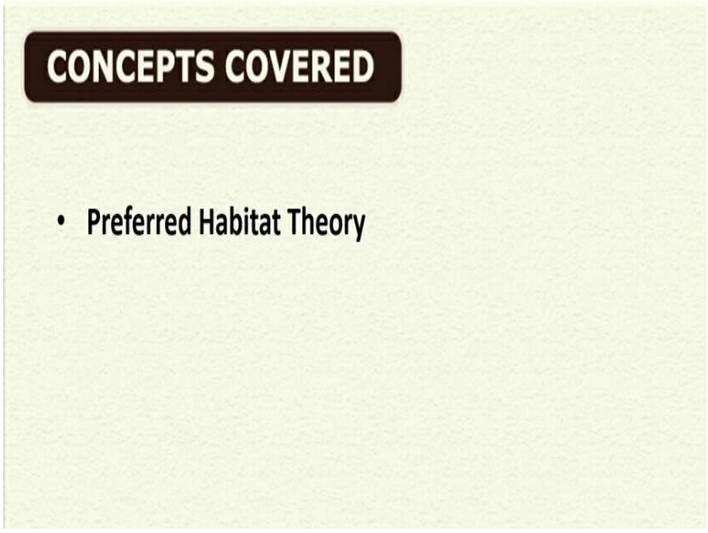
Managements of Fixed Income Securities
Prof. Jitendra Mahakud
Department of Humanities and Social Sciences
Indian Institute of Technology - Kharagpur

Module No # 05
Lecture No # 17
The Term Structure of Interest Rates V

Welcome back! So, in the previous discussion we have discussed about the first part of the term structure theory which basically talks about the market segmentation theory. There we have seen that, how the markets are segmented and as well as the demand-supply forces of the short-term market is not going to affect the demand-supply forces of the long-term market. So, the interest rates which are determined, these are determined with respect to that particular segment.

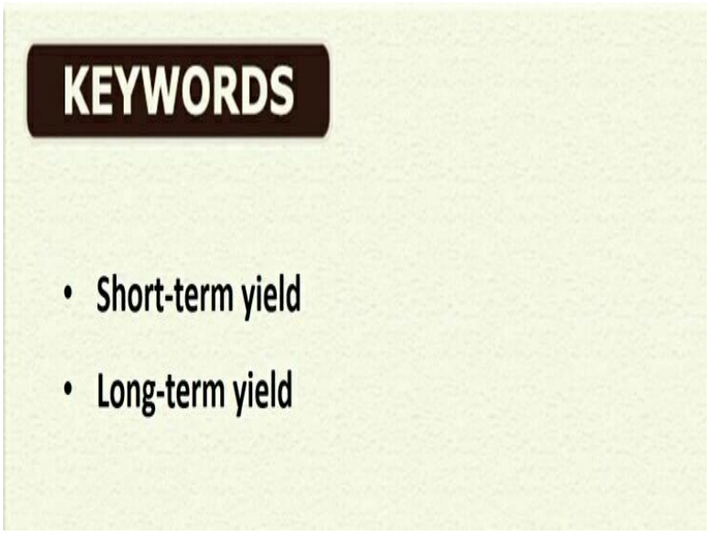
And other things we have discussed that, within that segment there may be a kind of substitution take place. That means if you are operating in a short-term market, you can substitute your kind of securities with the treasury bills with the commercial papers. If you are operating in a long-term market, you can substitute your bond with long-term government bonds with the long term corporate bonds.

(Refer Slide Time: 01:14)



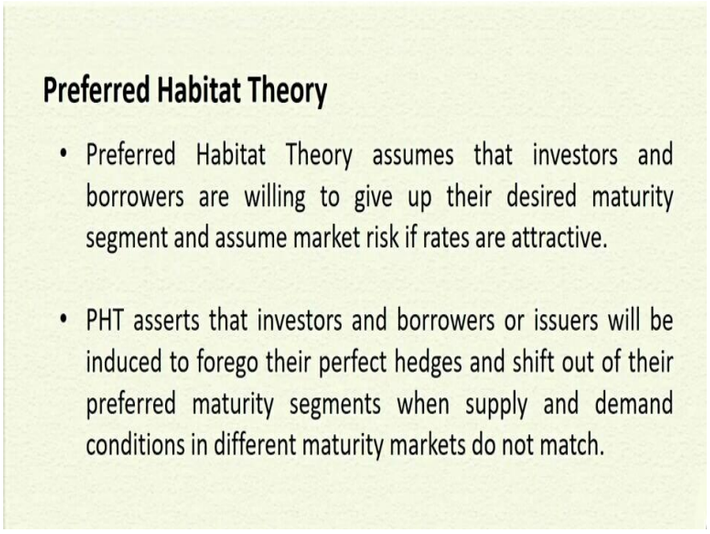
So, then the other part of the term structure theory we have that is called the preferred habitat theory, which is basically a extension of the market segmentation theory. in the true sense that is linked to the market segmentation theory. Little bit we can relax certain assumption whatever we have taken in the context of the market segmentation theory.

(Refer Slide Time: 01:44)



So, in the preferred habitat theory if you see, that mostly will be dealing with the short-term yield and long- term yield concept and how the long-term yield is related to the short term yield. That particular concept would be used in this particular session.

(Refer Slide Time: 01: 57)



So, already what basically I told you? that what is the basic essence of the preferred habitat theory? Here, there is a typical assumption that the investors and the issuers or the borrowers whatever what you can use for that. They are willing to give up their desired maturity segment and assume the market risk if the rates are attractive. In the previous case, what we have seen? that everybody has their investment horizon period and they want to stick to that particular segment and the demand-supply forces of that segment will determine the interest rate in that segment.

But, here what basically the preferred habitat theory is trying to explain, that the investor can also move from one segment to another segment or the issuer also can move from one segment to another segment if the risk is compensated. So, they are going to take certain kind of risk and already we know that, risk is nothing but the market risk, which means the interest rate risk. So, if they are going to take more risk and the risk is compensated with the extra return what they are going to get? so that, means they can move from one segment to another segment.

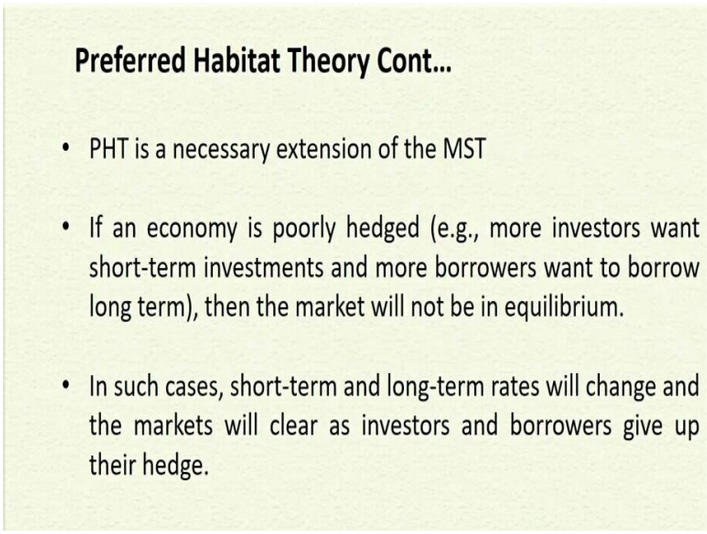
That means the yield curve basically you are going to determine through this preferred Habitat theory, that basically gives you the idea that how the long-term interest rate is linked to the short

term interest rate. So, in that particular context that is the basic assumption what basically we have taken. So, therefore the preferred habitat theory basically always tells that the investors and the issuers will be always ready to forgo their perfect hedges and shift out their preferred maturity segment when supply and demand conditions in different maturity segments do not match.

So what does it mean? For example, there is a huge demand in the short-term market where supply is not there. But there is excess supply in the long-term market but the demand is not there. In that particular context, there may be a shift can happen between these 2 segments. And the investments horizon period which is basically matching the liability and the assets time period or the maturity that also can be changed.

So, in that particular context, a new equilibrium point can be established with the interaction of both the short-term yield curve or we can say that short-term market and also the long-term market. so that is the basic essence of the preferred habitat theory.

(Refer Slide Time: 05:00)



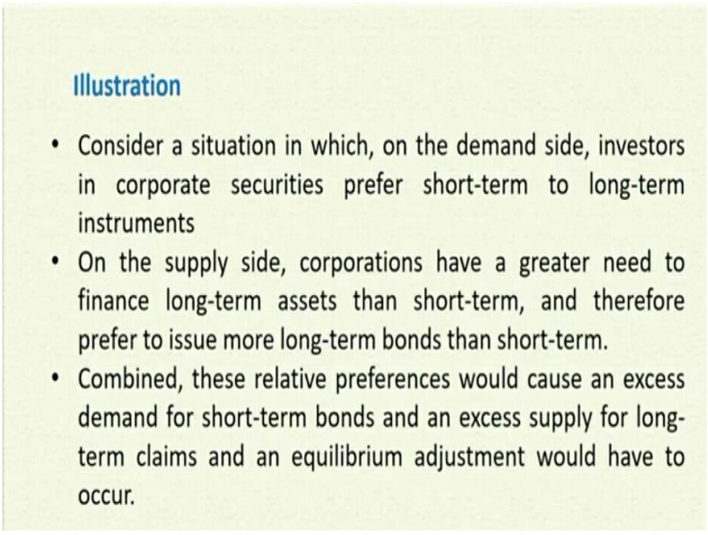
So, let us see that what basically happens in that particular segment with certain kind of examples. Already I told you, that it is an extension of the market segmentation theory. So, if you assume that the economy is poorly hedged. poorly hedged in the sense what? Let the more investors want short-term investments and more borrowers or the issuers want to borrow the long term. Then, obviously, neither of these markets are in the equilibrium. Whether the short-term market or the long-term market is in the equilibrium.

In that case, what basically will happen? both the short-term and long-term interest rate will change and the market will clear or the equilibrium position will arrive when the investors and borrowers give up their particular hedge. That means, I want the money for one period of time, may be for one year. my maturity period or my horizon period is one year. But I am ready to give up that particular segment whenever I am compensated by that.

Because, whenever I forgo that particular horizon period or my desired period that means I am going to take more risk. So, in that particular context, that risk should be compensated with the more return. So, that is why in the true sense the short-term and long-term interest rate is going

to be changed because there is a kind of disequilibrium happens in both the markets. So, that is the basic thing what basically the preferred habitat theory tells.

(Refer Slide Time: 06:55)



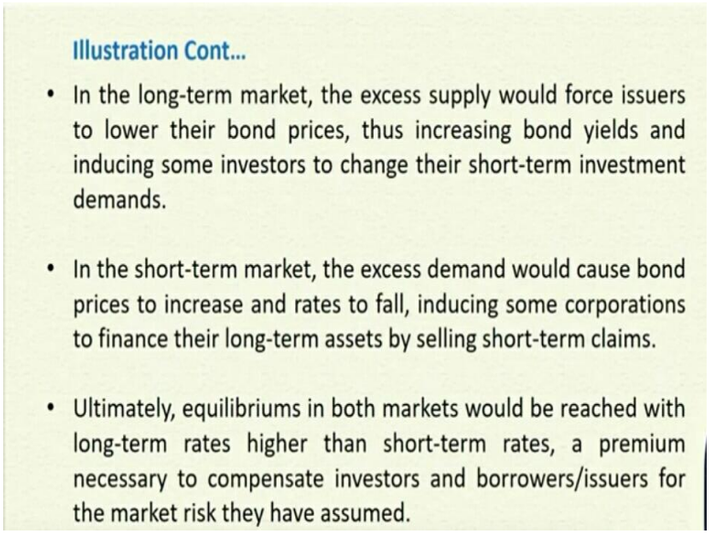
So, let us see with an illustration that how basically it happens? we have let consider a situation in which, on the demand side, the investors in the corporate securities, let somebody interested to invest in the corporate securities and they prefer the short-term to long-term instruments. The investors are more interested to invest in the short-term instruments than the long-term instruments that mean their horizon period is relatively short.

But on the supply side,Let you assume the companies have a greater need to finance their long term assets than the short-term that means, that company wants to go for the capital expenditure and all these things and because of that they want to issue more long-term bonds. So, to finance their long-term activities they are going to issue more long-term bonds. So, that means here what basically we have seen in the shorter market the investors are more inclined to go and invest in the short-term bonds but the supply is not there.

Because in the supply side who are going to supply the bonds they are more inclined to supply the long-term bonds. So, then what basically you can observe here? If you combine these 2 then the relative performance between these 2 markets will cause an excess demand for the short-term bonds and an excess supply of the long-term bonds. And obviously, somewhere the market is basically is disequilibrium. Both the markets are in the disequilibrium condition.

So, therefore some adjustment has to take place and that adjustment will change this interest rate. So, there will be a shift about the interest rate and that adjustment would make both the markets in the equilibrium and then accordingly the yield curve can be derived.

(Refer Slide Time: 09:20)



So, let us see what basically happens in this case? if this kind of condition you will assume, Then in the long-term market what will happen? that the excess supply for the bonds would force the issuers to lower the bond prices because supply is more than the demand. So, in that case what will happen? the price of the bond will decline. if the price of the bond will decline then it will increase the yield because there is an inverse relationship between the prices and yield.

If the price is declining, then obviously your yield will increase then whenever the yield will increase then what will happen? It will induce some investors to change their short-term investment demands. whenever they will observe that they are getting more yields in the long-term market then what will happen? They can shift from the short-term segment to the long-term segment because it looks very attractive for them . that attraction basically makes them to change their preferred zone preferred term to maturity will be changed.

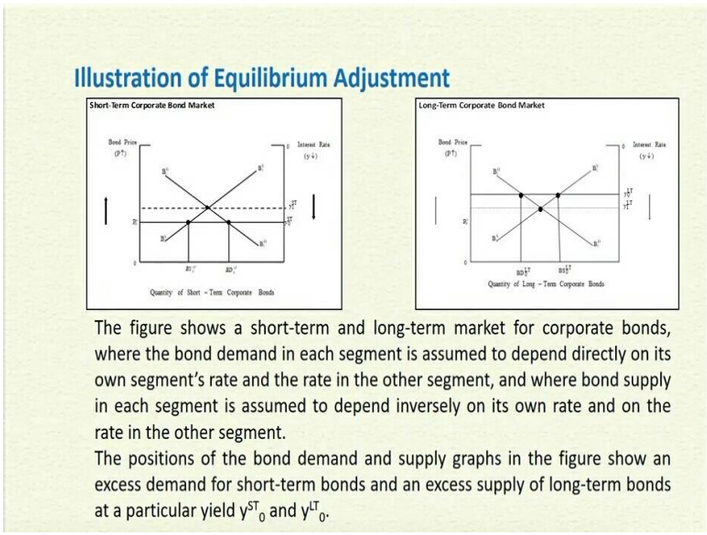
Now come to the short-term market. Short-term market there is excess demand but supply is not there. So, if the supply will not be there then what will happen ? that excess demand will basically cause the bond prices to increase because supply is more than the demand in that particular segment. Then, whenever the bond price will increase then obviously the interest rate will fall. So, whenever the interest will fall then what will happen? that will induce the companies to finance their long-term assets by selling the short-term claims or certain bonds.

In first case, the investors will be interested to invest in the long-term segment because the.long-term segment is giving more yields to them. The second case, whenever the bond price will increase because of the excess demand in the short-term market and the interest rate basically is going to decline that will basically induce the issuers to finance their long-term assets using the short-term bonds.

A series of the short-term bonds they can sell and they want to finance those particular activities through that. So, in both the markets this kind of adjustment is going to take place. So, whenever this kind of adjustment will take place then what will happen at the end? Ultimately the equilibriums in both the markets will be reached with the long-term rates higher than the short-term rates and a premium basically is necessary. why basically this thing will observe?

Because, a premium is necessary to compensate the investors and the issuers for the market risk they have assumed. Whenever, because the long-term investment is riskier than the short-term investment, whenever they are taking more risk then what will happen? That the yield from the long-term market is going to be more than the yield of the short-term market. this is what basically we can observe whenever this kind of scenario will arise.

(Refer Slide Time: 13:04)



So let us see, how basically exactly this demand and supply curve in both the market is going to be changed ? If you look at these 2 figures, what these 2 figures basically tell? Here, we have a Short-term market and we have a long-term market then we have taken the instruments like corporate bonds. And here, if you see the bond demand in each segment is assumed to be depending on the own segment's interest rate and as well as the rate which is prevailed in the other segment.

Because, there is a kind of interaction which is going to happen between these 2 markets. And bond supply also in each segment is assumed to depend inversely on its own rate and On the rate in the other segment. That is the common relationship between the supply and the interest rate and the demand and the interest rate. So let us if you see that let there is an initial rate which is available in both the markets.

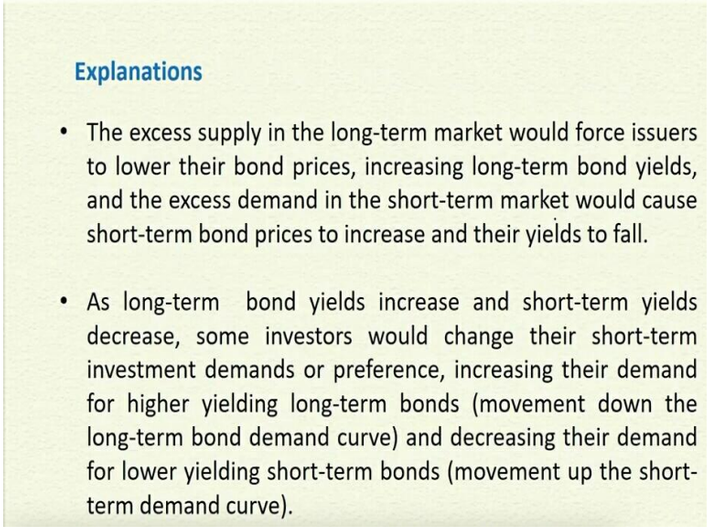
So, the initial rate let we have represented is the y0 ST represents the initial yield in the shorter market, and y0 LT represents the initial rate in the long-term market. That is the basically assumption whatever we have taken. So, now if you see that what basically happens here? That initial rate which basically here that is your y0 ST and here it is your y0 LT. That is the initial rate which is available.

Now, already we have seen there is excess demand in the short-term market and there is an excess supply in the long-term market. So, now if you see in this particular rate, So that is your supply curve this is your demand curve so that means this much is demanded up to this to this and this much is basically supplied. So, that means there is an excess supply which is happening and there is no such equilibrium is prevailing in this particular rate in this particular market. Then what will happen?

And in the same thing, you can observe also here in this case, your demand is less and the supply is more. So, this is your demand part and this total is the supply part. so here, there is excess supply and here, there is excess demand. So, now what will happen? because of the excess demand the price will go up and because of the excess supply the price will go down. So, then what will happen? whenever the price will change then obviously your interest rate will move.

So, now what has happened? with respect to that particular price, you will prevail a new interest rate. In these particular 2 segments a new interest rate basically will be arrived. So, let us see how that particular interest rate in both the markets are going to be changed and what context this particular movement will take place in which direction this particular movement will take place?

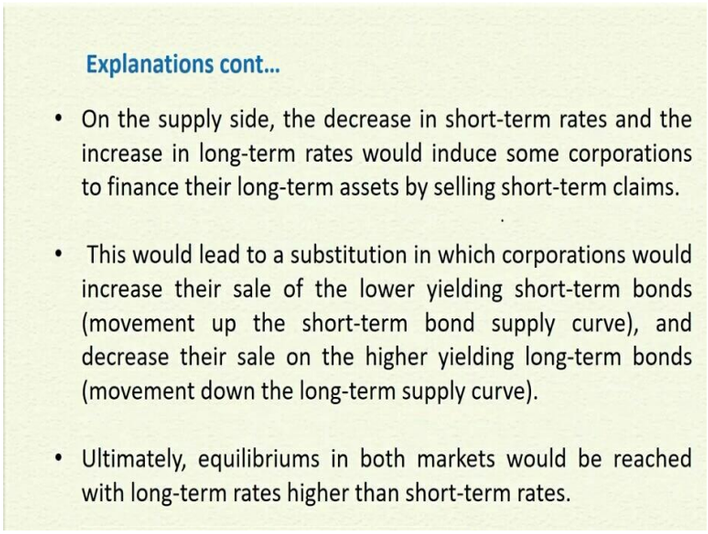
(Refer Slide Time: 17:02)



Let us come this explanations of this particular diagram. so, already what we have discussed that, the excess supply in the long-term market will force the issuers to lower their bond prices. Then, it will increase the long-term bond yield and the excess demand in the shorter market will cause the short-term bonds price to rise and yields to fall. So, in that case the long-term bond yields will increase and short-term bond yields will decline.

So, then some investor will change their short-term investment demands or the preference which will increase their demand for higher yielding the long-term bonds. So that is why, there is a movement down the long-term bond demand curve and decreasing their demand for the lower yielding short-term bonds basically what basically will happen with respect to the short-term demand curve? The short-term demand curve will have the movement up the short term demand curve. The position will be changed that way. So, now what basically we have seen? because of this kind of interactions the interest rate in 2 different segments have been changed.

(Refer Slide Time: 18:39)

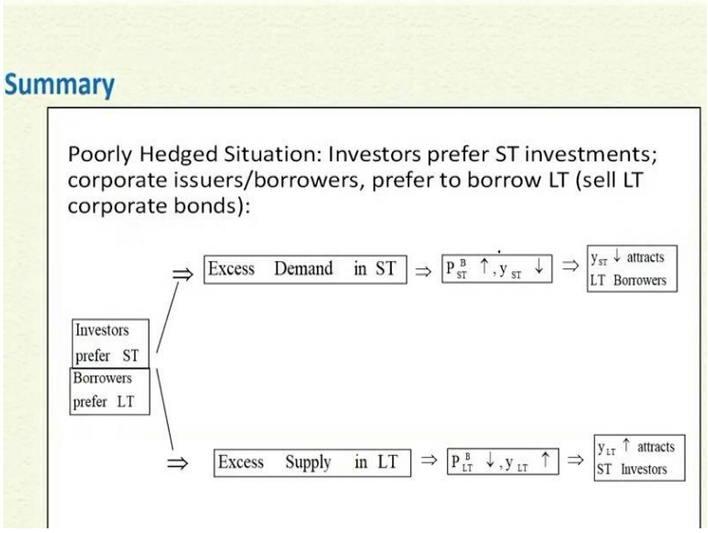


So, in that case if you see on the supply side. first part, we have discussed about the demand side. in the supply side what will happen? The decrease in the short-term rate and the increase in the long-term rate will induce the companies to finance their long-term assets, by selling the short-term assets. that means this would basically lead to a substitution in which the companies will increase the sale of lower-yielding short-term bonds.

That means, there is a movement of in terms of the short-term supply curve of the bond and decrease their sale on the higher-yielding long-term bonds. So that is why the long-term supply curve movement will be down. Then ultimately what will happen? the equilibrium in both the markets will be reached with the long-term rates higher than the short-term rates. The equilibrium in both the markets will be reached with the long-term rates higher than the short-term rates.

So, that is what basically we have observed whenever we go for this kind of interaction between the short-term and the long-term segments.

(Refer Slide Time: 20:11)



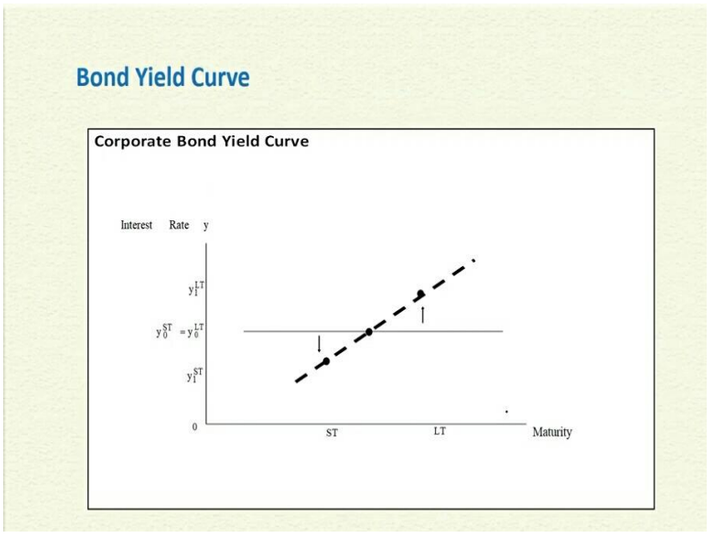
So, then in that case what basically if you summarize these things then what basically we have observed here? Already, we assume that is a poorly hedged situation there is disequilibrium happening in both the segments. That means, the investors before the short-term investments and the issuers basically prefer to issue the long-term securities that means they want to sell more the long-term securities.

So here, if you see the investors prefer the short-term part that means, the demand is more in the short-term segment and the borrowers or issuers prefer the long-term segment so which will basically create this kind of situation. So that means, there is excess demand in the short-term part. So, if there is a excess demand in the short-term segment then the price of the bond in the short-term segment will be up and the yield will go down.

So, whenever the yield will go down, then what will happen? This will attract more long-term borrowers because there is a demand which is prevailed in that particular segment. The companies who are issuing this long-term bonds, they will be inclined to issue more long-term bonds. In the same case, if you see the other part the excess supply in the long-term segment which is coming from this part, that will basically reduce the price in the long-term segment.

In the long-term segment, price will decline. Then, the yield will increase. The yield is going to be increasing. then what will happen? That will attract more short-term investors to invest in that type of bonds because the yield is more price is less. So, that is why they will be more inclined to invest in these kinds of bonds and in the other part in the demand part, If you see this will attract the more companies to issue the short-term bonds to finance their long-term activities. So that means there is some dynamics which will happen in these 2 different segments.

(Refer Slide Time: 23:08)



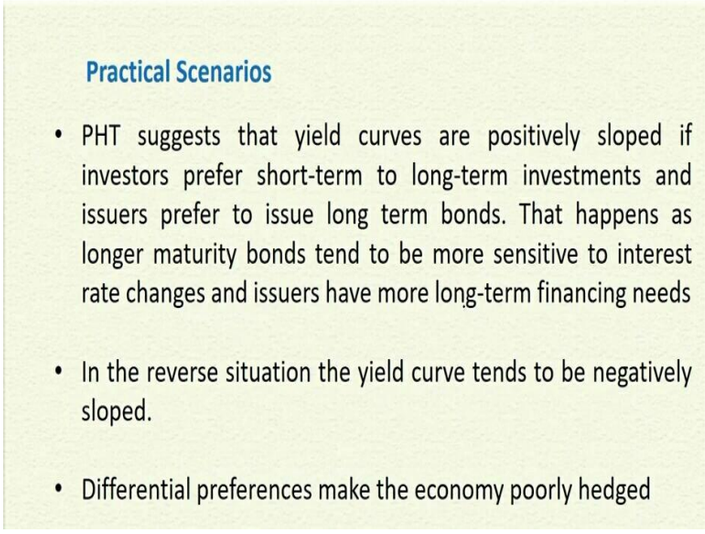
Then, what basically we can observe your yield curve safe is going to be changed. Initially, we have assumed a flat yield curve, where your y0 ST = y 0 LT; that is the initial yield curve. then what will happen? Because of the demand-supply dynamics which has happened in that particular segment the short-term yield will go down and long-term yield will go up. So now if you observe, so this particular y0 ST will go down to y 1 ST and here this y0 LT will go up to the y 1 LT.

So, now you will have if you draw this with respect to the interest rate and term to maturity which is our yield curve then what basically we will observe here? we will have an upward sloping yield curve. Initially, there was a flat yield curve that is the assumption whatever we have taken but whenever this kind of situation will arise, then you will find that the movement of the yield curve basically will go in this direction.

So, then what we have got from here? if there is some disequilibrium happens in both short-term and long-term market due to the change in the demand and change in the supply or there is disequilibrium in terms of the supply and demand dynamics, then what will happen? That because of the interdependence between the 2 different segments and we can say that, this will have some kind of for the investors or the issuers will change their behavior.

And because of their change in the behavior, then what will happen? that they will forgo their preferred zone and they will move to the other zone which will be attractive to them. So, here in this case what will happen? that because the corporate borrowers are ready to provide more short-term bonds to finance their long-term activities. And because of the high yield the short-term investors will be interested to invest in the long-term bond. then what will happen? you will observe this kind of yield curve in this particular segment. This is the way the yield curve can be derived through this preferred habitat theory.

(Refer Slide Time: 26:11)



Then, you see that this is a real practical situation. this preferred habitat theory, basically always whatever suggestion they have given that basically we can see in the practical situation also. The preferred habitat theory if you see that the yield curve is positively sloped if investors prefer short-term to long-term investments and issuers prefer to issue the long-term bonds. And that generally happens .why it generally happens? because the investors are risk averse in nature.

And as already we know also, we have discussed in the previous sessions that the long-term maturity bonds tends to be more sensitive to interest rate changes. And in general, the companies have more long-term financing needs because their short-term financing needs like working capital financing that basically they can always fulfill using the different other sources, also like bank financing and other sources.

But, whenever they want to finance their long-term activities, mostly one of the reliable source is the debt financing and in that case that basically in that particular context they will go for the long-term debts. And, if you already know from your financial management and other subjects that, we assume that debt is a cheaper source than the equity. So, because of less risk in nature so

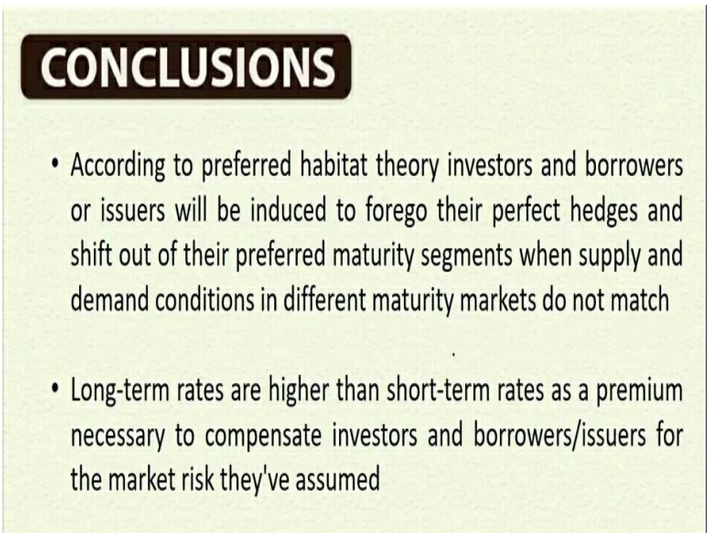
because of that they can always go for the debt financing what your pecking order theory and other theory basically talks about, you must have the idea about that.

So, that is the practical situation that always will find more demand in the short-term market and more supply in the long-term market. But assume that, there is a reverse situation there is a more demand in the long-term market and more supply in the short-term market for some reason then, in that case, your yield curve will be negatively sloped. In that case, your yield curve will negatively sloped but that is very unlikely in the sense. in a general sense, this thing happens in the market.

And we can say that because of these differential preferences always the market is poorly hedged. Always whatever horizon period the investor fixes that horizon period may not be prevailed in the market always. So always there is disequilibrium in these 2 markets and we can observe that there is some dynamics always happens between these 2 segments and accordingly, your shape of the yield curve gets changed.

And if you look at that this kind of dynamics regularly happens in the aggregate sense and accordingly the shape of the yield curve is always determined. But in general, we can say that the long-term bonds always give more returns or more yield than the short-term bonds because of this reason, according to the preferred habitat theory.

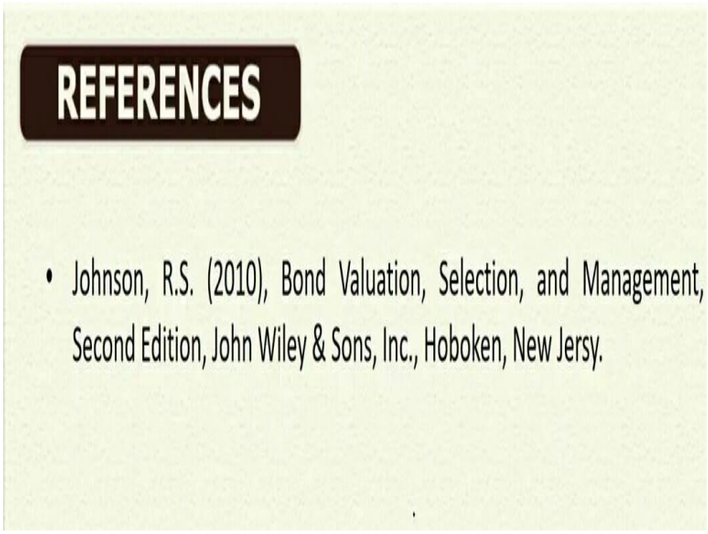
(Refer Slide Time: 30:00)



So, what basically we have discussed here? That according to the preferred habitat theory, investors and borrowers or the issuers will be induced to forgo their perfect hedges and shift out their preferred maturity segments when supply and demand conditions in different maturity markets do not match. And the long-term rates are always higher than the short-term rates as a premium is necessary to compensate the investors and the issuers for the market risk what basically they have assumed.

Whatever market is they consider because of this always the long-term bonds give more yield or more returns than the short-term ones.

(Refer Slide Time: 30:45)



So, this is the reference what basically you can go through for the detailed discussion and we will continue with the discussion with the other theories of term structure interest rate in the forthcoming sessions thank you.