Security Analysis and Portfolio Management
Professor J. P. Singh
Department of Management Studies
Indian Institute of Technology Roorkee
Lecture 24
Yield Spreads, Equity Valuation - I

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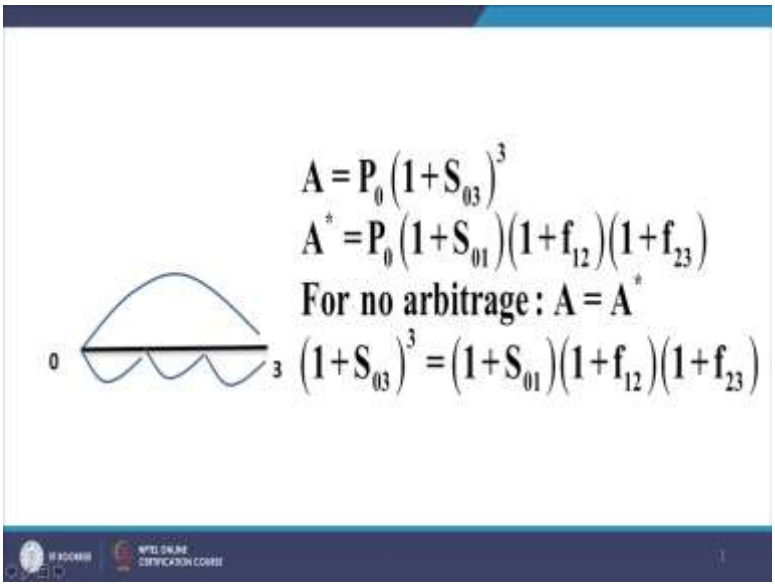

Welcome back. So before the break we were discussing this relationship between the spot rates and the forward rates and we arrived at the expression that is here on the slide on the basis of invoking the principle of no arbitrage. This condition can be generalized. The generalization is straightforward as is shown on the slide.

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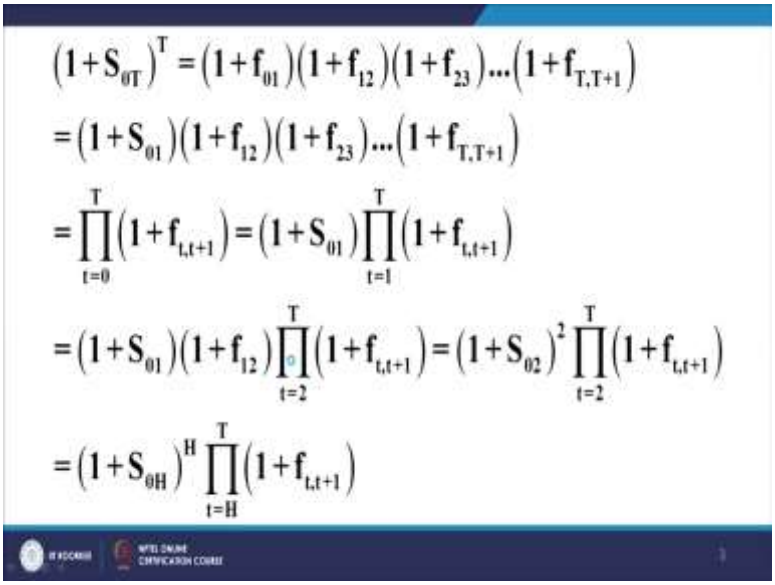

I shall not go into it step by step but it is quite elementary quite straight forward and we get a relationship between the various spot rates and the forward rates. Given one side of the equation and as the part of the other side of course we can find out the unknown first…. unknown rate whether it is forward rate or a spot rate.

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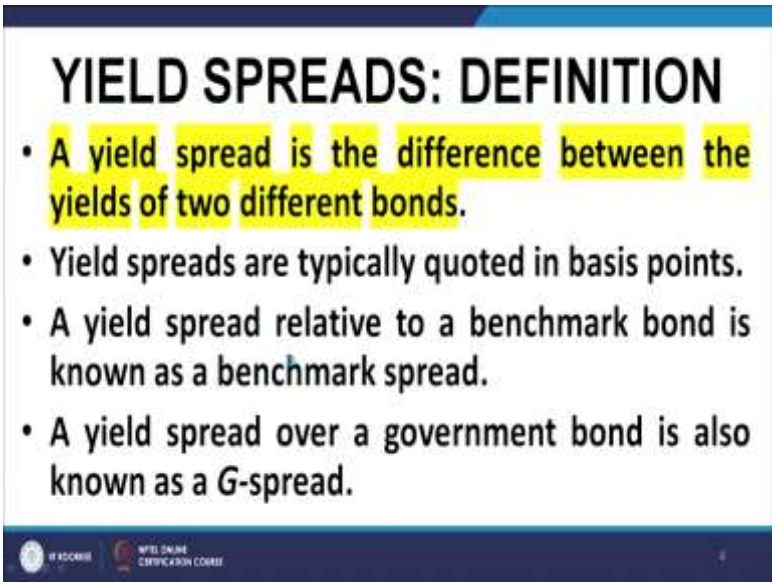

Now, we talk about yield spreads. A yield spread is the difference between the yields of two different bonds. The yield spread is the difference between the yields of two different bonds. They are typically quoted in terms of basis points. A yield spread relative to a benchmark bond is called a benchmark spread.

A yield spread relative to the government bond is called a G spread. I repeat a yield spread relative to a benchmark bond is called a benchmark spread and a yield spread relative to a government bond is called a G spread.

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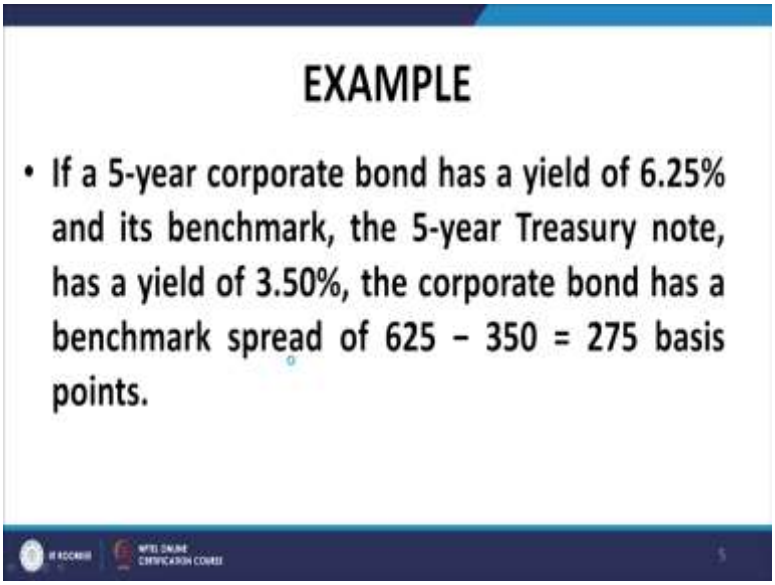

For example, if a five year corporate bond has a yield of 6.25 percent and its benchmark, the 5 year treasury has a yield of 3.50 percent, then the yield spread between the two 275 basis points, that is 6.25 percent minus 3.50 percent of course expressed in terms of basis points. So yield spread is a simple concept, but a pretty useful concept.

It represents the difference between the yields of two bonds. One of the two bonds is usually taken as a benchmark or a government bond, government bond operating as a benchmark and that helps us in ascertaining how the level of riskiness that is attached to the relevant bond that we are considering for investment.

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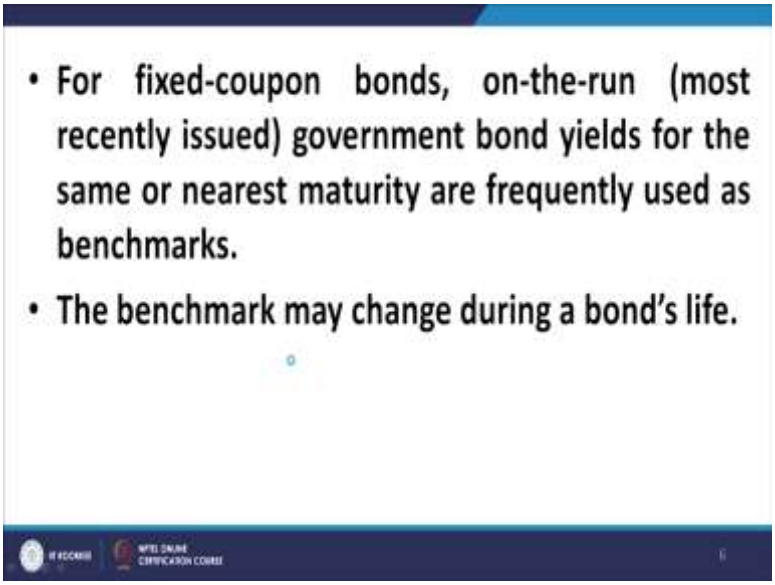

For fixed coupon bonds on the run, on the run means most recent recently issued on the run means most recently issued government bond yields for the same or nearest maturity or frequently used as benchmarks. The benchmark may change during the bonds life, of course, if you are evaluating the bond at a particular point in time you must use the benchmark which is corresponding to its remaining maturity.

So as you move forward in time say at an earlier point in time the bond at five years to maturity the benchmark should have been a five year government instrument, five year government treasury and now if after two years you are evaluating that instrument it is three years to maturity. So the benchmark should also change it should be a three year remaining government bond.

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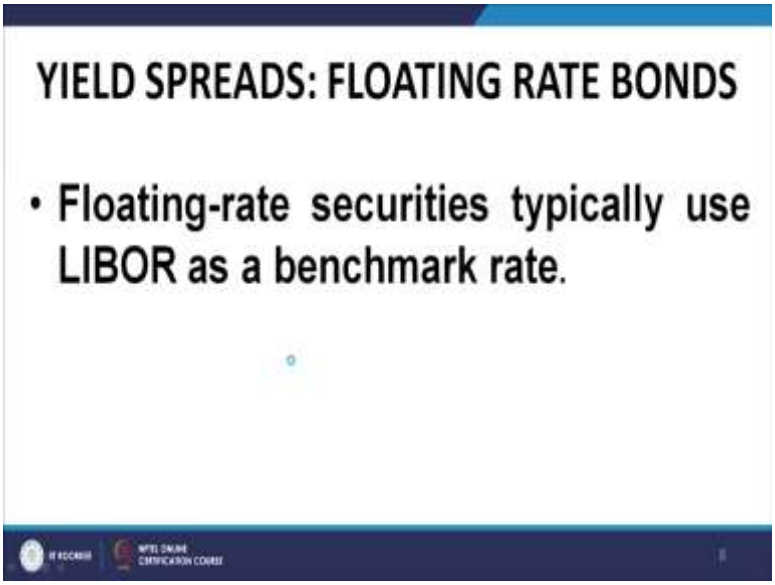

For floating rate bonds usually we use the LIBOR as a benchmark rate. LIBOR means the London Interbank Offer Rate which is quoted on the basis of interbank transactions in London lending and borrowing transaction between banks operating in London and it is a standard rate across the world which is used for floating rate instruments in most cases. Although, there is no such restriction, I must add here that floating rate does not means that it is automatically tagged to the LIBOR, it may be any rate, any relevant rate but LIBOR is usually considered as the benchmark, usually, not always, not necessarily.

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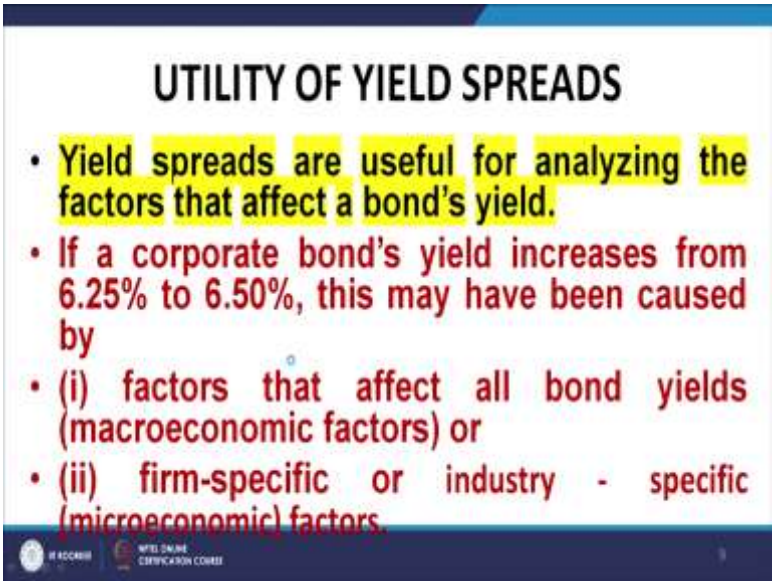

So utility of yield spreads, now the yield spreads are useful for analyzing the factors that affect a bonds yield. If a corporate bonds yield increases then the increase may be due to two factors or two types of factors. It could be macroeconomic factors affecting the economy as a whole or it could be a factor which is singular to that particular company which has issued that particular bond.

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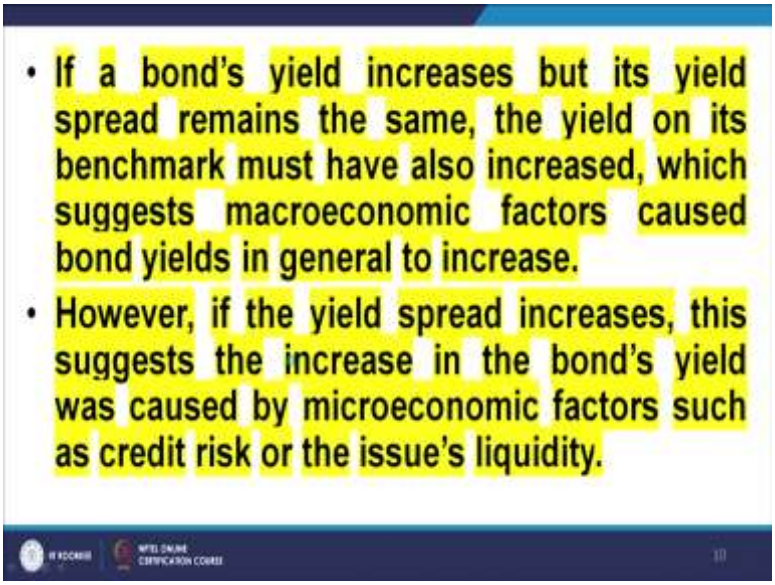

Now what happens is if the bond's yield increases and the yield spread remains the same it means that the benchmark yield has also increased. It means that the change is not due to something singular to the bond is not due to something singular to the bond, it is due to some macroeconomic changes in the overall economy of the country and as a result of it the bank benchmark yield has increased and the yield spread has remained the same.

And because the benchmark yield has increased the yield on the instrument has also increased, because the yield spread which represents the differential risk in a sense yields if spread represents the differential risk of the instrument and if the differential risk of the instrument compared to the risk free or the benchmark risk remains the same then obviously there is a change in some general overall conditions or something which is called the market conditions.

However, if the yield spread increases and the the yield increases and the yield spread also increases then there is something more important to it and more important in the sense that because the yield spread has increased there could be some reason for this, the riskiness of the bond would have increased, the credit rating of the bond could have

deteriorated or some other such singular event would have occurred that would have influenced the risk profile of the bond of which you are evaluating the yield spread.

So this could be as where the yield spread changes we are facing a situation which is singular to that particular in instrument or investment and where the yield reel spread remains the same we should be assured that the factor is more of a macroeconomic nature.

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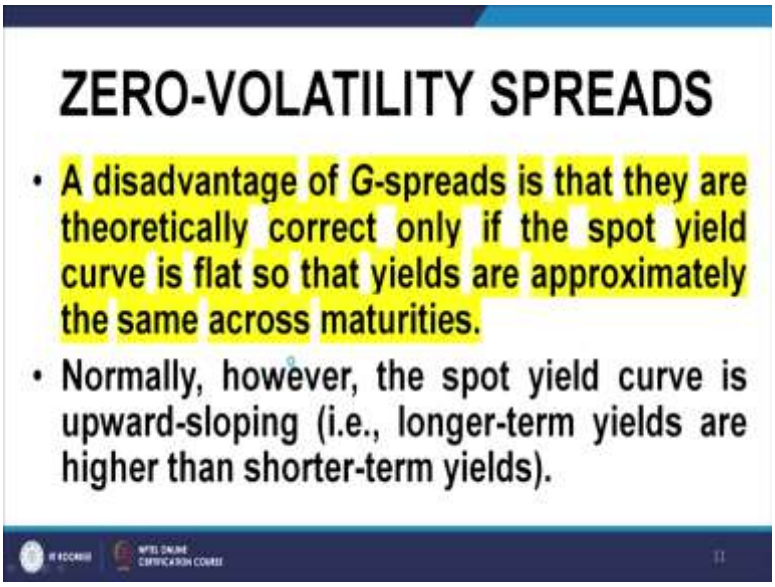

Now the important thing is a disadvantage of G spreads is that they are theoretically correct only if the spot yield curve is flat, so that yields are approximate the same across the all maturities. We have discussed this in a lot of detail in the previous lecture. A disadvantage of G spreads is that they are theoretically correct only if the spot yield curve is flat so that these are approximately the same across maturities.

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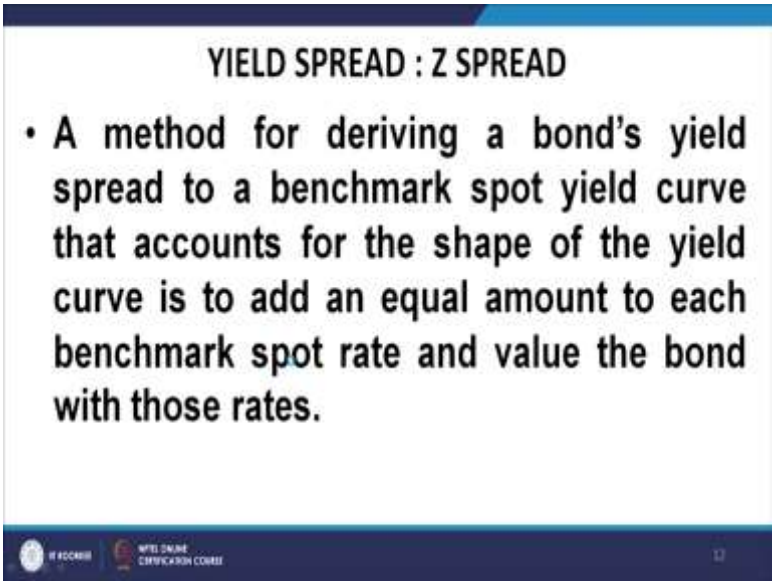

However this is not normally the case so what do we do? What is an alternative? The alternative which is called the Z spread is a very interesting alternative. What we do is, we use the entire spectrum of spot rates. Let us say we use this spectrum of spot rates which are used for evaluating the value of a government bond.

Let us say we have a bond of maturity 5 years of which we want to work out the jet spread and we have the 5 year treasury rates of the government the spot rates which are relevant to the valuation of a government bond in a sense what I am talking about is the risk free rate. So we have the t equal to one, one spot rate t equal to two spot rate, t equal to three, t equal to four and t equal to five spot rates, but these rates are the rates which are relevant for evaluating a government bond.

What we do is we add a certain quantity certain number let us say x to each of these bonds, to each of these rates so if the if the one year spot rate is say five percent we use five per 0.05 plus x and so on. Please note these are rates for, I repeat, I reiterate that the rates five percent five point five percent are the rates for the government bond that is there in a sense the tresury rates or the rates that are used for discounting the treasury cash flows in riskless cash flows.

So we add x to each of these spotlights for two year three year four and then we work out the present value of the cash flows of our bond the corporate bond. And this gives us an equation in x and when we solve for x the expression that we get is the Z spread of the

bond. So in a sense this this expression is more intuitively useful compared to the standard yield spread in the sense that it takes a count of the of the spectrum non-trivial spectrum of spot rates prevailing in the market so this is called this Z spread.

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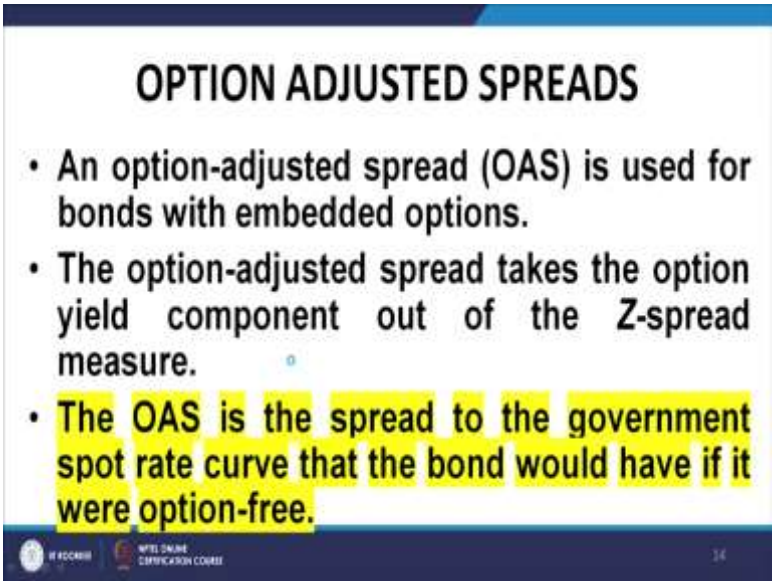

Now we talk about option adjusted spreads. An option adjuster spread (OAS) is used for bonds which have embedded options. You may have a bonds trading in the market which either have a call option or a put option attached to them. Now if a bond has a call option that gives the issuer the right to buy back the bond terms on a certain date which is called the excise debt, at a certain price which is called the strike price.

But where all these things are given in the contract of issue of the bond it is not that they are one fine morning the issuer may get up and say that I want to buy back the bonds at the at a certain price it does not happen that way the information must be known to the investor at the point of investment.

So if there is a call option attached to the bond then the issuer has a right to buy back the bond at a predetermined price or at a predetermined point in time. Similarly if a bond has an embedded put option that means this bond holder has the right to sell the bond back to the issuer at a certain price, at a certain predetermined price on a certain predetermined date or within a certain predetermined period.

So these are called bonds with embedded options. Now in the case of bonds with embedded options we calculate an expression called the option adjusted spread.

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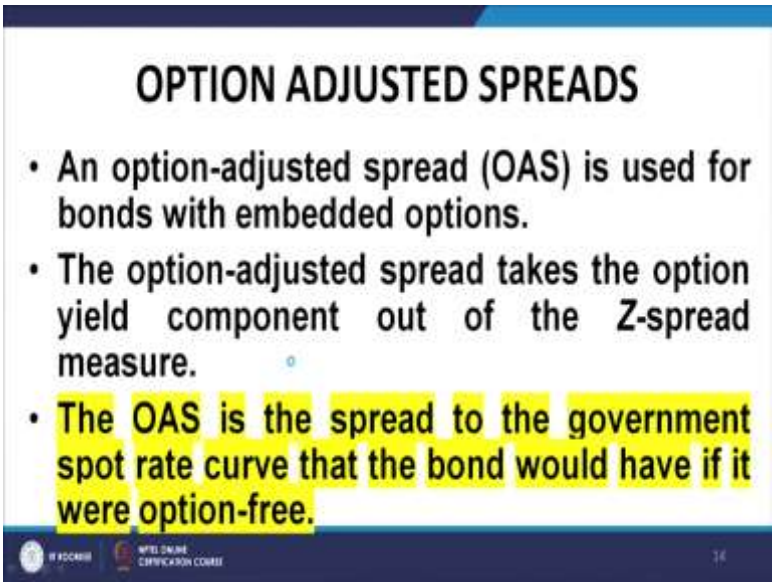

The option adjusted spread takes the option yield component out of the Z spread measure. How is it calculated? It is the option adjusted spread is the spread to the government spot rate curve that the bond would have it was option free. In other words we take away the option, suppose it has a call option, it is a callable bond.

Then what will happen because the issuer has a right to call back the bond the the market would demand a certain increase in yield to compensate for the right that the issuer has retained or for buying back the bond. And therefore the yield on option callable bonds would be slightly higher than the bonds which would not have that call option embedded in them.

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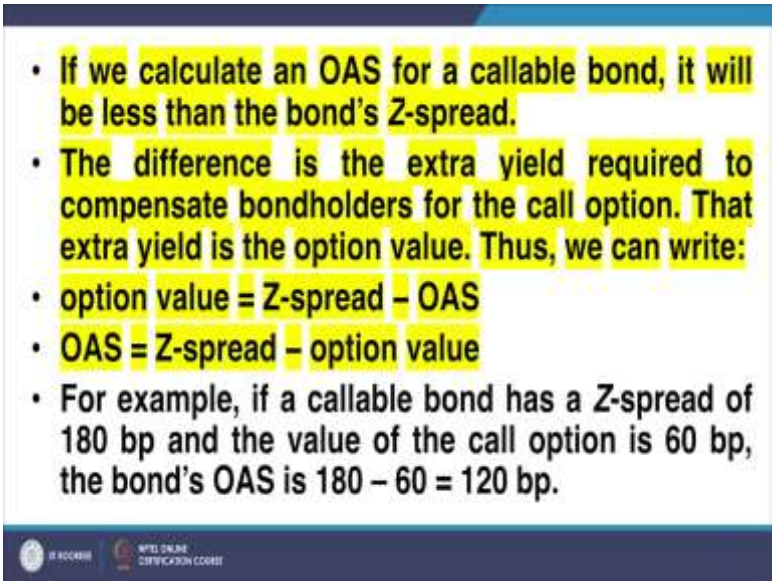

So this differential or the extra yield that is required to compensate boundary holders for the call option that is retained by the issuer this extra yield is the option value and therefore we can write option value is equal to Z spread minus option adjusted spread. In other words we work out the Z spread assuming that the option is available to the issuer and we work out this option adjusted spread and the difference between them gives us the option value. So that is the relevance of what we call the option adjuster spread.

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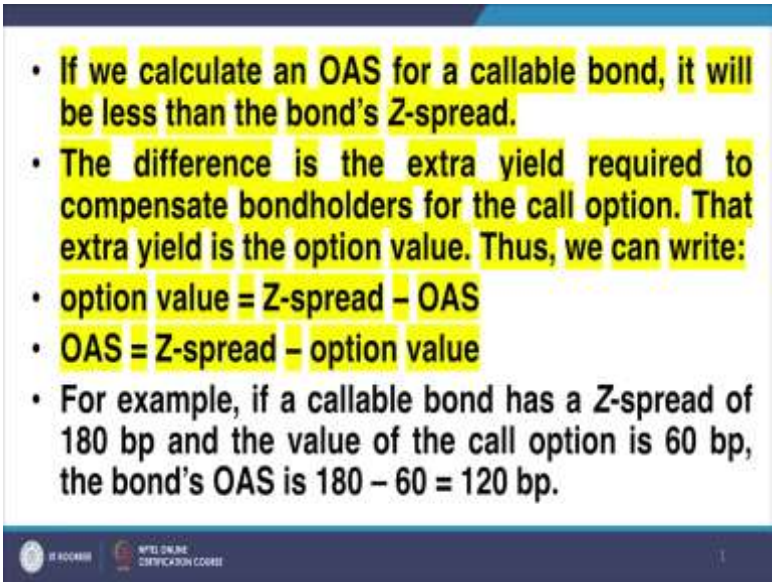

So the important thing is when we talk about the option adjusted spread we are talking about the spread which for a callable bond or a portable bond as the case may be for a

bond with embedded option the spread which would exist if the option was removed, if the option was eliminated from the bond then the the spread that would exist is called the option adjusted spread.

Now we talk about common bond structures. I shall briefly, you see the important thing here is before I get into this topic, let me emphasize there is a huge variety of depth instruments that are traded in the market that are available in the market and there are very few legal restrictions on how you can structure your bond? How you can structure the cash flows of your bond in reference to debt instrument.

There are some restrictions as far as as issue of equity is concerned. For example the issue of equity as a discount issue of equity at a discount is strongly regulated. However there is no such restriction as far as depth instruments are concerned. The freedom that the issuer has in terms of the issue of depth instrument is massive.

And as a result of which huge variety, huge spectrum of depth instruments has percolated into the market and it is impossible to emulate, and emulate the all the types of instruments that are prevailing that are traded in the market. I shall…therefore the list that I am presenting here is certainly not exhaustive it is illustrative.

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So let us get into it. The plain vanilla bond, it is the level coupon bond that we have been talking about throughout our discussion so far. It is a bond which has a single coupon

rate which is existent throughout the life of the bond and redemption is at face value. The zero coupon bond also I have been talking about.

Zero coupon bonds are bonds which have no coupon payments in the intermediate period which are either issued at discount redeemed at face value or issued at face value and redeemed at a premium. Deep discount bonds are similar to zero coupon bonds with a long maturity. Balloon repayment bonds are bonds where a significant portion of the interest and the principle is redeemed in the final installment.

Amortizing bond is the bond where the cash flows, the periodical cash flows that arise on account of the bond are a combination of the interest and amortization of the principal. In other words each cash flow consists of a combination of the interest and a certain amount of principle. So the print principle is not repaid in one go it is repaid in installments over the life of the instrument.

Bonds with sinking funds, occasionally the instrument of issue of the bonds may contain a provision for the maintenance of a sinking fund by extracting the profits for each year and putting the fund, putting the profits for each year aside in a reserve to enable additional security to the bond holders that when the redemption point will arise the redemption date will arise the company will have adequate resources adequate assets to liquidate and repay the bond holders.

This sinking, the profits that are set aside in the sinking fund account are usually invested in certain securities of maturities close to or maturities matching either in terms of duration or otherwise close to the redemption dates of the instrument of the bonds and so that you can liquidate or the company can liquidate these investments on the date of redemption and repay of the debenture holders or the bond holders.

Floating rate bonds as we have discussed are bonds on which the interest rate is not fixed, interest rate is tagged to another variable, to another market variable usually it is another interest rate usually not always it is the another interest rate like the LIBOR.

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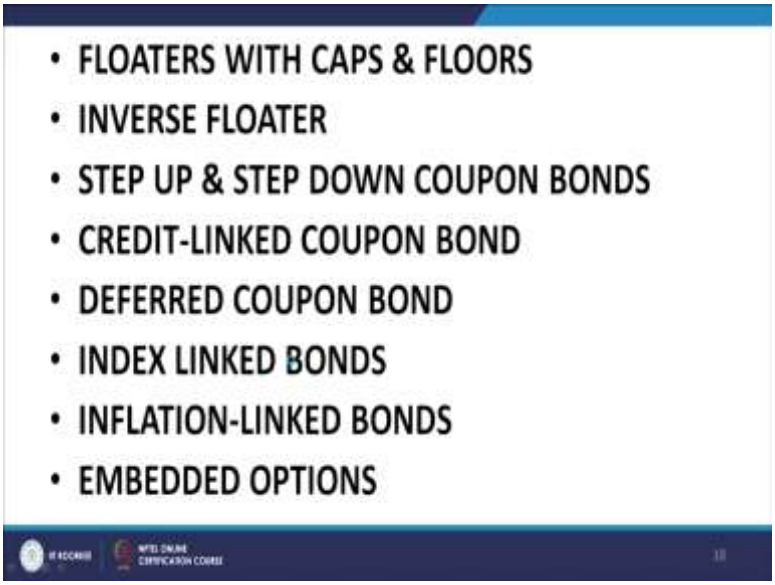

Floaters with caps and floors: These are floating red bonds, but they have a ceiling in terms of the maximum interest that would be admissible on this pond and as floor and a ceiling on the minimum rate of interest that would be allowed on these bonds. Caps mean a maximum limit and floors means a minimum limit.

Inverse floater is a floating rate bond where the rate changes inversely as the benchmark rate or the floating rate or the tagged rate. Step up and step down bonds as the name signifies the the coupon rates tend to increase or decrease over the life of the bond. Credit link coupon bonds are interesting.

They have a provision that if the credit rating of the company changes or decreases, for example during the life of the bond then the coupon rate will automatically increase to compensate the the lenders for the increased risk associated with the decline in the credit quality of the instrument.

Deferred coupon bond, well you have a gestation period after which the coupon payments starts. Index linked bonds can be bought, in some sense they are floating red bonds with the rate of interest tagged to some kind of index, some commodity index or stock index or a depth index or whatever.

Inflation linked bonds are bonds which are quite popular in the US and have been issued where the where the interest rate is stacked to the rate of inflation and obviously at the end of every period or at the end of every period as specified in the contract the rate is

reassessed on the basis of the then prevailing interest and then prevailing inflation rate and is accordingly refixed. Embedded option bonds with embedded options I have already discussed a few minutes back.

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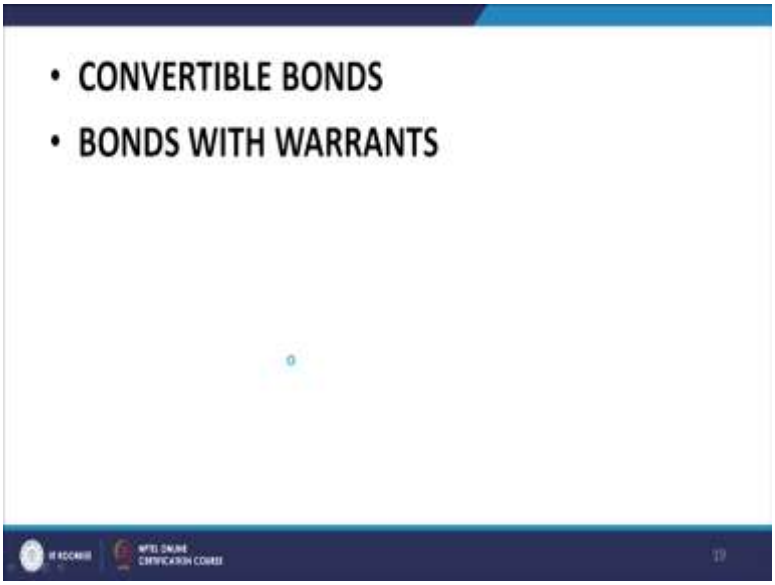

Convertible bonds are bonds which get converted into equity at a…at a point in time which is predetermined at a rate or at a value which is the computation of which is already pre agreed upon at the point of issue of these instruments. In warrants also I have discussed warrants are tradable instruments which are issued by the company as sweeteners they are attached to bonds although they can be traded in their own rights.

The holder of the warrant gets the right to invest in the equity of the company at a price which is again agreed upon at a point in time which is also agreed upon at the time of issue of these instruments. So this is a brief illustration of the various types of depth instruments that prevail in the market. I reiterate this list is not exhaustive it is only illustrative.

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So now we move over to our next topic which is equity valuation. Equity valuation is possibly much more challenging and a much more interesting area which really tells the acumen the ability of the financial analyst. So let us get into it.

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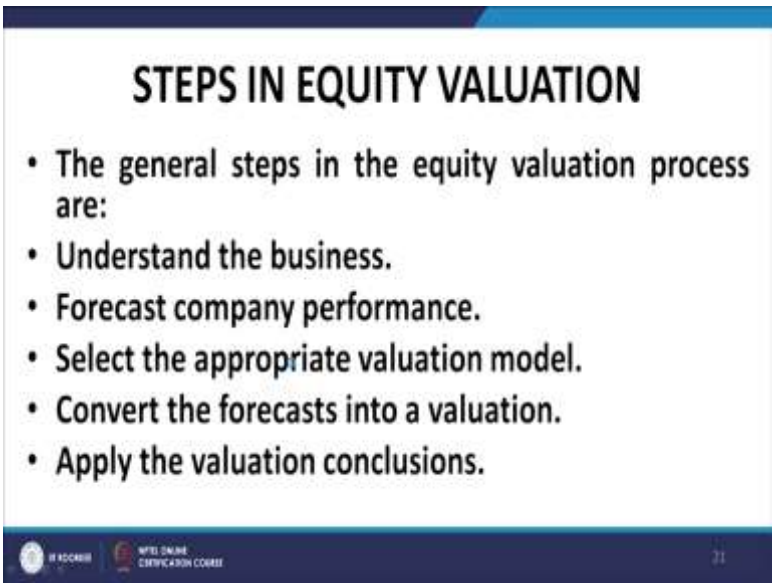

What are the steps in equity valuation, the general steps in the equity valuation process understand the business of the company for which you are doing the valuation, forecasting company's performance, selecting the appropriate valuation model, converting the forecast into evaluation and applying the evaluation conclusions. We shall be discussing in detail, primarily focusing on the valuation models.

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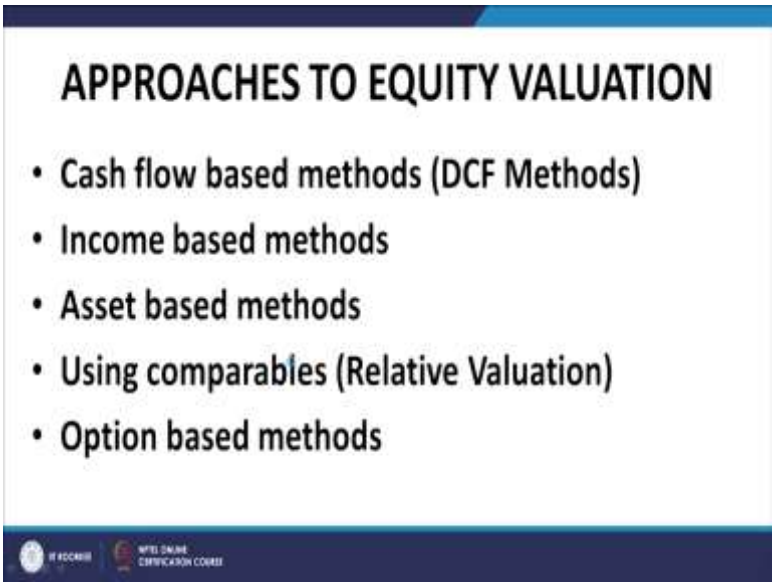

Now, the approaches to equity evaluation: Well the most common approach and the approach that we are now very well familiar with is the DCF based approach, the discounted cash flow approach. We also have in the context of equity valuation we have income based methods like the economic profit and the residual income approach. We have asset based methods which work out the asset value per equity share on the basis of the revalued assets of the company.

We can use comparables like the P/E ratio, this is a very common method for at least at the level of the layman and we have option based method which are technically much more challenging and which we shall discuss probably in the in the next segment of this course when we talk about derivatives.

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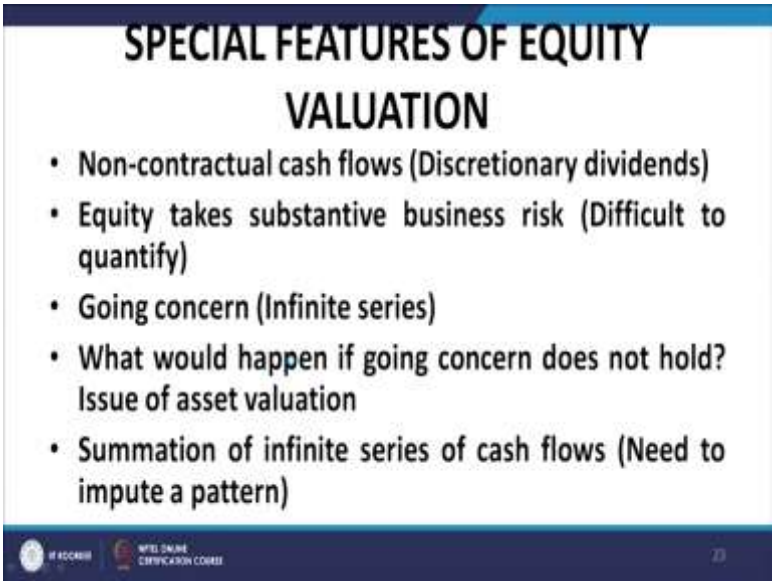

So what are the special features of equity evaluation? Before we get into the valuation models, what are the special features of equity evaluation? The first thing that puts the equity valuation far apart from the bond valuation that we have discussed is the existence of non-contractual cash flows.

When we talked about bond valuation the cash flows that arise from holding up depth instrument from holding a bond is pretty much fixed by the contract of issue. And therefore as far as the as far as estimation of cash flows is concerned it is not a difficult exercise and it is an exercise where the values ascertained as ascertained by various analysts and the market itself would converge.

And there would not be any significant mismatch between the values estimated by xyz or the market, because the cash flows are contractual in the case of depth instruments. However when we talk about equities the cash flows are not contractual dividends are discretionary I emphasize this point strongly that whereas the payment of interest is not discretionary the payment of dividend is discretionary.

A company may very well decide to retain profits for future use in due of declaring dividend if it feels to if that is a felt appropriate by the company. Then the second thing, is therefore what is the fallout, what is the consequence of this? The consequences that the valuation or the assessment of cash flows even is going to be challenging and it could

be that different analyst xyz even the market would arrive at different estimates of cash flows for the same company. So that is that is an impediment right at the start.

Now let us move to the discount rate, the discount rate also is a problem when we talk about equity valuation. Why is that? It is because it is the equity shareholders of the company that take the substantive business risk and because the equity shareholders take the substantive business risk, this business risk needs to be reflected in the discount rate which is used for discounting the cash flows or the realizability of the cash flows.

Obviously the cash flows would be realizable if the company is in profits and therefore the business risk must be the relevant risk when we work out the discount rate of the company and the evaluation of this business service and to translate the quantification of this business risk and and encoding that business risk into a single number is a massive challenge believe you me.

It is a very difficult challenge to arrive at some kind of even a reasonably precise estimate of the level of risk that is encoded in a particular business and in a particular set of cash flows relating to equity. So here this is another challenge for the equity analysts. Then we have another interesting feature normally most of us are familiar with the concept of growing concern.

We invariably prepare the accounts of a company on the premise that the company is growing concern. What does it mean first of all? It means that the life of the business or the life of the company is indefinite and we make this presumption when we do the accounting for the company. How does it, what is the significance of this particular assumption is very important.

The significance of this growing concern assumption is that it enables us to have a consistent approach to the evaluation of the assets and liabilities of the company. We value the assets and liabilities of the company in the normal course of business on the premise that the business is going to exist indefinitely.

And as a result of it there is no immediate need to liquidate the assets and liabilities of the company because if there were any such immediate necessity to liquidate some assets of the company then obviously we need to reassess the value of such assets why because the it is quite obvious that if an asset is sold as a distriss sale the value that it would

derive in the market would be substantially different from the value of the asset which it would derive in the ordinary course of business.

Distress valuation is at a huge discount in most cases. So that being the case…that being the case the presumption of growing concern of the or of the company or the company continuing indefinitely enables the analyst or enables the accountant to ascribe values to the assets and liabilities which they would have in the normal course of business. So that is a very important point here.

Now what does it im what does it result in? Now because we are…we are assuming that the life of the business is indefinite so that means what, that means we have to forecast the performance of the company irrespective of whether it is in terms of cash flows or in terms of profits or whatever the case may be income or but the important thing is we need to make forecasts over a huge period of time over in and in other words we need to arrive at some kind of an infinite series of forecasting of cash flows or profits.

So what does it result in? Because we need to forecast an infinite series of cash flow we assume that the business of the company has an indefinite life and if that is, so the forecasting needs to be over an indefinite period and if that is so what happens is, we end up with an infinite series of cash flow and now to arrive at sumabilities or summation of the discounted values of these cash flows what we need to do is?

We must do is to impute a certain pattern to this cash flows at least at some point in time in the future. Because until and unless we impute a certain pattern to these cash flows we cannot arrive at a convergent sum of these cash flow. So it is by necessity, by mathematical necessity really that we need to impute a pattern to these cash flows.

We cannot, obviously we cannot estimate this cash flows over an extended period of time with any degree of accuracy. At a certain point in time we must break off and we must say that at the end of this period we assume that the cash flow follows this infinite stream which is correct characterized by a certain growth rate or there is some other mechanism by which we attribute a certain final value to the set of cash flows.

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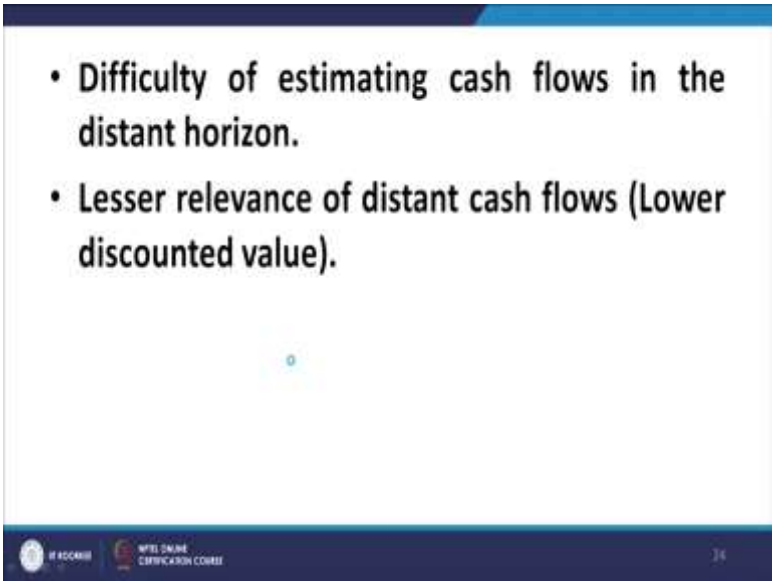

I shall be explicitly clarifying these things as we move along in this discussion, but there is a saving grace here. While we are talking about the the extended length of cash flow that need to be forecast the important point is while as I mentioned just now as you move well into the for future the accuracy with which you forecast this cash flows declines it is obviously much easier to forecast tomorrow's operations or tomorrow's performance of the company rather than a performance 20 years into the future it is common sense.

So that being the case the problem is that forecasting deep into the future is beset with inaccuracies and problems but the saving grace here is that the further you go into the future the lesser is the relevance of that cash flows when you are calculating the present value discounting a cash flow for one year will, let us say you discount a cash flow of rupee one for one year you get something like 90, 0.90, at 10 percent per annum if you discount it for 20 years you will get hardly something around 0.20 or something.

So as you move into the future the worth of that cash flow in terms of its present value declines for because the number of discounting periods increases. So that is the saving grace although over the extended period when you are forecasting the cash flows the inaccuracy will be there but the relevance of that inaccuracy in terms of the current value of the business would be significantly small.

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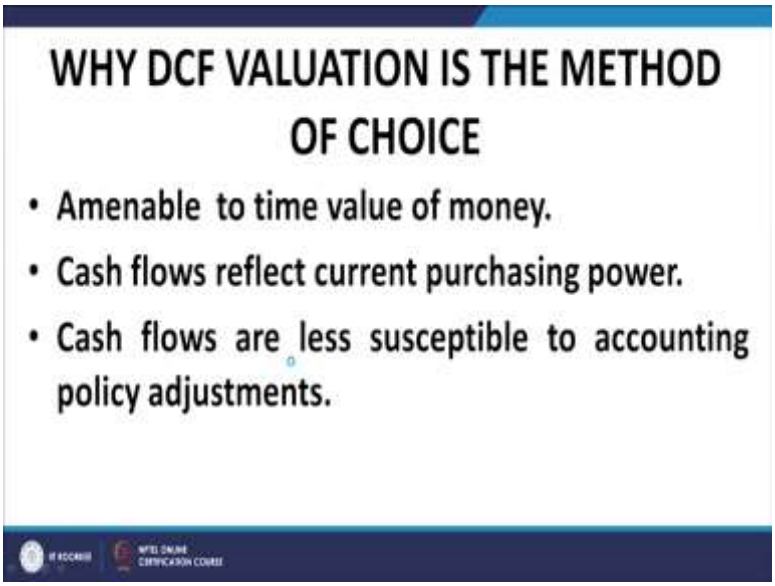

Now why DCF valuation is preferred well there are simple reasons for this first of all DCF valuation or discounted cash flow evaluation is amenable to time value of money which is compounding and discounting for the purpose of, for the purpose of accounting for the time value of money.

So it is very it is more often than not it is the case that we discount cash flows rather than discounting profits. So discounting of cash flows or the use of cash flows rather is more amenable to time value of money because the the cash flows reflect the actual purchasing par profits do not reflect actual purchasing par. I strongly emphasize this point that profits do not reflect current purchasing par.

You cannot go to the market take profits and say that I want to buy a machine by giving you these profits but you can certainly go to the bank or to the market and buy a machine by paying cash for it. So what I want to highlight is that it is the hard cash that determines the purchasing par at a particular point in time rather than the profits.

Then there is another important issue, another technical issue profits are the bottom lines of business. Now when you are talking about the bottom lines of business it is susceptible to all that has gone before that bottom line is arrived at. In other words what I am trying to say is all those amounts which are subject to ambiguous accounting policies, for example depreciation you can use straight line you can use WDV.

Similarly for amortization of certain assets you can use either straight line or WDV treatment of deferred revenue expenditures some may amortize it over three years some may do it over five years, preliminary expenses, pre operative expenses, so many, there are so research and development expenses, there are so many items for which we cannot have a hard and fast and you know later based accounting process.

There needs to be some leverage some discretion available to the entrepreneur or to the preparer of accounts when it comes to certain items. So that being the case that being the case all these accounting policies may affect the profitability of the company the bottom line of the company because it is the bottom line.

However, when we talk about cash flows, cash flows are not susceptible to many of these accounting policies. Agreed, they are susceptible to certain types of accounting policies, for example those relating to revenue recognition and so on but on the other hand there are a number of accounting policies which do not impact cash flows, for example those relating to depreciation amortization and so on.

So to that extent cash flows are more accurate more precise and more devoid of you know when you compare cash flows across companies because one of the objects of evaluation is invariably to compare the value of the shares of X with the value of shares of Y so when you compare such valuations if you use cash flows you are lesser likely to be influenced by divergent accounting policies followed by X and Y.

So these are the reasons why cash flow methods are the methods of choice when we do a valuation exercise. We shall continue from here, thank you.