Security Analysis and Portfolio Management

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Module No. # 01

Lecture No. # 36

Bond Portfolio Management Strategies - II

In the previous class, we discussed about the different types of Bond Portfolio Strategy. And here what we discussed that, let there are three types of bond portfolio strategies what the fund manager or the investors always use. And within that, if you want to define those, are basically, already we have discussed about the passive strategy.

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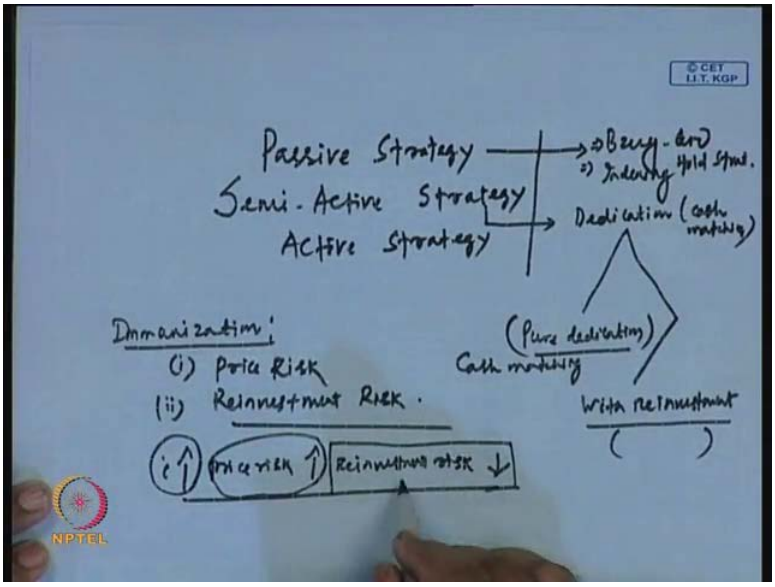

Passive bond portfolio management strategy then, probably whatever way we can define in the different books have defined in different way, but we have defined it like this - semi active strategy and another way is, it is a active strategy. These are the three types of strategies used for the bond portfolio management and here in the case of passive strategy, we discussed about extensively in the previous class, that is basically buy and hold strategy in largest trend.

And also we talk about the indexing and within the buy and hold strategy, we also discussed about the laddering. Then here, we have discussed about the dedication or we can say the cash matching and within that, we have talked about two things, one is your pure dedication strategy pure dedication and another one is your, it is the with reinvestment dedication, pure dedication is without reinvestments. And it is the basically the pure cash matching and but here, we talk about these things with that we can talk about there is a concept of reinvestment is involved in this case.

But here, whenever we talk about these things, also we talk about we started the discussion on immunization. What this immunization basically talks about? But here, everything depends on the value of the bond, but nobody talks about the how they realize return; a return can be materialized for the investor for a stipulated period of time. Therefore, the concept of immunization basically comes into the picture, which basically you try to neutralize the two types of risks, which defined as the price risk and another one is your reinvestment risk. Because the price risk and the reinvestment risk, both move in the opposite direction.

If your interest rate basically, these are the parts of the interest rate risk, if your interest rate goes up, then the price risk basically also goes up, but the reinvestment risk goes down. That means, if the interest rate goes up, the value of the bond goes down that is why that is downward price was risk, this price risk of the particular bond. But, in that particular time if you observe that, the coupon what this particular investor is going to be receiving for that, the reinvestment risk will be very low because in the market, this investment opportunities are more and because the interest rate is higher. That is why that way the reinvestment risk can be neutralized can be can be decreased, so the price risk and reinvestment risk both will be offset to each other.

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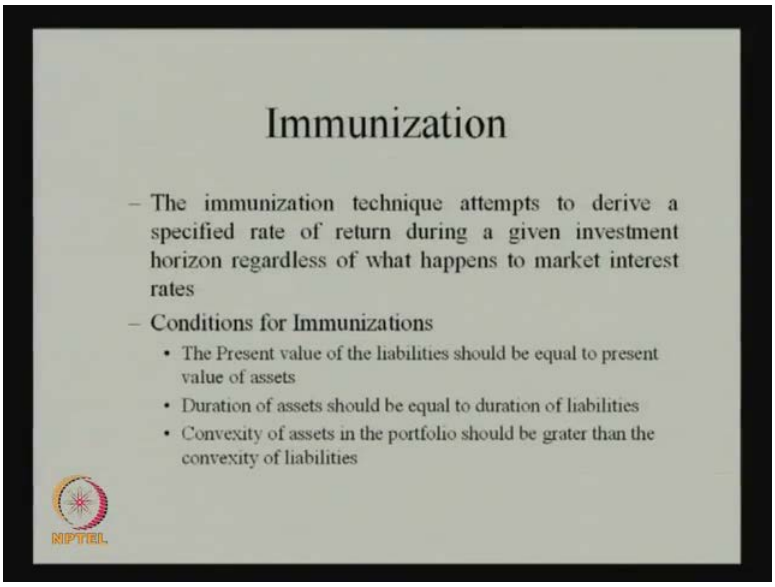

Therefore, in this case, what we can say? The immunization technique basically attempts to derive a specified rate of return during given investment horizon regardless of what happens to the market interest rate. So, basically here we are minimizing the interest rate risk and one thing is, what you can say, the basic objective of this immunization strategy is the bonds duration should be matched with the investment horizon period of the investor.

That means, if my investment horizon period is 5 years, so I should hold a bond whose duration is 5 years, not the term to maturity. That means, obviously, if you go by the principle, the term to maturity, definitely will be more than the duration. There are certain conditions, which basically prevails if the immunization strategy will work. What are those conditions?

The conditions are basically, the present value of the liabilities should be equal to the present value of the assets of this particular investor. The duration of assets should be equal to the duration of liabilities, what the investor has and the convexity of assets in the portfolio should be greater than the convexity of the liabilities. These are the three conditions should be satisfied if the immunization strategy is going to be used to minimize the interest rate risk in the market.

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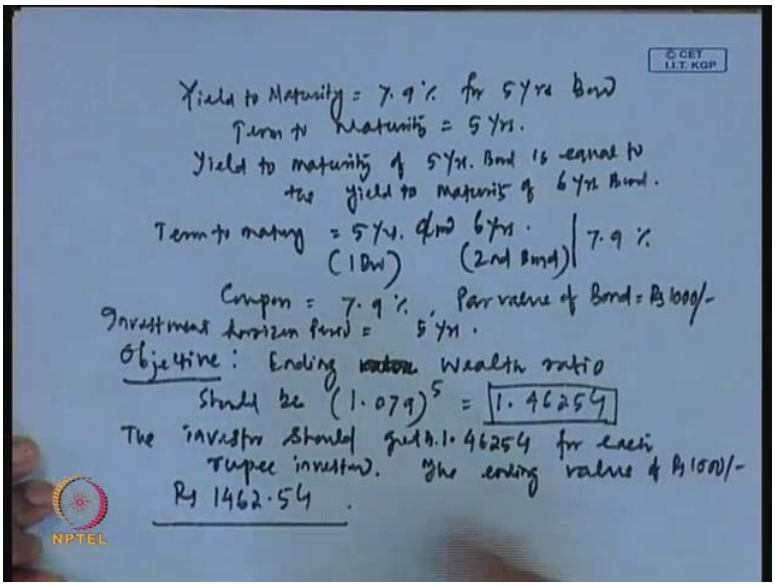

So, how this immunization strategy basically works? Let us see that how this immunization strategy works, let you take this example in this case. Let there are bonds available, let there are yield to maturity is given let 7.9 percent for 5 years bond; that means, the term to maturity. That means, term to maturity is 5 years and because of the flat nature of the yield curve, let the because of the flat nature of the yield curve, the yield to maturity of 5 years bond is equal to the yield to maturity of 6 years bond.

That means, the term to maturity equal to 5 years and 6 years for this is for one bond, this is for the second bond and the yield to maturity is same for both of them that is 7.9 percent. Let we assume the coupon also 7.9 percent and the par value of the bond, par value of the bond is let 1000 rupees, par value of the bond is 1000 rupees. Then what is the objective of the investor? In this case, the objective is the investor should maintain and it is investment horizon period, let the investment horizon period is 5 years.

So, the objective of the investor is the ending value, ending value or we can say the ending wealth ratio. The ending wealth ratio of the investor should be should be 1.079 to the power 5 is equal to 1.46254 that should be maintained after 5 years. What does it imply? It implies, the investor should get 1.46254 for each rupees 1.46254 for each rupee invested in the bond. Therefore, the ending value the ending value of 1000 rupees should be 1462.54.

This is the basically the objective of the investor, the investor should get this much should be the wealth ratio and this much should be the ending value of this particular or this particular value of the investment should be 1462.54 at the end of the 5 year, that is the objective what the investor has. Then let us see now, the investor has two options, one he has, he can invest in a 5 years bond or he can invest in a 6 years term to maturity bond or he can invest in a bond where the duration is 5 years.

So, when the interest rate changes, how this particular risk, both price risk and as well as the reinvestment risk can offset to each other and how this total value of the wealth where the investor was interested or in he is interested to maintain at the end of the investment horizon period, how that can be kept that is the basic objective of the particular investor has.

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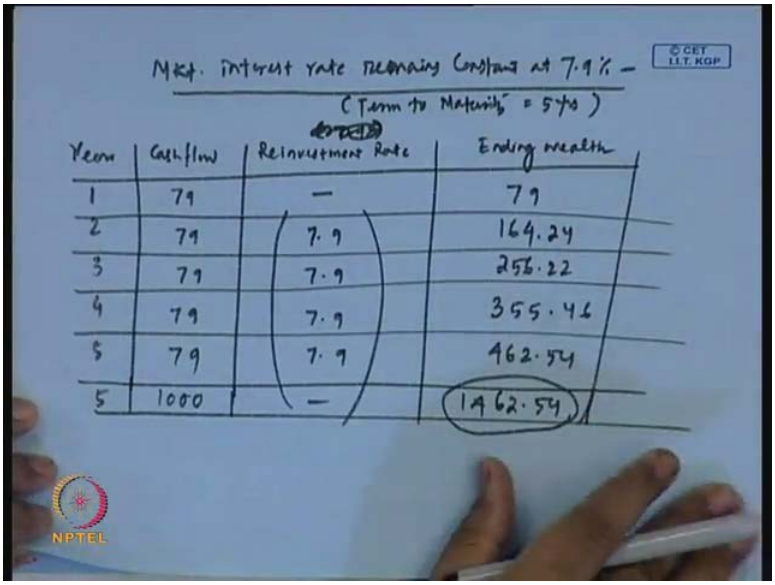

Then let this market interest rate in the first case, the market interest rate remains constant at 7.9 percent and particularly we can say that, what is that the term to maturity, the term to maturity is 5 years. Let us see what is happening? They make it let this is your year, this is your cash flow, this is your reinvestment rate and this is your ending wealth ok.

Year 1, year 2, 3, 4, 5, let us see that how this thing can be maintained. So, in the first year, there is the cash flow is 79, 79, 79, 79, and end of the 50 year basically you will is

get is 1000 rupees which is the par value of the bond. So, now, the reinvestment rate is 7.9 percent already you know. So, the 7.9 instead of write 7.9 there is no reinvestment available for the first cash flow, because at the end of the first year only it can be used, the second year it will be 7.9, it is 7.9, 7.9, 7.9, here also it is not available.

Then the ending wealth is 79 here, it is if you calculate it is 1.079 to the power square into 100 that is 164.24, this is 256.22, it is 355.46, it is 462.54 and obviously, in the end of the period, it will be 1000 plus this 1462.54. So, this is the wealth ratio what is the investor has at end of the 5 year, if the reinvestment rate remains constant.

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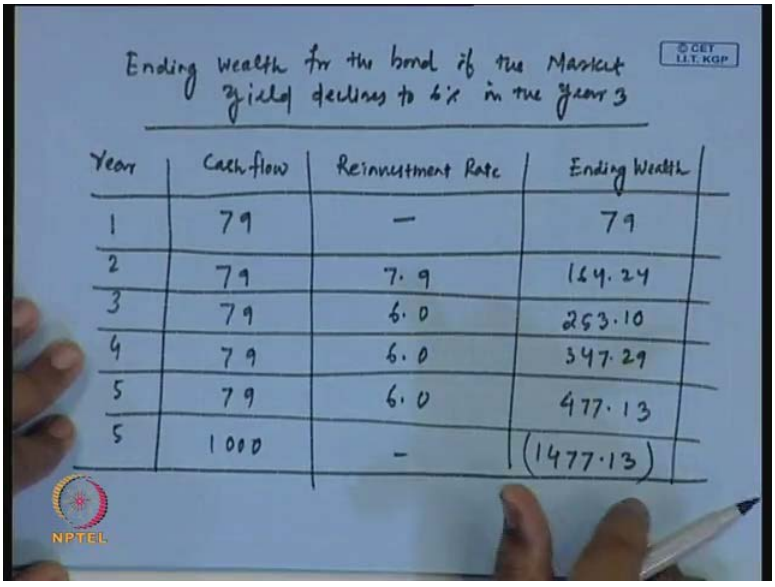

So, there is no change in the market interest rate. Here the market interest rate has declined; then now if you want to calculate the ending wealth, the ending wealth for the bond, if the market yield declines to 6 percent in the year 3. Let the other things is remaining same in the first year, but at the year number 3 at the market interest rate has declined from 7.9 percent to 6 percent, like that if you want to make this table. This is your year, this is your cash flow, this is your reinvestment rate and this is your ending wealth 1 2 3 4 5 5, the end of the value.

So, then what you can also from this, the cash flow in the first year already we know, first year was the yield was 7.9 percent that is why 79, second year also 79 because coupon is not changing the coupon remains same, every year it is 79, 79, here also 1000.

Reinvestment is not available here, this is your 7.9 or the first year in the third year whenever we have said, it will reach it the interest rate declines from 7.5 to 6 percent. So, that is why it is 6.0 it will remains same 6.0 like that. Then your ending wealth was 79 it is same 164.24, but here if you see whenever it is 6 percent, then the ending wealth value will decline previously it was 253.10, but now it will be 253.10.

This will be 347.29, this will be 477.13, and then final value will be 1477.13. So, or we can observe here that this value of this particular, the ending value of this particular security has we are expecting it should be 1462. 54, but this value is basically as gone down to this as increase to 1477.13.

But now, let in this same condition, we want to calculate for the 6 years bond, where the duration is 5 years. Let the term to maturity 6 years, but the duration is 5 years of the 6 years bond, if you assume these things let us see that, how this particular interest rate is going this change in the interest rate behavior is affecting this ending or ending wealth of this particular bond.

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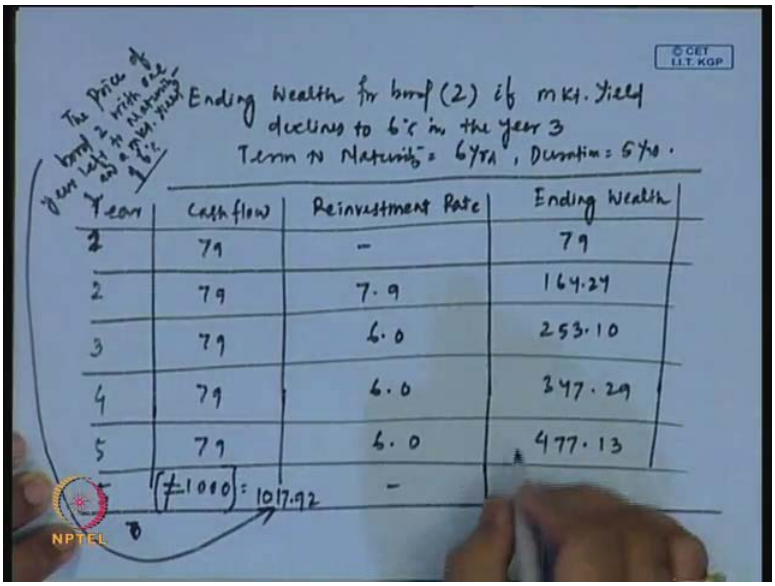

So, here we want to calculate the ending wealth, ending wealth for bond second bond, bond 2 if market yield declines to 6 percent in the year 3, here the term to maturity is equal to 6years, where hypothesizing and the duration is 5 years. Let us see the duration is 5 years, then what will happen in this case? If you observe that, let one again we can

take, this is your year, this is your cash flow, cash flow, and this is your reinvestment rate.

This is your ending wealth 1 2 3 4 5 end of the period 5, let us see if the in the same situation if you are investing in a bond which duration is 5 years, how this particular wealth ratio can be maintained? The cash flow is same 79, 79, 79, 79, 79, here it is 1000, but here the one thing is, the cash flow basically we have to check it because the price of the bond 2 with one year late to maturity and a market yield of 6 percent is we have to calculate.

So, this cash flow it cannot be 1000, it cannot be 1000, we have to calculate this cash flow and the market value of the market interest rate is 6 percent. So, the price we have to see, but you write here, the price the price of bond 2 with one year left to maturity and a market yield of 6 percent is basically, we calculate it will be 1017.92 the value will be 107.92.

So, if reinvestment rate is 7.9 percent, it is 6.0, here it is 6.0, here it is also 6.0. So, in that known in the value is 79, this same 164.24, 253.10, it is 347.29, this is 477.13, but finally, the value of the value of this plus this that will give you 1465.15. So, which is very much close to our objective in the beginning whatever we have taken, the objective was basically 1462.54.

So, it is more or less same with this thing, therefore, we can say that instead of if your investment horizon period is 5 years. So, instead of holding a bond whose term to maturity is 5 years, we should hold a bond, where the duration is 5 years by that when the reinvestment risk is or the because of the change in nature of the interest rate, the value of the bond goes down, this reinvestment risk aspects also, the reinvestment risk is basically goes up by that it can be cancel to each other or the interest rate as increase the value of the bond goes down. That time return can be maximize through the investment like that the bond holder can offset to reinvestment risk with the price risk and the opposite can have an whenever the interest rate goes up, we can observe that the value of the bond goes up, and the value of the bond goes down, but the reinvestment rate risk will be more, in that case which will offset to each other.

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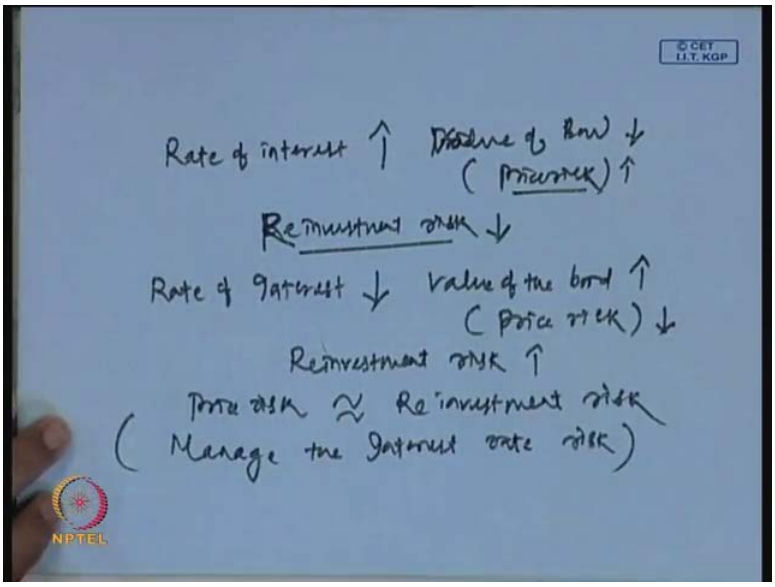

So, in summary what you can say? If the rate of interest goes up, then the value of bond goes down, which basically the price risk is increasing. So, in that case what will happen? That reinvestment risk, reinvestment risk is declining. So, the price risk and reinvestment risk basically will offset to each other.

So, the opposite may happen, whenever the rate of interest goes down, value of the bond goes up. So, that is why the will happen the price risk declines, but the reinvestment risk of the investor goes up. So, again we can assume in this case also, the price risk more or less into the reinvestment risk. So, finally, we can manage the in totality, we can manage the in interest rate risk because, the interest rate risk is basically nothing but, it is the combination of the price risk and the reinvestment risk; that is what we can use this bond immunization strategy whenever we use it in the market.

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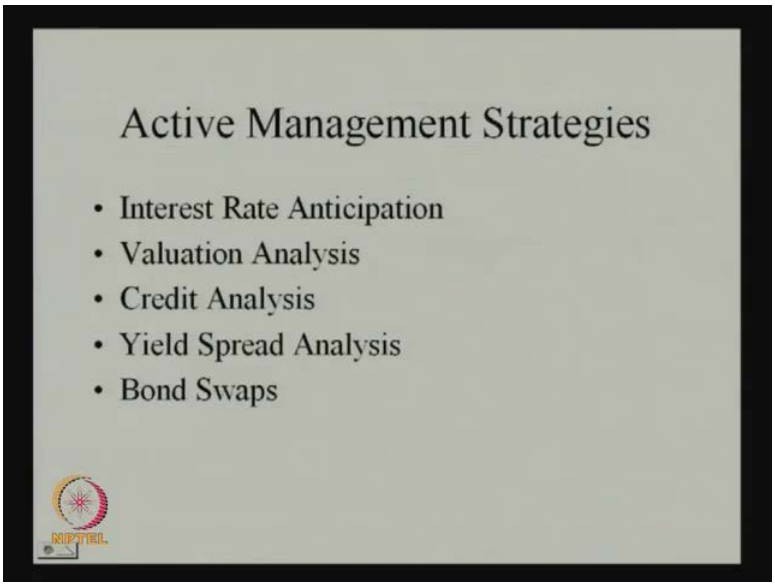

Then coming to the active management strategy, in the active management strategy we have the various methods through which the bond portfolio can be managed; one is your interest rate anticipation, then you have the valuation analysis, then you have a credit analysis, then the yield spread analysis and the bond swap. These are the different five ways through which the bond portfolio can be managed actively. Let us see one by one how this portfolio strategy basically works, whenever we deal with the instruments like bonds.

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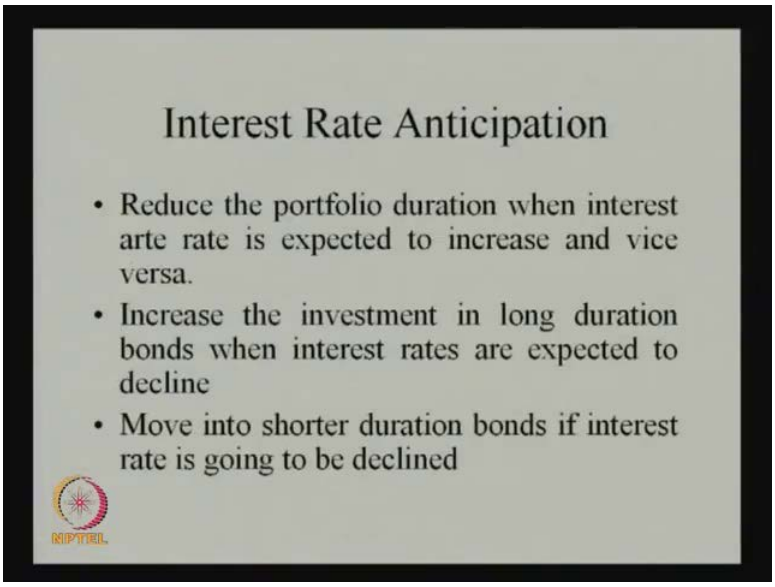

If you see here, that interest rate anticipation generally in the literature, we consider interest rate anticipation is basically is the riskiest strategy. Interest rate anticipation or predicting interest rate or anticipating interest rate, this is the riskiest strategy in the bond portfolio management process. So, here what this particular strategy we are trying to say, that reduce the portfolio duration when the interest rate interest rate is expected to increase and vice versa.

That means here, what it is trying to say? There is a minor mistake here, if you observe here that, reduce the portfolio duration when interest rate is expected to increase and vice versa. What does it mean? That increase the investment in the long duration bonds when interest rates are expected to decline; that means, what this particular strategy were trying to say that, we should invest if you are expecting that the interest rate is going down.

If you are predicting the interest rate is going to be down then, what you should do? You should invest in long term expected to if interest rate decline you invest in the long term and low coupon bonds, you should invest in investment in the long term in low coupon bonds will be more, why it is so? It is because if there is a inclining, there is interest rate will decline then, what will happen that there is some kind of laws because of the reinvestment opportunities, the reinvestment return basically will decline, but the bond value price, the bond price will be up.

So, in that case in the means, in the long run if you are expecting these things, then you should invest more money in the long term in low coupon bonds, by that you can manage or raise your interest rate risk and also the return can be maximized and like that, if you observe that interest rate is going to be the moving to the shorter duration bonds, if the interest rate is going to be inclined.

It is basically inclined. So, here what I am trying to say that whenever you are predicting that interest rate is going down, you invest in the long term in low coupon bonds, if you are interest rate is going up, then we invest your there is some kind of money you can keep it with you and if you want to invest, the invest in the short term and high coupon bonds.

This is the strategy basically what the investor always uses, but the question is basically the fundamental question is how the interest rate can be predicted? how the interest rate can be predicted, But if you go back to your previous discussion, some of the things some of the theories which talks about interest rate, they generally discuss that, how the interest rate is going to behave, which basically depends on this supply and demand forces. But, the biggest question is that, the supplier demand forces basically is very difficult to observe that, how these two particular functions can behave in a particular time period.

Therefore, what you can say? That interest rate strategy is the riskiest strategy what the investor always use in the market. Then we have some of another strategy always the sometimes investor use, that is the valuation analysis. What basically they do if you go back the equity valuation part? Also, what you can say that if you calculate by using any of the discount from (( )) or either it is dividend discount flow or the free cash flow models, if you can calculate the intrinsic value of a bond, then what generally we can do? We can always compare this intrinsic value with this actual market value and from that we can say that, whether the particular stock is overvalued or undervalued and accordingly we take our decision in the market.

Like that here also the same strategy can be applied in the bond portfolio management and we can decide when we should buy this particular bond and when we should sell this particular bond on the basis of their valuation of this particular once.

So, here what generally they do? Select the bonds from the basis of their intrinsic values and the question is, which are those factors which affect these intrinsic values of the bond. Then normal interest rate already you know and as well as the cash flow, apart from that the interest rate or the coupon, interest rate of this particular market and in terms of the coupon whatever cash flow you get, that basically varies on the basis of the bonds rating and also the call features of the particular bond.

What does it mean? That means, if you go back to the previous sessions, what we have observed there, that if the rating is higher, we are expecting that the return or the interest rate of this particular bond will be lower, but if you observe that this particular bond has more risky features like all features, like kind of deferred call etcetera.

Then we can say that, the premium of this particular bond or return from the particular bond should be higher, expected return of the particular bond should be higher. So, there are certain characteristics, which basically determine how this particular bonds value can be determined and there are certain features, which basically talks about this particular concept in the market.

So, then what is this particular managerial implications from this and how this managers can take the decision that, which bond should be bought and which bond should be sold? In this case if you see, then this said that buy the undervalued bonds and sell the overvalued bonds, if the same technique basically whatever way the equity portfolio management strategy case, we discussed in the portfolio management process in terms of the equity.

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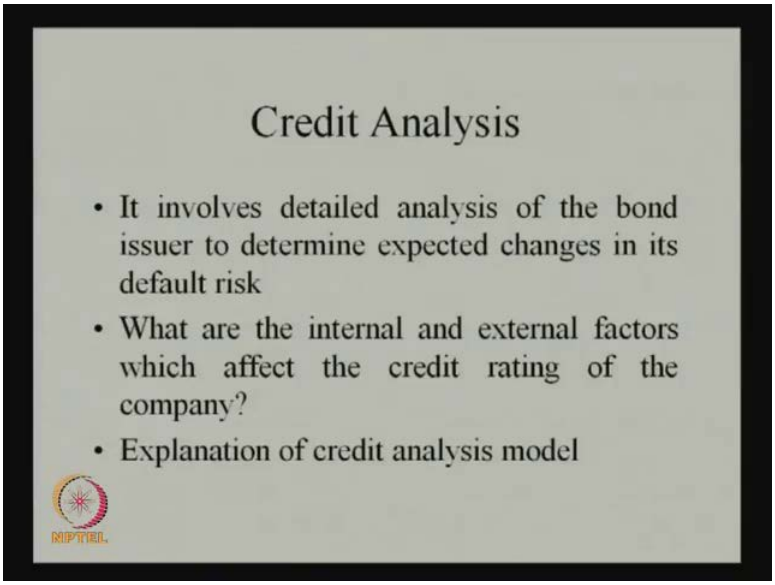

Then we have another approach or we use another approach that is called the credit analysis. What this credit analysis is basically means? The credit analysis basically it is, it involves detailed analysis of the bond issuer to determine expected changes in its default risk. If the default risk is higher, then obviously, the premium should be higher and that is why the return should be higher, but the default risk is lower than we can say we can expect that, this particular bond is less risky and we can expect the return will be little bit, the expected return will be little bit lower in that case.

So, therefore, the credit analysis is basically talking about the expected changes in the default risk of the bond issuer. So, here in this context, what basically first the concept has been discussed by the Altman and (( )). What generally they discuss that, they try to find out which are the or what are the internal and external factors, which affect the credit rating of this particular company.

And internal means, we refer to the companies specific factors and external means, we refer to the particular factors with respect to the microeconomic context or which is outside this particular firm or outside this particular company. And how this particular model is developed, if you observe here they call it this Z score model.

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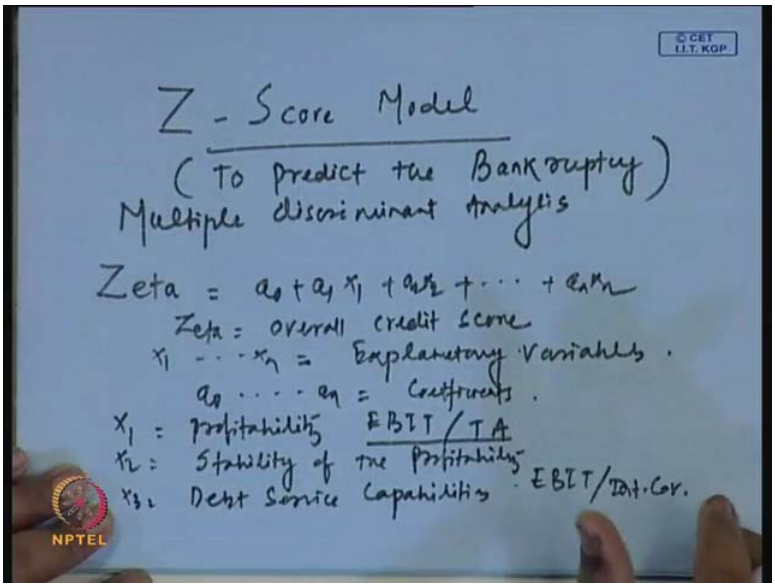

They call it is Z score model, what this Z score model was trying to explain? If this model is basically use to predict the bankruptcy, Z score model is use to bankruptcy and it combines this model basically combines the traditional financial measures with a multi varied technique and what we call it that multiple discriminate analysis.

Multiple discriminate analysis to derive, basically the set of the weights for the specified variables and the result is an overall credit score of is fall, then how basically the credit score is given? What this Altman as said? That zeta is equal to a 0 plus a 1 x 1 plus a 2 x 2 like that plus a n x n. So, here what this zeta means, it is the overall credit score of the company, overall credit score of the company and the x 1 to x n these are basically the

explanatory variables, which basically have the impact on the credit score of the company.

On that basis explanatory variables, which basically helps to assign some scores to the particular company and a 0 to a n these are nothing but, these are the coefficients, these are the coefficients. And here which are those particular variables which particularly affect, this particular thing, he has said that, the major variables are explanatory variables are profitability of the company.

Profitability means they have referred it, these earnings before interest and tax, earnings before interest and tax divide by the total assets. Then you have the like that he has taken this another thing that is the stability of the profitability, stability of the profitability which is nothing but, the standard deviation of this standard error of the estimate of this EBIT by TA for the 10 years. Then you have the debt service capabilities, which is nothing but, the interest coverage ratio and interest coverage ratio is EBIT by the interest coverage or the interest charges.

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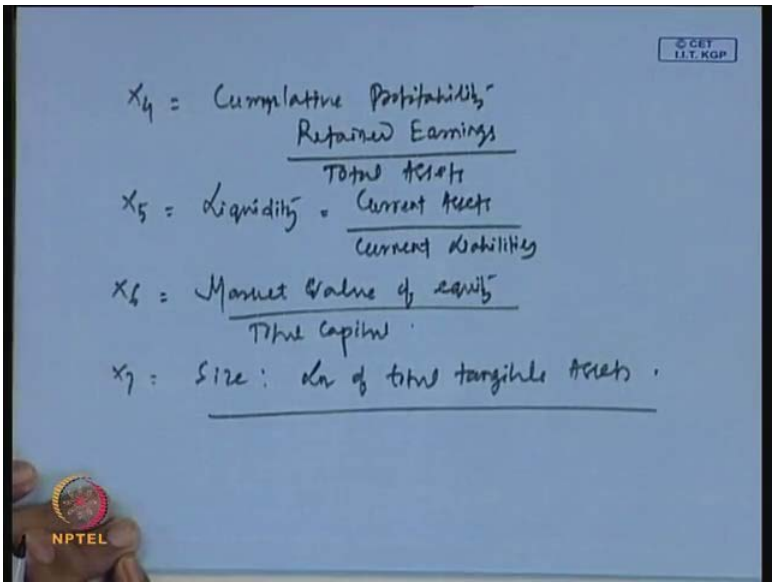

So, another variable he has taken. So, then they have the cumulative profitability, cumulative profitability what does it mean? It is basically the retain earnings divided by the total assets and x 5 is basically the liquidity which is nothing but, the current assets by current liabilities, this is the current assets by current liabilities. Then you have x 6

which is nothing but, the market capitulation level or we can say that market value market value of equity.

Market value of equity by the total capital, then we have the size of the company, which is basically the total normalize or L n of total tangible assets. So, these are the different variables which basically, how the impact on this zeta or the credit scores of the company.

So, what these analysts basically do? Before investing in this particular bond, they try to discuss, try to analyze those variables what we have identified here. And after analyzing those variables, they can measure this credit score on their own and on the basis of their credit score they can say that, how much risk or default risk this company has. And finally, they can decide that, how much return we can expect it expect from this particular bond investment and whether this particular bond it is or to be invested in that particular period of time or not. So, this is the way the credit analysis works.

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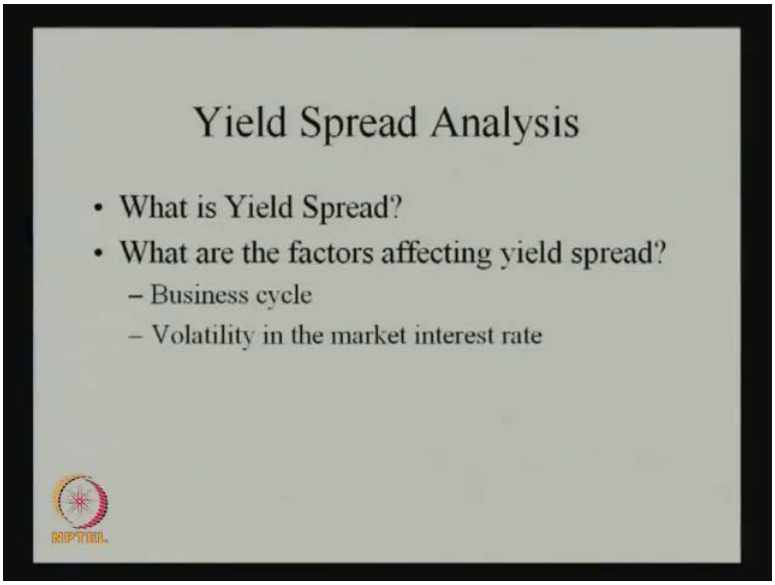

Then another type of analysis always we use that is a basically or we can say that, always people have used that what is this yield spread basically? Yield spread analysis always what we use by the theory or use by the different kind of a bond investors and what the exactly this yield spread means? The yield spread means, it is basically the spread

between the spread between the high graded and or we can say high rated and low rated bonds.

So, here what it basically means, that in a different time period if you observe that the spread between the different bonds, even if there in the same term to maturity will be different on the basis of their credit rating or on the basis of their other aspects, then which are those basically factors, which affect this spread. This spreads which are affected by this, let we can say one factor is business cycle. So, what people have studied regarding this? They said at the recession, at the time of recession, at the time of recession the spread has been more.

What is the logic beyond that? At the time of recession why this spread has been more, it is because this there is more risk in the market, more risk. So, risk is more than the premium also should be more and the investor which also has more premium. So, if the premium will be more, then there is a gap also between these two particular bonds or particular different rating bonds also will be more.

So, therefore, at the time of recession, at the time of bad phases, we can say that this spread would be more and at the time of good phases the spread will be less. So, that is the argument what this investors or the fund manager where trying to give. So, in this context, what you can say? That the business cycle is the most important factor or the macroeconomic condition is the most important factor, who basically decides what should be the spread.

Then if you see this another factor, the major factor is volatility in the market interest rate. That means, what basically this market and the market interest rate is nothing but, the demands of life fluctuation. So, once this market interest rate will be volatile, it will have the impact on the different types of the bonds. So, if the different types of the bond will be affected, then automatically what will happen? That the spread between the different types of instruments, financial instruments which are available in the market also will be the spread between them the return between them will be also varied.

So, therefore, in the volatility in the market interest rate, which basically decreases or increases the value of the bond depending upon the characteristics of the bond, which basically increases or decreases this yield spread in a particular time? So, what the

investor does, he basically decides the yield spread by looking into by analyzing the yield spread he says that, what is the condition of the particular market and by analyzing the condition, he can decide where to be invested.

And the whether we should invest in this bond or that bond and what kind of interest rate is going to be prevailed in the market. So, all these things can be known. So, that is why what you can say sometimes, most of the time we use this yield spread, which can measure this business cycle and from there we can predict that, what kind of investment alternatives will be suitable for the investor at that particular time period.

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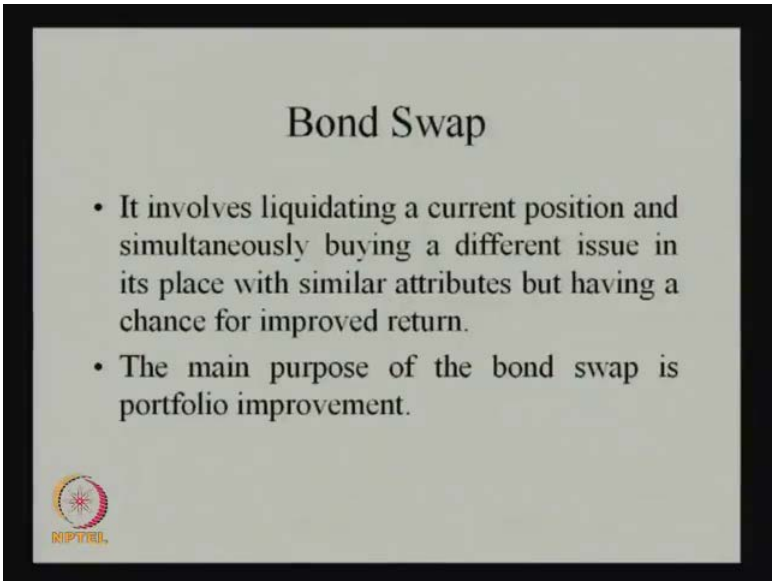

Then the other one is the bond swapping. What basically the bond swapping means? The bond swapping means, it involves liquidating a current position and simultaneously buying a different issue in its place with similar attributes, but having it chance for improved return.

So, therefore, what basically we have to find out another candidate for that, which may have the different or more or less same characteristics, on the basis of the objective of the investor, but having a chance that this particular bond can be improved further, the return of this particular bond can be improved further.

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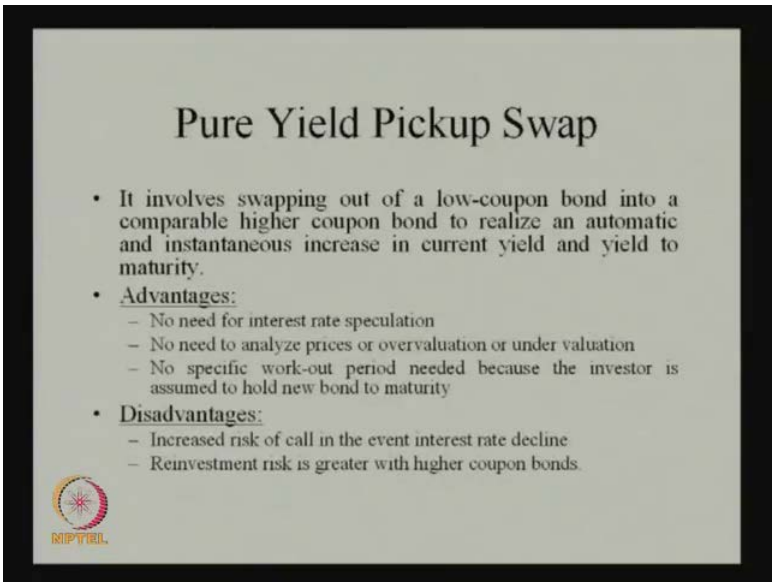

So, the main purpose of this particular bond swap is the portfolio improvement, which are those different types of the bond swap? We have a pure yield pickup swap, we have a substitution swap and we have a tax swap and how this pure yield pickup swap works? The pure yield pickup swap basically involves swapping out of a low coupon bond into a comparable higher coupon bond to realize an automatic and instantaneous increase in current yield and yield to maturity.

That means the picking of the swap is possible, when the two party, the counter party will be available, two markets will be available that particular time and the different alternatives on the basis of their objective or on the basis of their requirement, the two instrument should be also available in that particular time. So, here somebody is expecting that the interest rate will behave in one direction; another investor is expecting the interest rate will behave in opposite direction.

So, in that case their understanding is basically the opposite about the market, about the prediction. So, then the swapping is possible between these two; therefore, in this case what this pure yield pickup swap is talking about, it involves swapping out of a low coupon bond into a comparable higher coupon bond to realize an automatic and instantaneous increase in the current yield and yield to maturity. Therefore, he feels that, that generally this current yield should be more, he feels that I do not need the current

yield. So, therefore, he is going for a higher coupon bond and he is going for a lower coupon bond.

And he also feels that, I should invest in a long term bond that is why I should go for long term low coupon bonds and here he feels that, I should go for a short run higher coupon bonds on the basis of the interest rate behavior, just now we discussed about that. Where is those advantages in this case, here we do not have to speculate anything, we no need for interest rate speculation, no need to analyze the prices or overvaluation or undervaluation, no specific work-out period needed because the investor is assume to hold new bond to maturity.

That means here, what we have observed? He needs the current yield should increase immediately therefore, he is swapping the low coupon bond with higher coupon bond; may be another fellow, who is swapping this bond with him, may be does not need this increase in the current yield that particular time, maybe he wants to stay in the market for a certain period and by looking into the interest rate behavior in other things, maybe he can maximize is return in the future.

But, in this case, what we have observed that he needs this particular current yield immediately, that is why he wants to swap it with a low coupon bond with a he wants to swap with the high coupon bonds.

And what are the disadvantages? Disadvantage is increase the risk of call in the event interest rate decline, reinvestment risk is greater with higher coupon bonds. So, if you are observing that reinvestment risk is already the reinvestment return is very high or the market interest rate is very high, we are expecting that reinvestment rate will go down, and then the reinvestment risk in the market also will be higher in the future. So, this is the disadvantage we can have, whenever we talk about the pure yield pickup swap.

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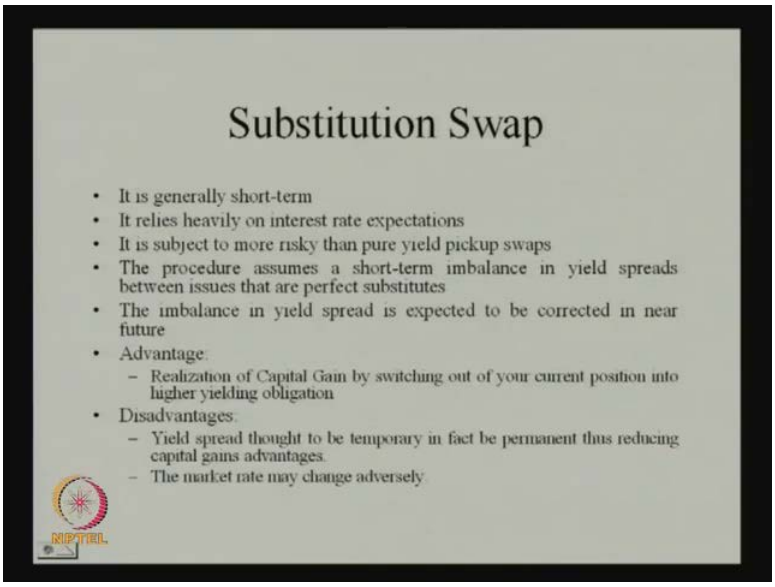

Then if you talk about the substitution swap, in the substitution swap what basically we do? It is generally short term in nature, it relies heavily on interest rate expectations it is subject to more risky than pure yield pickup swaps, the procedure assumes a short term imbalance in the yield spread between issues that are the perfect substitutes, the imbalance in yield spread is expected to be corrected in the near future, then only this substitution between the two bonds can be possible.

Then what is the advantage? The advantage is the realization of capital gain by switching out of your current position into higher yielding obligation and the disadvantage is, the yield spread thought to be temporary. In fact, be permanent, thus reducing the capital gain advantages, the market rate may change adversely.

What basically we have observed from this, the characteristics of the substitution swap? It is highly dependent on the interest rate anticipation, if we are on the beginning we said that, anticipating interest rate is the most risky strategy in the market, then second thing this substitution swap is relying more on the anticipation of the interest rate. Then it is very difficult to use it in the market in the real sense number one, number two that if you compare or if you discuss about the yield spread on a particular time, we can say that the yield spread basically is a concept which may varied on the basis of the business cycles or on the basis of the different macroeconomic conditions, but here what we have seen?

That if you assume that the particular yield spread, even if there is a high spread now, we are assuming that, this will be corrected in the next future. Therefore, we want to substitutes this bond with another bond depending upon their characteristics, then sometimes we are also in the bias of the more risk, it is because that the yield spread is basically a long run phenomena depending upon this macroeconomic situation.

So, if there is nothing in the hand of the investor regarding the macroeconomic fluctuations, then this thing also cannot be realized or this thing also cannot be predicted. So, therefore, these are certain limitations to be used and this substituting with very perfect kind of assets with another asset is very difficult to find in a particular market. So, that is why the substitution is sometimes is not possible.

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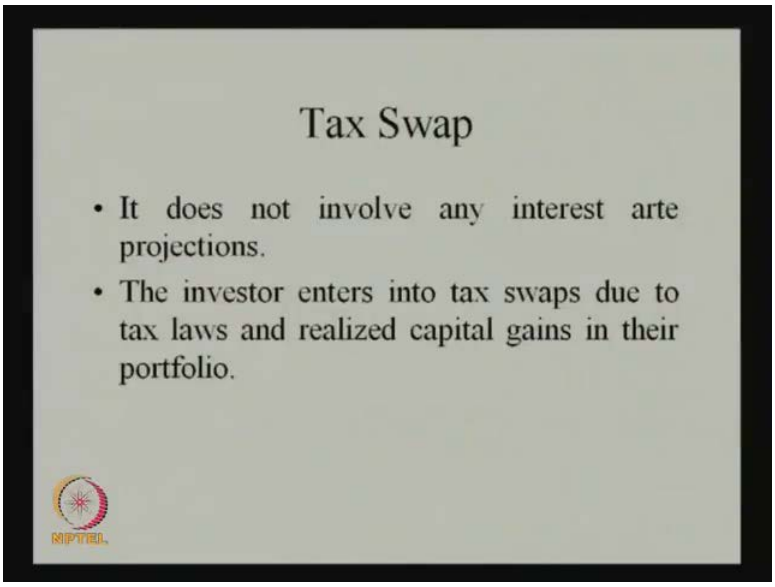

Then we have the tax swapping, here in the tax swapping it is purely due to the tax laws, it does not need any interest rate projections, does not have any kind of economic meanings. So, what this bond investor is trying to do in this case? They always enter into the tax swap, due to tax laws and realized capital gains in their portfolio. Already we know that, there are certain bonds which are tax free, there are certain bonds, which are not tax free.

So, that is why what generally they do or in a particular time period the finance end of the finance early or this capital gain will be this much or that much. So, in that case, they

want to swap it with some another bond, which has the opposite characteristics of this particular bond. So, like that they can save some tax or also they can minimize their risk in terms of the fluctuation in the capital gain. Therefore, it is not link to interest rate, it is a long not link to the other bond characteristics, it is directly link to the tax law of in the other obligations by the regulators.

Therefore, what we can conclude here? That the risk of the bond is all measured or is all calculated on the basis of the interest rate fluctuations and coupons and as well as the basically more risk, basically the bond investment gets from the interest rate fluctuations. So, any investment in the bond portfolios or any fund manager who tries to found in terms of the port bonds, tries to minimize the interest rate risk in the market, but the interest rate risk is the most volatile.

And as well as very difficult kind of risk always we face in the market, because it is very difficult to predict the interest rate. There is no such kind of anticipation, the clear clock very thorough anticipation will be prevailed in the market or to predict the interest rate. Therefore, depending upon the demands, supply situation in a particular time, if we can predict the interest rate, may be the bond investment will be more profitable, but if you are not predicting the interest rate perfectly or the certain factors, which affect this bond returns like your coupon, your par value etcetera, then what will happen? The bond investment may not be profitable for the investor.

But still, it is less riskier than the equity investment and as well as some part of the bond investment can be predictable and also the bond invest there is certain characteristics of the bond, what we have seen from the passive portfolio management and other strategy that the certain kind of income maximization, maximize your can invest in this particular bond to maximize their return, if they know their investment horizon period and they know their liability from the beginning.

So, this is about the bond portfolio strategy and who can get the maximization of and how this income can be maximized from the bond investment and this is the way, this is the different methods through which the bond portfolio management can be carried out. So, in the next class will be talking about the other instruments, how the other instruments basically used in the investment part or the liquid investment or in general the financial investment in the market, thank you.