 per gram then clearing house basically agrees to receive from party 2, one September contract for gold and to pay 1000 per gram. And finally, the clearing house sends it to this party 1 at that particular time; this is the way the future market obligation works.

(Refer Slide Time: 32:55)



Then if somebody wanted to close a future position, how basically it is closed? The closing can be taken place either through a physical delivery or through a cash settlement. So, that is we call it the delivery, the delivery can be made through a physical delivery or a cash settlement depending upon the underlying assets.

So, there is a concept we call it offset; that means how it is offset? Basically it is through the reversing trade and the trader basically transacts in the future market to bring his net position in the particular future contract back to zero and how the reversing takes place we can see this.

And the exchange-for-physicals basically whenever talk about, here the two traders agree to simultaneous exchange of a cash commodity and future contracts based on their cash commodity and it is known as basically it is whenever we talk about this, it is known as the ex-pit transactions in the financial market.

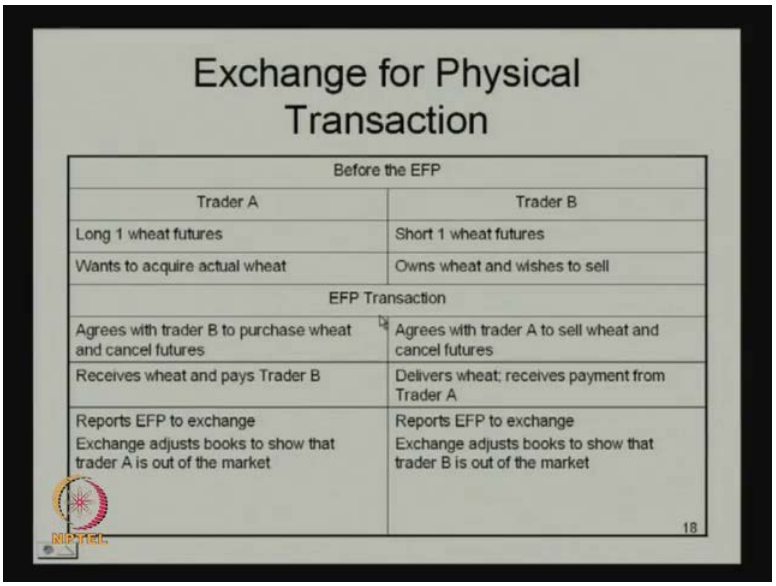
(Refer Slide Time: 33:54)

How this reversing trading takes place? The reversing trading takes place he wants to close the position in the market, what this particular different party does. The party 1's initial position is he bought 1 September contract for gold 1000 per gram, then in the may 1 the party sold 1 September contract for gold at 1000 per gram, then the how this party 1 reversing trade takes place. In the may 10, it sells 1 September contract for gold at 1100 per gram and there is another party, who is ready to buy this contract.

He has taken the position on may 1 to buy it from party 2 at 1000 per gram and in the may 10, after just 9 days, he sells this future contract to somebody else at a price of 1100 per gram and somebody else, which is the party 3 basically is ready to buy this contract buys this September contract on 1100 per gram.

This is the way, he can make another position by introducing another party in the financial market and by that, the closing of this particular settlement can takes place which we will define as the reversing trade.

(Refer Slide Time: 35:09)



Then another already use this exchange for the physical transaction and exchange for physical means, what basically happens here before this exchange for physical transaction EFP, the trader a basically long one wheat futures; but, he wanted to buy long one means, he wanted to buy a wheat futures.

And trader B wants to sell that is why it is a short position, he wants to sell the wheat futures and here the trader 1 wants to acquire the actual wheat and trader B basically owns the wheat and wishes to sell. Here he is the he wants to acquire the wheat and trader B, basically owns the wheat and he wanted to sell it.

Then, how this EFP transaction takes place? The trader 1 agrees with trader B to purchase wheat and cancel the futures. Trader B basically agrees with trader A to sell wheat and cancel the futures. Receives wheat and pays the trader B and delivers the wheat, receives the payment from trader A.

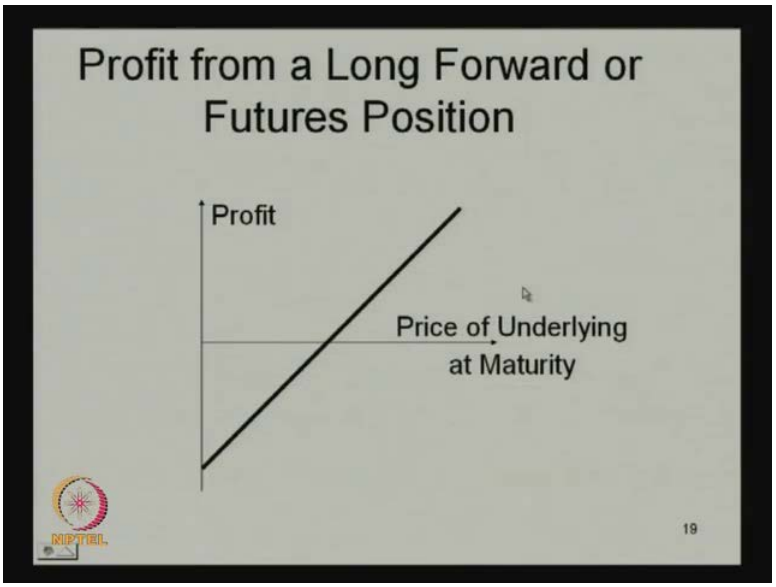
That means, whenever he take the wheat, this particular transaction time has come, the delivery time has come, the trader B has giving the wheat to trader A and trader A receives the wheat and pays the money to trader B and here the trader B delivers wheat and receives the payment from trader A.

And it reports EFP, this exchange for physical to exchange and the exchange adjust books to show that, the trader A is out of the market, now the transaction takes place.

So, once he will report this things to the exchange that this particular delivery has taken place and he has received the wheat from trader A, the trader A has received from the trader B, the wheat already has been received by him, then he report to the exchange and the exchange basically adjust their books to show that the trader A is out of the market.

And finally, whenever the trader B has delivered the wheat and gets the money from the trader A, he reports the exchange that exchange adjust and after that the exchange adjusts the book to show that, trader B is out of the market. This is the way the exchange for physical transaction takes place, takes place between the two buyers and the one buyer and one seller.

(Refer Slide Time: 37:37)



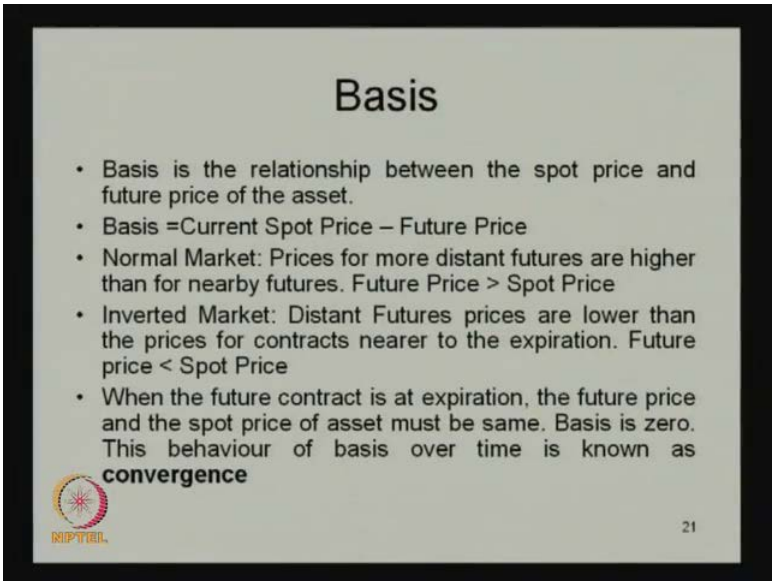
Then how basically, you can see that the profit can be taken place? Let if this is your profit and this column this axis talks about to profit and this is your price of underlying asset at maturity. Then what happens, the pay off matrix always looks like this and this is basically your strike price and if your price of the underlying asset is more than the strike price, then at the time of the delivery then what will happen? That the particular buyer is in profit that is why you call it profit from a long forward. Long forward means, we talk about the buyer and whenever we talk about the short forward, we talks about it can talk about the seller.

So, the buyer is in the profit, whenever the price of the underlying asset will be more than the strike price and it will be in the loss, whenever the price of the underlying asset will be based on the strike price. Like that if you see about the profit from the short forward or the future position, it is just opposite.

Because we are referring to again, this is your profit and this payoff matrix looks like this and this is your strike price and this is your price of underlying asset, price of underlying at maturity. Then here, if in terms of the seller, basically he expects that the market price at that time there, the spot price of that particular product should be the less than the strike price.

That means, the exercise price or the strike price should be more than the market price by which the profit can go to the seller, then only the seller can make the profit. This is the payoff matrix in terms of the buyer and the sellers, in terms of the future or the forward contracts.

(Refer Slide Time: 40:10)



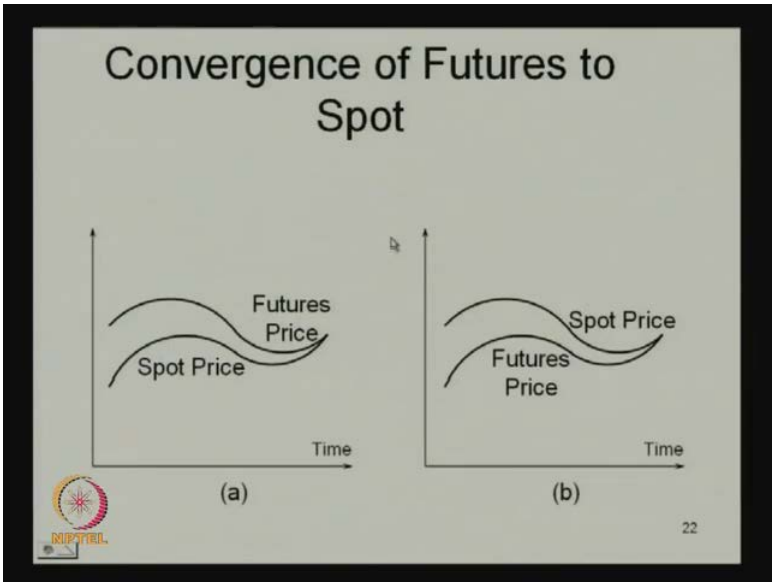
Then we can talk about some concepts we use in the forward future market, we call it the basis. What exactly the basis is? The basis is the relationship between the spot price and the future price of the asset.

That means how it can be measured? It is measured as the current spot price minus future price. So, in the normal market, the prices for more distant futures are higher than the

nearby futures. That is why the future price is more than the spot price, but in the inverted market, the distant future prices are lower than the prices for contracts near that nearer to the expiration.

That's why the future price is less than the spot price, if this is happening then we can say this is an inverted market, but if the future price is more than the spot price, we call it a normal market. Then when the future contract is that expiration, the future price and the spot price of asset must be same and the basis should be zero. This is the expectation whatever we have and this behavior of basis over time is known as convergence.

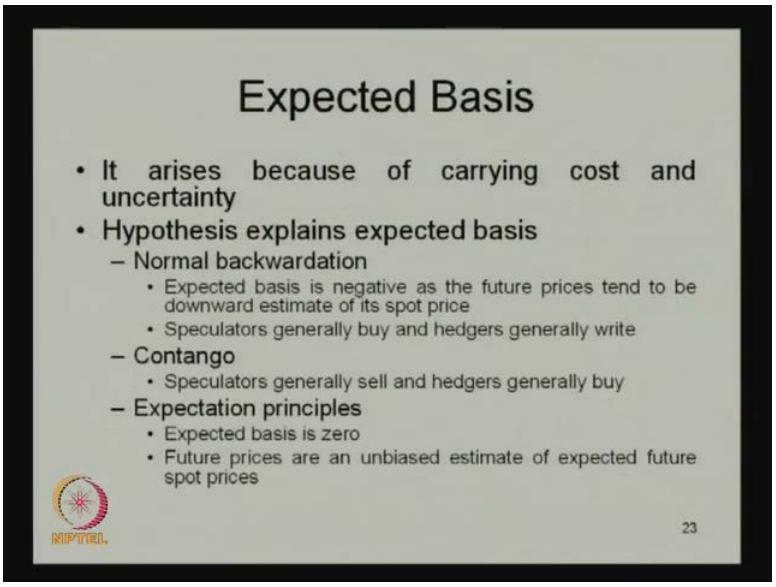
(Refer Slide Time: 41:23)



That means the future price and spot price should converge to each other. So, if you see this is the spot price, which is less than the future price from the beginning, and finally, it is increasing and somewhere it is converging. And here, the future price is less than the spot price, but at a particular time this particular to both the prices has been converging.

That is for there is there is always a conversion between the future price and spot price and if there is a pure conversion convergence is taking place between the future price and this spot price, then we can say that the basis will be equal to zero. Therefore, we can say the basis is nothing but, the future price minus the spot price.

(Refer Slide Time: 42:08)

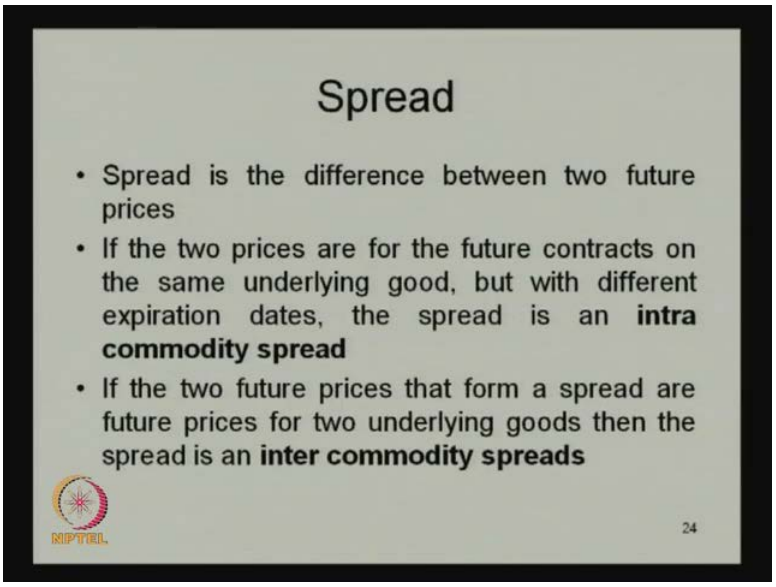


And therefore, whenever the investor takes the position in the market, he is using a concept; we call it the expected basis. And the expected basis is basically arises because of the carrying cost and the uncertainty, which is prevailing in the market and which is the hypothesis which basically explains, which talks about the expected basis. It is basically the normal backwardation, contango and the expectation principal.

What basically the normal backwardation is talking about? Here the expected basis is negative as the future prices tend to be downward estimate of the spot prices. And that means, the future price is less than the spot price and the speculators generally buy and the hedgers generally sell of the right. Right means, it is the selling we talk about therefore, the speculators generally buy, if there is a normal backwardation, then the speculators generally buy and the hedgers generally sell.

But, if it is a contango, the speculators generally sell and the hedgers generally buy and the expectation principal is always the expected basis should be equal to zero and the future prices are unbiased estimate of expected future spot prices. Future prices are an unbiased estimate of the expected future spot prices; that means, the expected future spot price should be equal to the future price on a particular date.

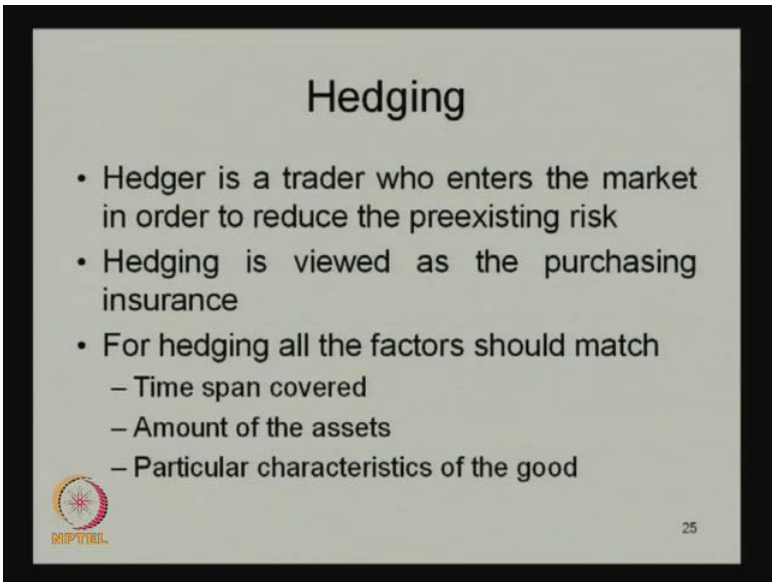
(Refer Slide Time: 43:34)



Then another concept we use in this contract, which is defined as spread. Spread is nothing but, it is the difference between two future prices. And if the two prices are for the future contracts on the same underlying good, but with a different expiration dates, the spread is an intra commodity spread. That means, the two prices are for the future contracts the same underlying good, but the expiration date for the two contracts should be different, then the price difference is defined as the intra commodity spread.

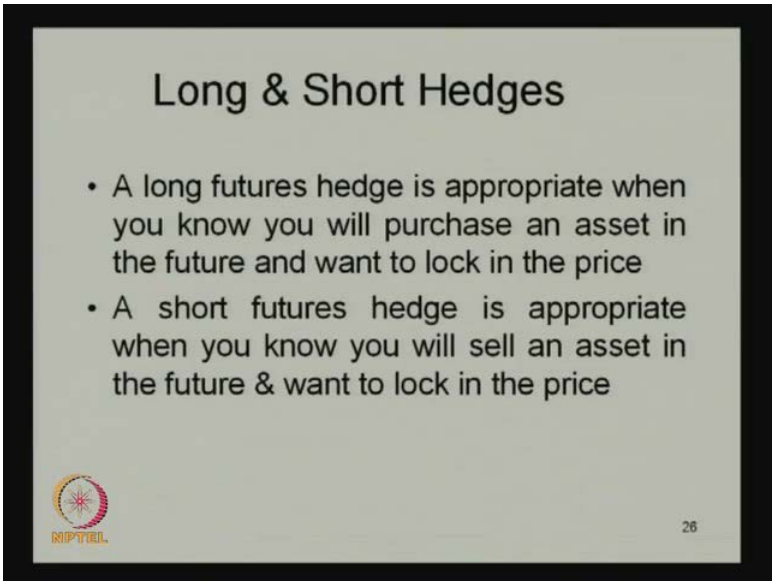
But, if the two future prices that form a spread or future prices for two underlying good, then the spread is inter commodity spread; that means, the two future price that form a spread for the future prices, for two underlying goods. Here the good is same, but here there are two goods, then the spread is an intra commodity spread, already what we told that, basically this instrument derivative is used for hedging.

(Refer Slide Time: 44:30)



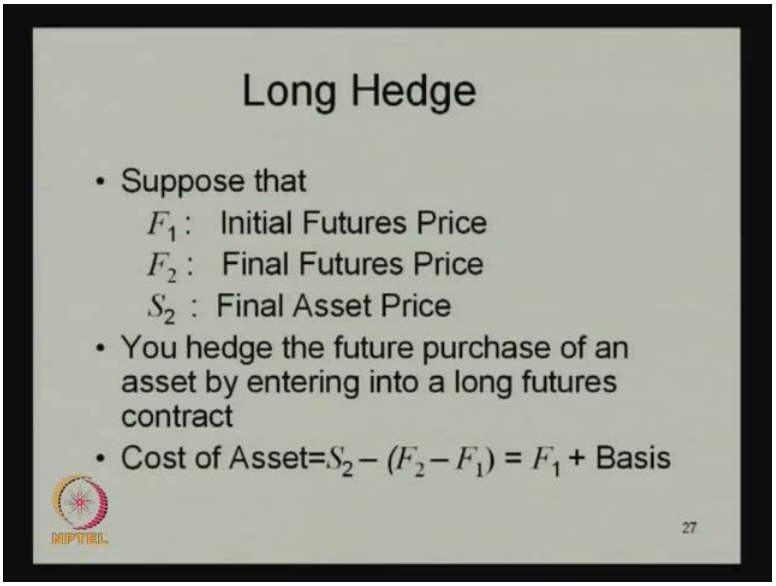
So, what exactly it means? The hedger is basically a trader, who enters the market in order to reduce the preexisting risk, what he is prevailing in the market. So, hedging is viewed as the purchasing insurance; that means, in the future this risk can be minimized. For hedging all the factors should match, the time span, the amount of the asset and the characteristics of the goods, these are the three things should be matched with the hedging.

(Refer Slide Time: 45:01)



So, there are two types of hedge here on the basis of buyers and sellers take place, what we called as the long and short hedges. A long future hedge is appropriate when you know you will purchase an asset in the future and want to lock in that particular price. And a short future basically the seller, basically it is short future hedge basically appropriate, when you know you will sell an asset in the future and wants to lock in the price. So, he talks about the buying capacity, it talks about the selling capacity.

(Refer Slide Time: 45:31)

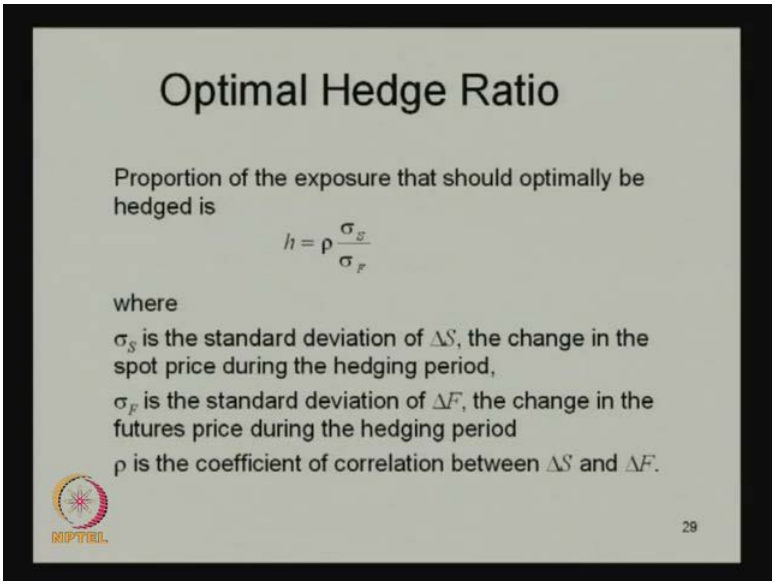


So, how this long hedge basically takes place? Suppose you have initial future prices, which is a F 1and the final future price is let F 2. Then S 2 is equal to your final asset price, then you hedge the future purchase of an asset by entering into a long future contract and here the cost of the asset should be your final asset price minus F 2 minus F 1; that means it is basically F 1 plus the basis.

Basis means, you know that is your difference between the spot price and the future price that is why the F 1 plus basis basically decides the cost of the assets if you take a long hedge position in the market. And the short hedge if you talk about from the sellers, then in the same example if you say, F 1 is equal to your initial future price, F 2 is equal to your final future price and S 2 is equal to your final asset price.

Then you hedge the future sale of an asset by entering into a short future contract and here, the price is realized is S 2 plus f 1 minus F 2, which is your F 1 plus the basis. So, this is basically the way through which the hedging can take place in the market.

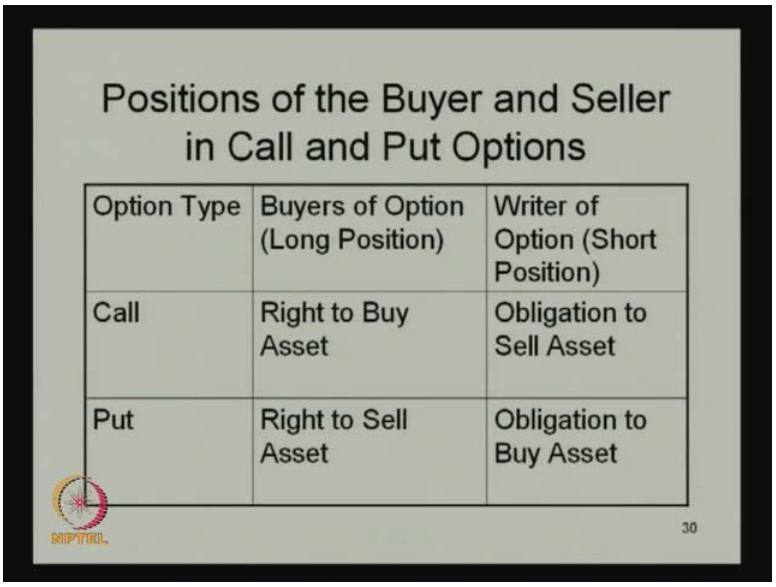
(Refer Slide Time: 46:49)



So, how much money should be hedged? What is the proportion of the exposure, what the investor faces? That should be optimally we hedge to minimize the risk that basically is measured as s is equal to rho into standard deviation of the hedge divided by the standard deviation of the F.

What it means, where the standard deviation of S means, it is the deviation of delta s or change in S, change in the spot price during the hedging period and delta this standard deviation; this sigma F is basically, the change in the future price during the hedging period, the standard deviation of the change in the future price during the hedging period. And rho is basically the coefficient of correlation between delta s and the delta F, through which you can say that, what is the proportion of exposure this particular investor should be optimally should optimally hedge in that particular time.

(Refer Slide Time: 47:43)

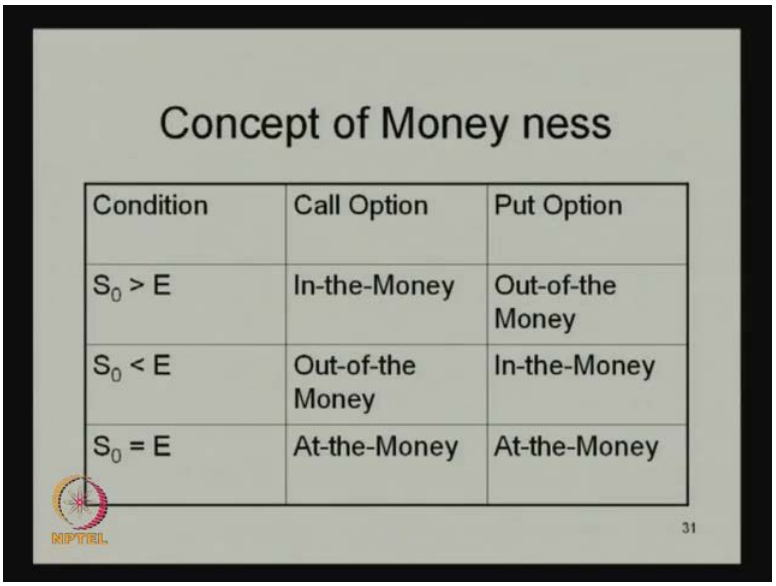


Then after talking about this future contract and some of the concepts related to the future contracts or the forward contracts, let us explain certain things which are related to the options also. So, in the option basically whenever from the beginning we know that, it has the right the buyer has the right to exercise this particular contract particular obligation to the to this. And we have seen there are two types of options, one is American option another one is the European option.

In American option basically at any time, this particular transaction can takes place, but the European option, the particular transaction only takes place at the time of the maturity. So, therefore, you have the option type, you have a call option, you have a put option and the buyers of option is long always takes the long position, already we know the buyer takes the long position and the writer of option, that mean the seller of the option, which always takes the short position.

So, the call option when we talk about, it is right to buy, there is right to buy the asset, whenever we talk about the buyers and the right to sell the asset whenever we talk about the put options. But, the seller of the call option, it has the obligation to sell the assets and the seller of the put option basically obligation to buy the assets. So, here the seller has the obligation, but the buyer has the right, this is the way this particular position of the buyers and sellers in the call and put option takes place in the financial market, whenever we deal with the option instrument.

(Refer Slide Time: 49:21)

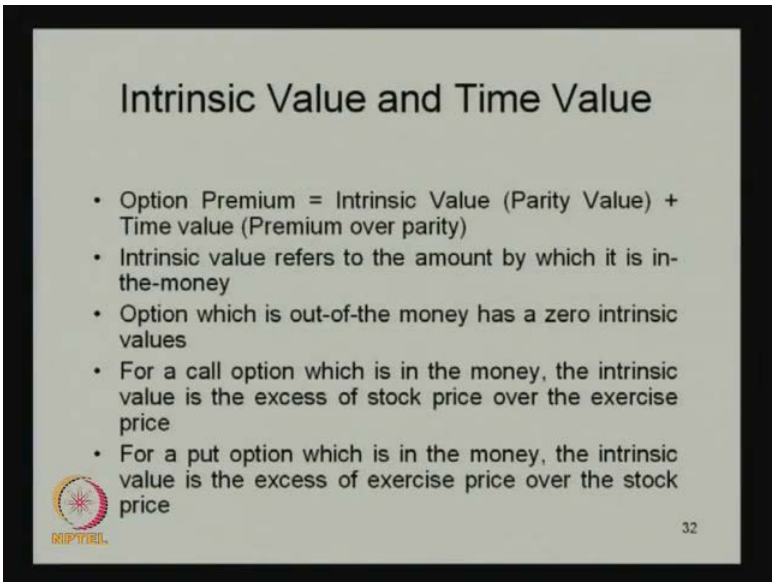


The biggest concept which are very much relevant, whenever we use this options as one of the instruments in the market that is the money ness. What exactly the money ness is? The money ness is basically, we have a concept of in-the-money and out-of-the-money and also the at-the-money.

What it exactly means that if you talk about the options make a difference between the spot price and the future price or we can say the exercise price, then we can see that if the spot price is greater than the exercise price, then the call option is in the money and the put option is out-of-the-money because it talks about the seller, it talks about the buyer.

But if the spot price is less than the exercise price on that day, then the call option is out-of-the-money and the put option is in-the-money, it is just opposite in the context of the investment. And if both are same then we can say both call option and put option are at the money. So, that is why what you can say there is always, we have to make the balance between this two.

(Refer Slide Time: 50:30)

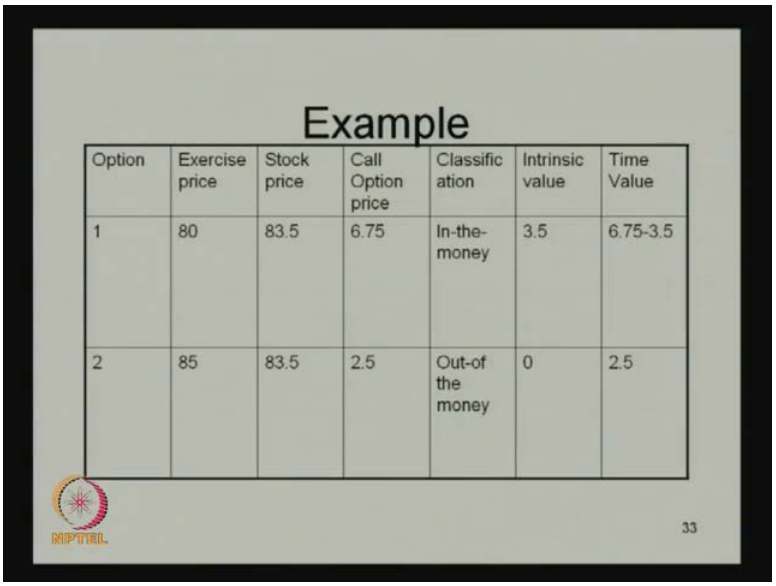


And the return what we get from the options, we have always of the intrinsic value and the time value, these are two things related to this. That is why the option premium what we get from the option investment, it has intrinsic value what we call it the parity value and the time value which is the premium over parity.

So, that is why the intrinsic value basically refers to the amount by which it is in-the-money and option which is out-of-the money has zero intrinsic value. Remember, it is very important to remember, the option which is out-of-the-money has zero intrinsic values and for a call option which is in-the-money, the intrinsic value is excess of stock price over the exercise price that we know.

For a put option which is in-the-money, the intrinsic value is the excess of exercise price over a stock price. So, this is basically the excess of exercise price over a stock price, here the excess of stock price over exercise price.

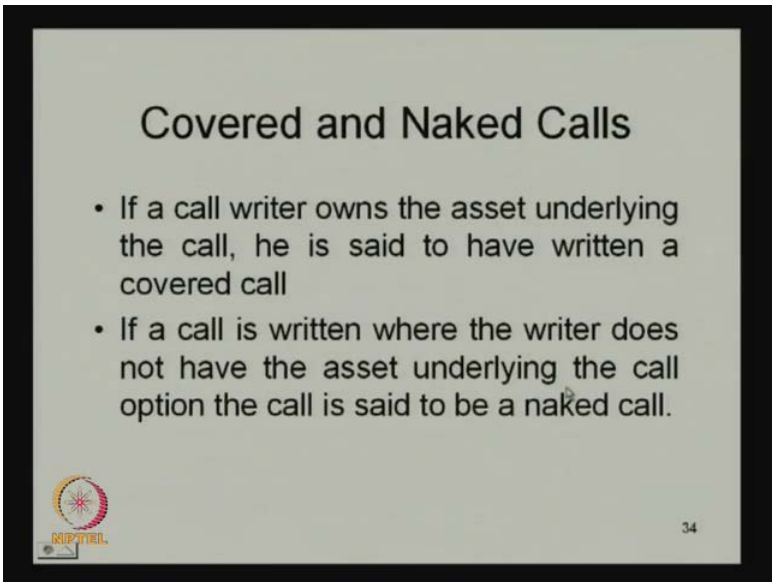
(Refer Slide Time: 51:30)



Here we have taken the example, the stock price is the underlying asset and the example is if you take option 1, exercise price is 80 rupees, stock price is 83.5 and the call option price is let 6.75 which is the premium, then the classification it is in-the-money because the exercise price is less than the stock price, then the intrinsic value is 3.5 difference between this two and the time value is 6.75 minus 3.5.

Then here if it is 85, it is 83.5; that means, exercise price is more than stock price, then the call option price is 2.5, it is already out-of-the-money that is why the intrinsic it is out-of-the-money the intrinsic value is 0 and the time value of the call option is2.5; that means, the total premium comes from the time value, the time value of this particular option.

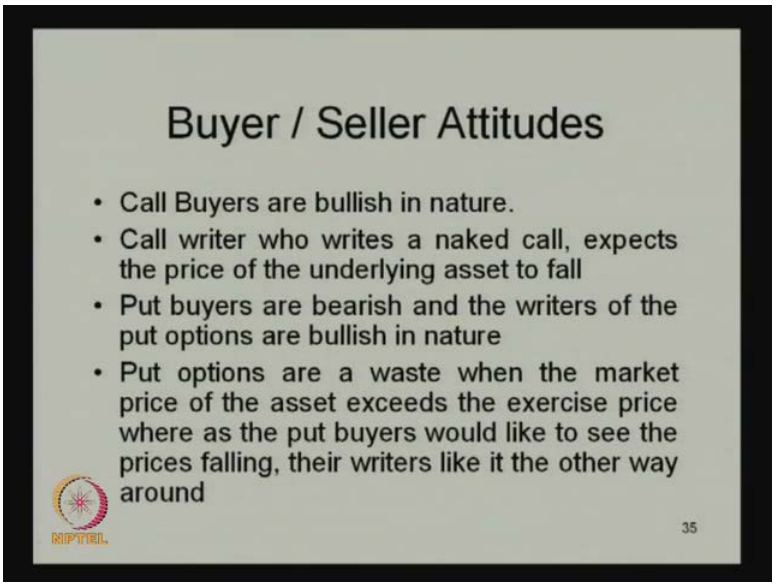
(Refer Slide Time: 52:14)



And then that is why this option we have, we have a intrinsic value and the time value and the time value basically always if it is out-of-the-money, then this intrinsic value zero, then all the premium comes from the time value only.

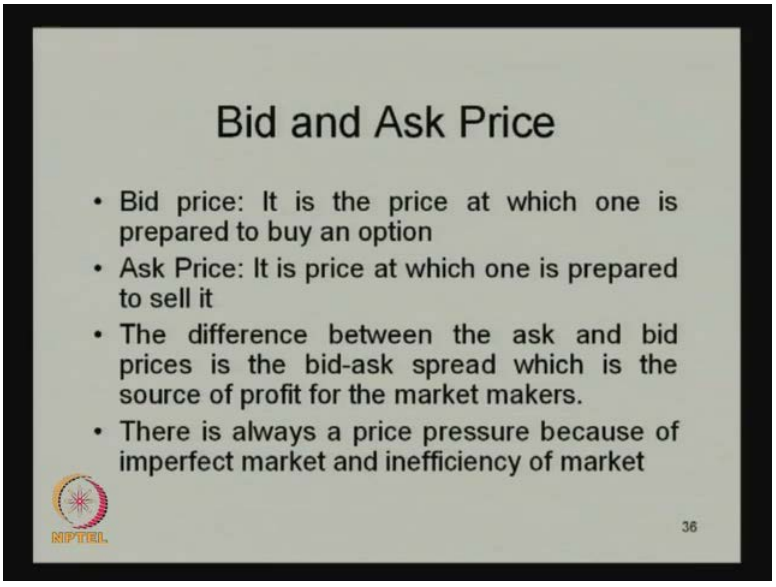
Then we have another is covered and naked calls; if a call writer, call seller owns the asset underlying the call, he is said to have a written a covered call; that means, the particular asset is owned by him, but if a call is written where the writer does not have the asset underlying the call option, the call is said to be naked call. That means, he does not own this particular asset, may be he has to borrow and deliver it.

(Refer Slide Time: 52:52)



So, always the attitude if you observe, the call buyers are bullish in nature, call writer, call seller who writes a naked call except the price of the underlying asset to fall because he is not owning it. That means, is the concept of short selling the put buyers are bearish and the writers of the put option are bullish in nature, it is obvious. Put options are waste, when the market price of asset exceeds the exercise price, where as the put buyers would like to see the price falling their writers like the other way around.

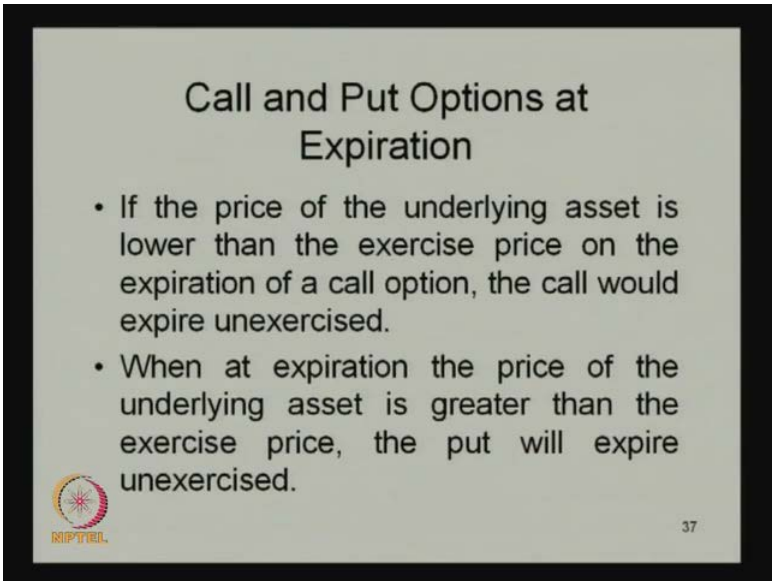
(Refer Slide Time: 53:22)



Bid price basically is nothing but, it is the price at which the one is prepared to buy an option the ask price is the price at which one is prepared to sell the option. That's why difference between ask and bid basically is, bid-ask spread which is the source of profit from the market and this is basically talks about the liquidity.

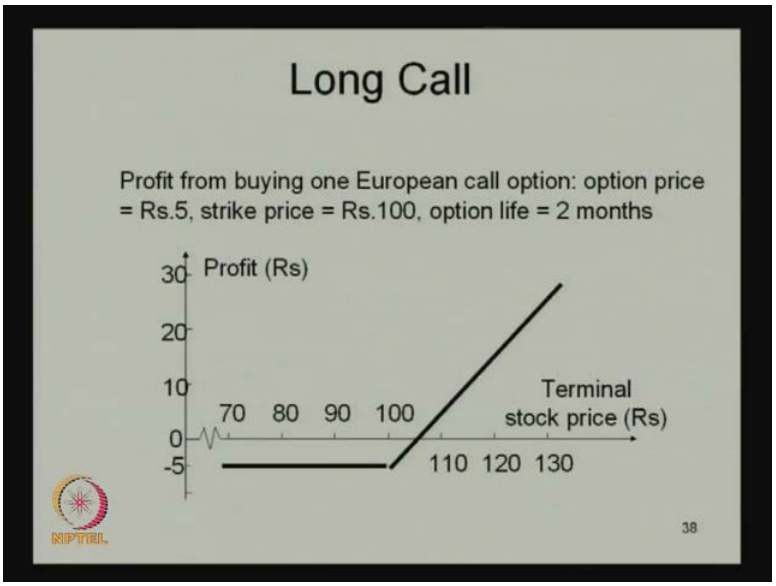
So, there is always a price pressure because the because of imperfect market and the inefficiency of the market, that is why the difference between them is there.

(Refer Slide Time: 53:46)



So, if the price of the underlying asset is lower than the exercises price on the expiration of a call option, the call would be expire unexercised, nobody will do that because they will be in the loss. And when at expiration the price of the underlying asset is greater than exercise price, the put will expire unexercised, this is just opposite in this case.

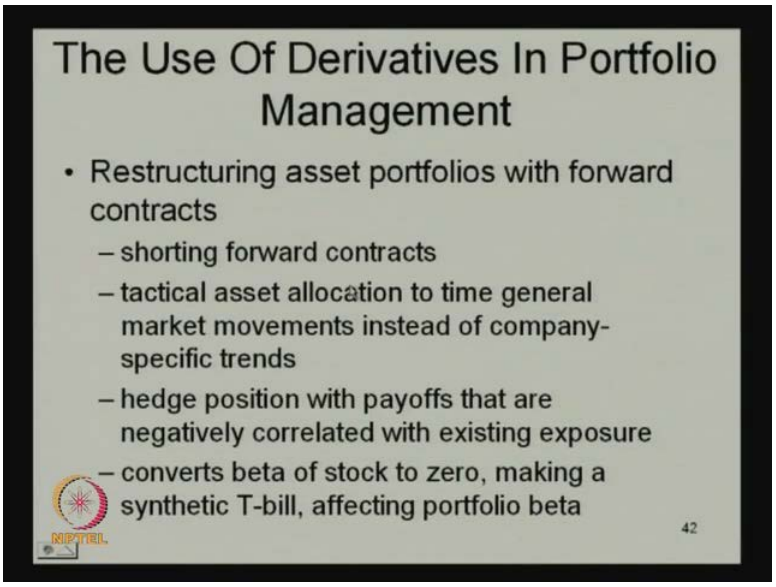
(Refer Slide Time: 54:07)



And this is the way like your options and future, we can have the profits; this is the way if this is your 70 rupees, 100 rupees is the strike price and this particular option is 5 rupees option price, this strike price is 5 rupees; then we can option price is premium is 5 rupees, then the option life is 2 months, this is the way basically this will be 5 rupees somewhere this can be exercised.

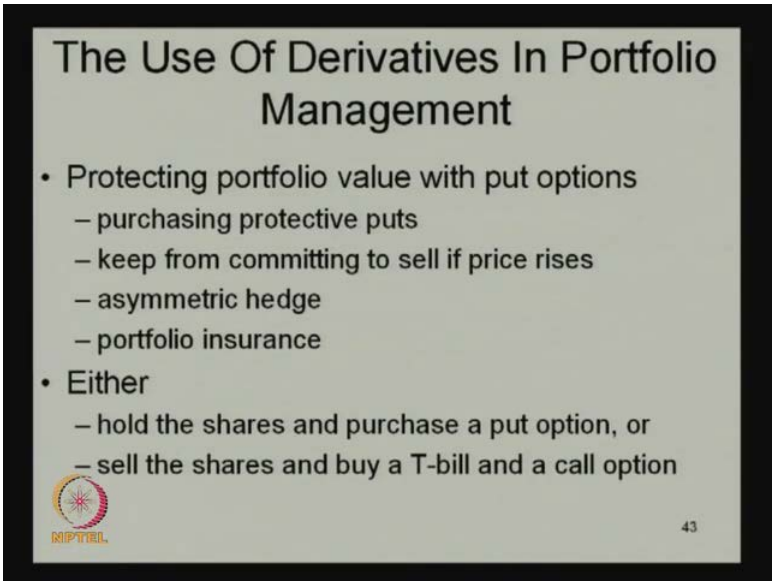
Long call it is just opposite, here long put even the 70 rupees is the exercise price and strike price and we have an option in this case. And short put we have seen that, this is the strike price is 70 and we have a premium option price of 7 rupees here, that is why this is the 7 rupees.

(Refer Slide Time: 54:57)



And how this instruments are used in the portfolio management, we have a restructuring always asset portfolios with forward contracts sorting the forward contracts. Tactical asset allocation to time general market movements instead of company specific trends, we can hedge the position with payoffs that are negatively correlated with existing exposure, converts beta of stock to zero making a synthetic treasury bill affecting portfolio beta.

(Refer Slide Time: 55:23)



And also we have the protecting the portfolio value with a put option, how it is done? The purchasing protective puts, keep from committing to sell if prices are rise, asymmetric hedging and the portfolio insurance either holds the shares and purchases put option or sell the shares and buy a T-bill and a call option. These are the different strategy what you can use in the market for the portfolio management, using this different kind of derivative instruments with the different alternatives. So, in the next class, we will be talking about the pricing of different derivative instruments like futures or the forwards and the options, thank you.