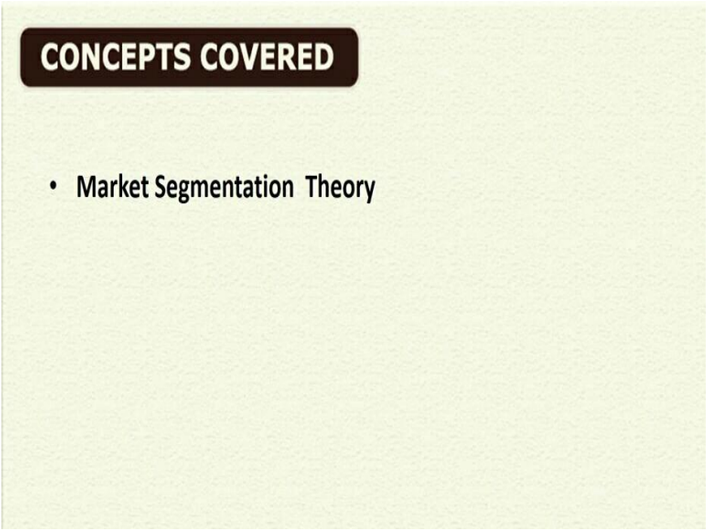
Managements of Fixed Income Securities
Prof. Jitendra Mahakud
Department of Humanities and Social Sciences
Indian Institute of Technology Kharagpur

Module No # 03
Lecture No # 14
The Term Structure of Interest Rates – II

Welcome back. In the previous class, we started the discussion on the term structure interest rate theories. There basically, 2 questions we always try to answer one is that why the differences always be observed between the long term and short term interest rates and on the basis of that, there are different type of yield curves we have observed or the shape of the yield curve basically varies. So, what is the basic reason for that? Why basically the shape of the yield curve is different?

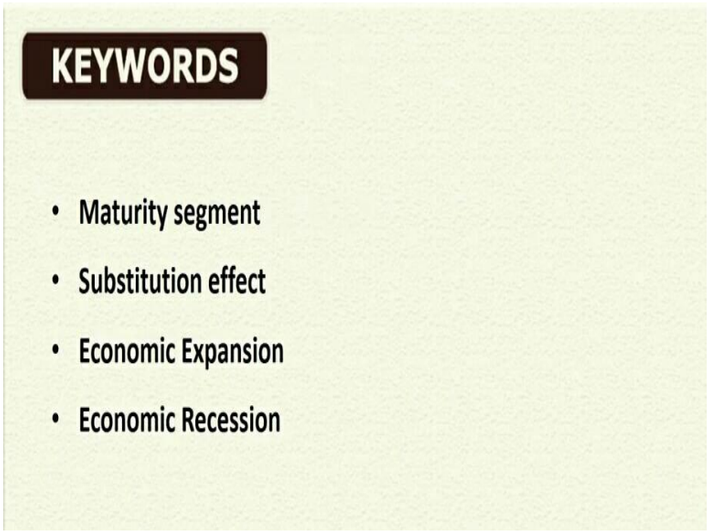
So, to answer that particular questions, there are different theories basically were developed and all those theories basically include the market segmentation theory. Then you have the preferred habitat theory then you have the pure expectations theory then you have the liquidity premium theory. So, over the sessions, we will be discussing about all those theories and how those theories basically is trying to explain the shape of the yield curve or the relationship between the long term and the short term yield of the different type of bonds.

(Refer Slide Time: 01:29)

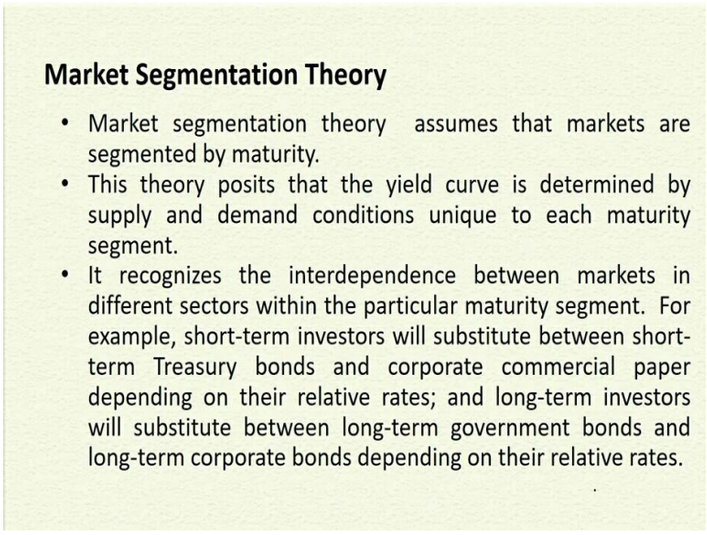


So, in today's discussion, we will start with the discussion on the market segmentation theory and in this particular session, you will come across different keywords like maturity segment, substitution effect, what is the relationship between economic expansions with the term to or the yield to maturity or what is the role of the economic recession on the determination of the interest rate or the yield to maturity? So, these are the things what basically will be covering of in today's discussion.

(Refer Slide Time: 01:36)



(Refer Slide Time: 02:07)



So, let us see that what this market segmentation theory basically talks about. So, the market segmentation theory what basically I told you that this is the one of the theories which try to explain the difference between the long term and short- term interest rates or long term or short-term yield in the bond market. But one thing you keep in the mind that this theory basically assumes that the markets are segmented by the maturity. That means whatever short-term, long - term, medium term bonds are available in the market accordingly, the markets are classified.

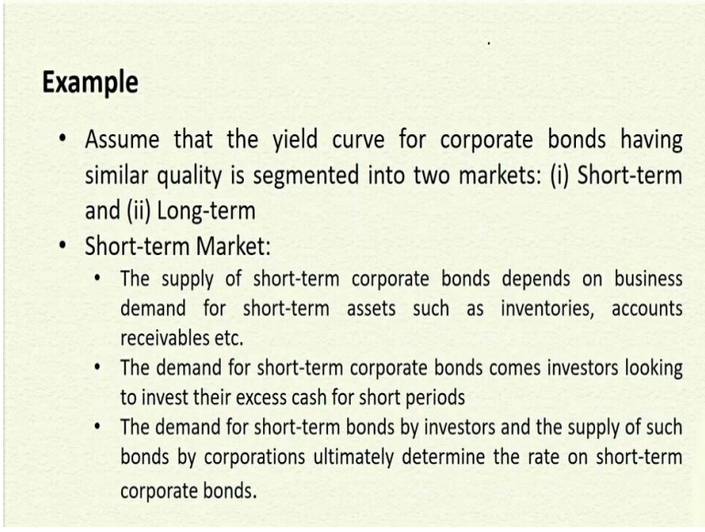
Another thing is that whenever you talk about this, the yield curve is determined by the supply and demand conditions which are specific or unique to each maturity segment. That means the supply and demand factors to determine the yield curve of a short-term bond market is different from the long term bond market. So, therefore, there is no such dependence or no substitution happens between the short term and long term bonds or the medium term and the long term bonds like that.

But one thing it assumes there may be interdependence between the markets in different sectors within that particular maturity segment. So, here for example if you see that if you are talking about a short-term bond market, there may be a substitution between the short-term treasury bonds and the commercial papers both are short term. The investor can decide between these two depending upon the rates or the return what they are going to receive from these 2.

So, which one gives the better return they can go and invest in that particular type of security. In the same way, in the long term market, the substitution may take place between the long term corporate bonds or the long term government bonds. So, that particular thing is basically decided by on the basis of the returns what they are going to derive. So, one thing you always overall, you should keep in the mind that the supply and demand factors which determine the interest rate in the short term bond market is different from the supply and demand forces which are operating in the long term bond market.

So, the yield curves are completely independent across the different 2 segments and the segments are classified on the basis of the term to maturity of the bonds which are traded in that particular market.

(Refer Slide Time: 04:58)



So, here, if you see that, whenever we talk about this concept let us give one example. You assume that the yield curve for the corporate bonds having the similar quality which is very important what do you mean by the similar quality? Similar quality in this sense let the bonds rating are more or less similar. Because if you are comparing between a high rated bond with the lower rated bond, you will not find the actual differences in terms of yield because that also is a factor which decide which one give you the more returns.

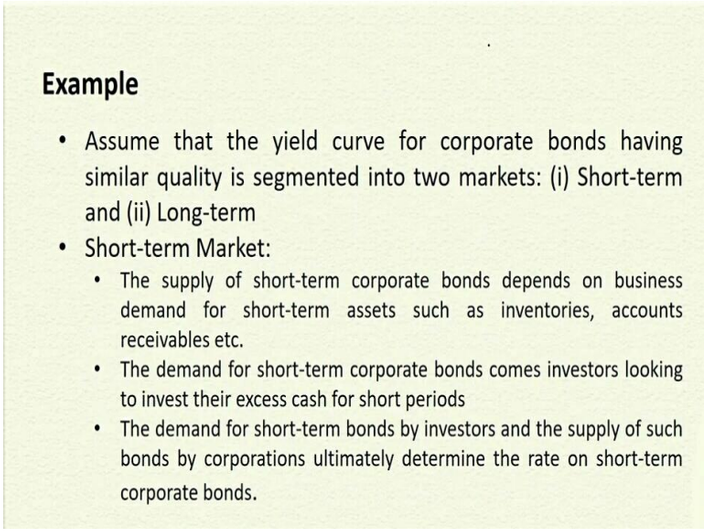
So, if the bonds having the similar quality if you are dividing the market into 2 parts let there is a short term bond market and there is a long term bond market. So let us see what happens within that particular segment. Let you have a short-term market then in the short-term market, which are the supply side and which are the demand side or the particular kind of factors which are affecting the supply of the bonds and which are the factors which are affecting the demand for the bonds?

So, whenever you talk about the supply side, the supply of the certain corporate bonds for example that depends upon the business demand for the short-term assets. Why the business sectors demand the certain assets? Because they have to basically fulfil the requirements like inventories account receivables etc which are the short term requirements of the different business units and for to finance that particular activities, they want to always issue these short-term bonds and which one, basically; coming; from the demand side? The demand side basically;

coming from the or the demand for the short term corporate bonds that basically comes from the investors who basically is looking to invest their excess cash for a short period of time. Their investment horizon period is relatively short. So, the corporate sector issues the bond to fulfil their short-term requirements and the investor whose horizon period is relatively less relatively short, they basically demand for that particular type of bonds and they were interested to invest in that type of bonds and generally this demand for the short term bonds by the investor and supply of the bonds by the corporations ultimately determine the interest rate on that particular segment on that particular market. So, here what you have seen? You have seen some of the requirements from the corporate side which basically compel them to supply the bonds and we have seen certain kind of demand side factors where the investments is for short term.

So, those basically factors are determining the demand side. So, wherever there is a interaction happens between these 2, the supply of such bonds by the companies and the demand for the short-term bonds by the investor finally determine the interest rate

(Refer Slide Time: 08:13)

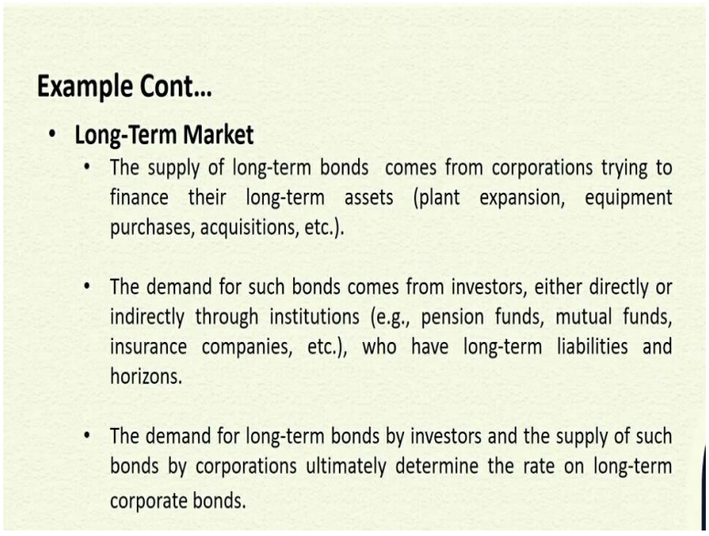


The same thing also if you see that how basically this works for example if you see that whatever thing we have explained if I write that let the short term bonds. So, if you have a short-term bond market. So, you can make it in 2 ways both from the supply side and demand side. So, how the supply basically comes? The supply comes from the corporate sector and why they basically supply? They basically financing of the short term requirements. OK?

And short-term requirements already we have discussed that is inventories then particularly this working capital needs or the accounts receivables etc. So, in the demand side what we have discussed the demand part why basically investors? Having short term horizon investment horizon period or short term horizon. So, they need the money in the short-term basis. So, that is why those kind of investors will go for demanding for this kind of bonds and the corporate sector basically supply for this rejects.

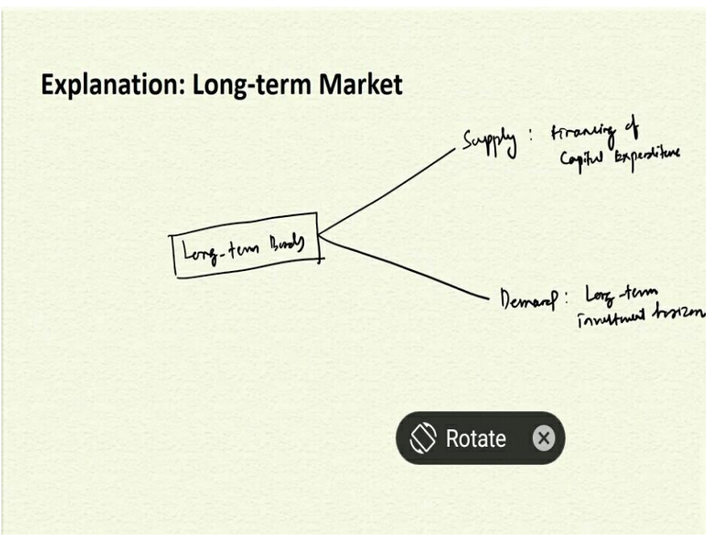
Then wherever there is a interaction happens, so, in that case, the interest rate in that particular market will be determined. So, that is the way basically the short-term interest rate is determined in the short term segment.

(Refer Slide Time: 10:21)



The same thing can happen in the long term segment also and why the corporate sector supplies the long term bonds? The short term bonds are supplied by the corporate sector because of the certain requirements like inventories account receivables etc. But in the long term bond case, the corporate sector basically supplies the bond for the capital expenditure mostly for the plant expansion, equipment purchase or acquisition of other companies. So, for these reasons, they need some kind of financing and to provide the finance for this kind of activities, they can go for supplying the long term bonds. So, the demand for such bonds generally which comes from the investor side that basically either come directly or indirectly through this different institutions like pension funds because the pension funds basically invest the money for a long term purpose mutual funds, insurance companies all these kind of entities they note they always need the money for long term reasons their investment horizon period is relatively longer because they have the long term liabilities and also the investment horizon period is very long and again the supply and demand of this type of bonds will decide the interest rate in that particular segment. OK? So, that is the way basically the interest rate in the short-term market determined and this is the way the long term interest rate is also determined. So, that is why there is no such interdependence happens in these 2 different segments that is the basic essence of the market segmentation theory.

(Refer Slide Time: 12:21)

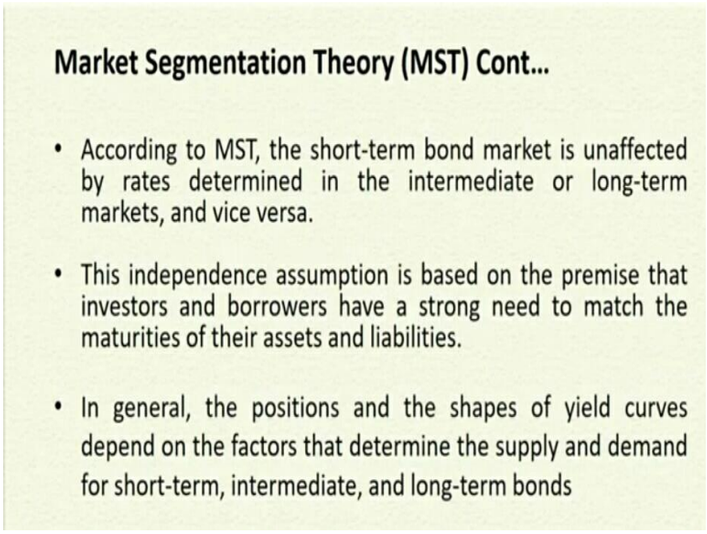


In the same way, you can also write down that thing that here you have the long term bonds. So, in the long term bond again you have a supply part and you have a demand part and already what

basically we have discussed? The supply basically comes for the financing of capital expenditure. Right? And demand basically comes from the investor side that has the long term liabilities and long term investment horizon period. OK?

So, wherever the supply is equal to demand in that particular segment, the long term interest rate will be determined accordingly. So, that is the basic essence of the market segmentation theory.

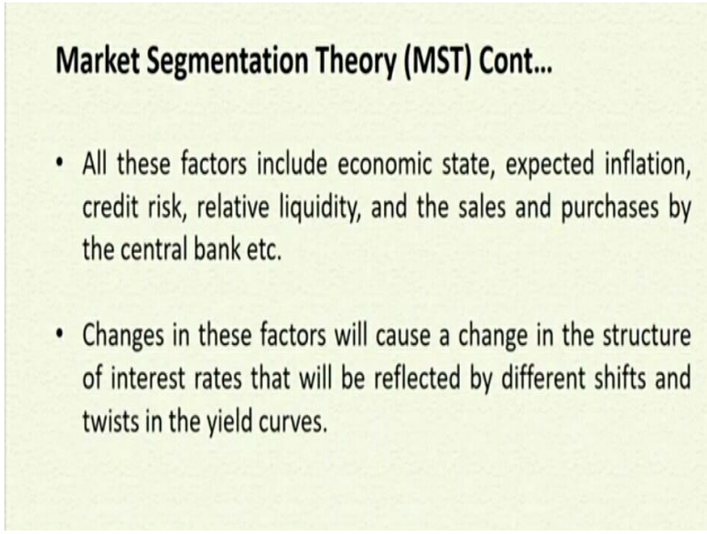
(Refer Slide Time: 13:25)



So, the short-term bond market is unaffected by the rates determined in the intermediate or the long term market and vice versa. So, the independent assumption whatever the market segmentation theory takes that is basically based on the premise that the investors and the borrowers particularly the issuers have a strong need to match the maturities of their assets and liabilities because their assets and liabilities period has to be matched. So, that is why this particular independent assumption is based on that particular kind of logic.

So, the positions and the shape of the yield curves generally depend on the factors which determine the supply and demand for the short-term, intermediate and the long-term bonds. So, they are independent. So, the shape of the long term yield curve and shape of the short-term yield curve generally is or we cannot say that short term and long term yield curve the yield curve basically shows the relationship between the yield and term to maturity but the interest rate in the long term market and the interest rate in the short-term market that basically is decided on the basis of the supply and demand forces within that particular segment. That is the basic essence of the market segmentation theory. Keep in the mind there is no such concept called short term yield curve and long term yield curve but yield curve basically talks about the relationship between yield and term to maturity and here the interest rate in the short-term market and long-term market is decided on the basis of the supply and demand forces within that particular segment that actually you have to keep in the mind.

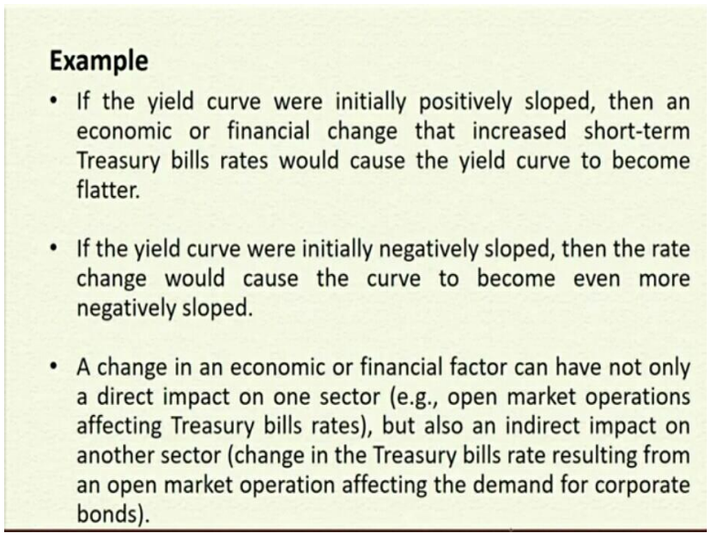
(Refer Slide Time: 15:23)



Then if you see, what are those factors? Those factors can be the business cycle those factors can be the state of the economy it can be the inflation or the expected inflation. The credit risk of that particular bond which basically talk about the quality of the bond, liquidity of the particular bond, how the bond is marketable in this particular market and also the sales and purchase by the central bank because once the sales and purchase means that is a part of the monetary policy if it is short term, it is monetary policy and for long term regions also sometimes the central bank wants to use this bond instruments to control the inflation and other things. So, once you change these factors or these factors will be changed, then that will cause the change in the structure of the interest rate and which will be reflected by the shift and twist of the yield curve. And once these factors will change the shape of the yield curve will change.

In a particular initial condition may be the shape of the yield curve looks different but once these factors will change then the yield curve also gets changed the shape of the yield curve may change or the yield curve may also shift. So, that is the basic factor which are affecting the shape of the yield curve.

(Refer Slide Time: 17:03)



So, here if you see for example let the yield curve was initially positively sloped then any economic or financial change which increase the short term let treasury bill rate then what will happen? That will cause the yield curve to become flatter Right? But if the yield curve is initially

negatively sloped, then what will happen? That the rate change; would cause the curve to become even more negatively sloped. Right?

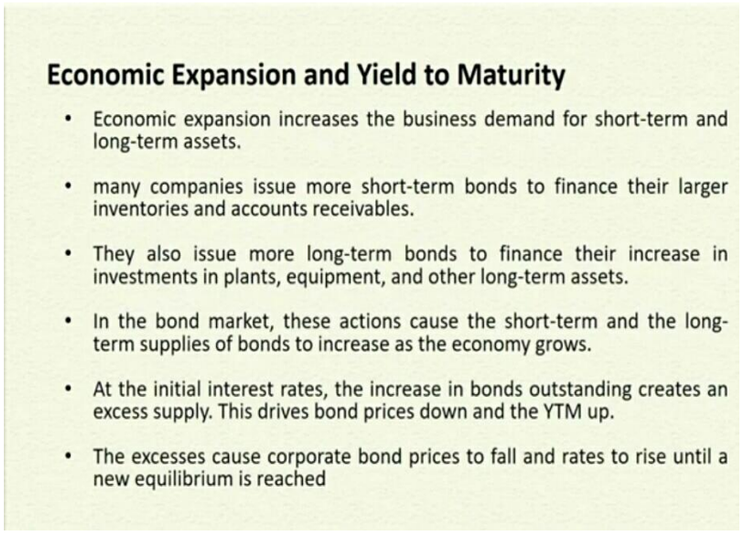
So, it depends upon the initial shape of the yield curve and accordingly any kind of factor which will going to be change in the market that will have a larger impact on the shape of the yield curve. But one thing you keep in the mind a change in economic or financial factors has not only a direct impact on one sector. It also has an indirect impact on another sector. OK? So, that means if the Treasury bill rates will be changed, that will also have the impact on the demand for the corporate bonds market particularly the short term bond market. That is also going to be changed.

(Refer Slide Time: 18:33)

So, that particular thing what we call it that is basically in our language we call it the substitution fact. We will see that how basically that effect works. So, these are the factors which are affecting the yield curve shift. Already I told you the broad factors we have economic expansion we have economic recession, credit risk, credit tightening, deficit financing with short-term securities, deficit financing with long-term securities deficit financing means I refer to if there is any deficit with the government and government also can go for purchasing the long term securities if there is a surplus and obviously we have the typical instruments of the monetary policy like open market operation. So, depending upon the liquidity condition in the market, the central bank can go and purchase the short-term treasury bills or they can also go and sell this long-term treasury bills. Sale of the short-term treasury bills and purchase of the short term treasury bills not the long treasury bills.

So, these are the generally the short term treasury bills are used in the short term market which is a part of the monetary policy instrument.

(Refer Slide Time: 19:49)

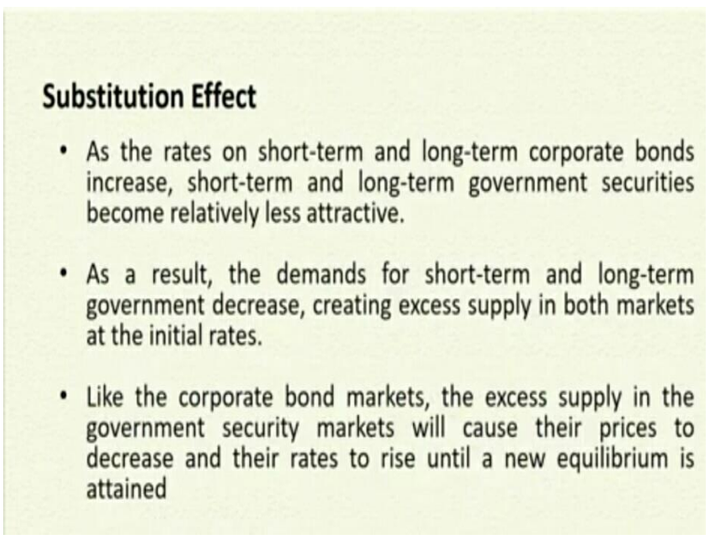


So, let us see that how the economic expansion is going to affect the yield to maturity. So, economic expansion what will basically happen if there is an expansion in the economy? This will increase the demand in the corporate sector for both short term and long term assets because there are many investment opportunities. So, in that case, many companies will go for issuing more short-term bonds to finance their larger requirements in terms of inventories account receivables and all and they also issue more long-term bonds to finance their increase in the investment in plants, equipment and other long term assets. So, in the bond market, what will happen? All these actions will cause the increase in the supply of the both short-term and long-term bonds because they need money. So, because of that they issue this kind of bonds so that is why the supply of these bonds will increase.

So, at the initial interest rate, the increase in the bonds outstanding creates an excess supply. Demand may not be there may not be there much in that particular time so what will happen? If there is excess supply, then the price will go down because demand is more than the supply. So, the price will go down then the yield to maturity will go up. There is an inverse relationship between yield to maturity and price:- if the price will be lower, than yield to maturity will be more.

And the excess cause the corporate bond prices to fall and rates to rise until a new equilibrium is reached.OK?

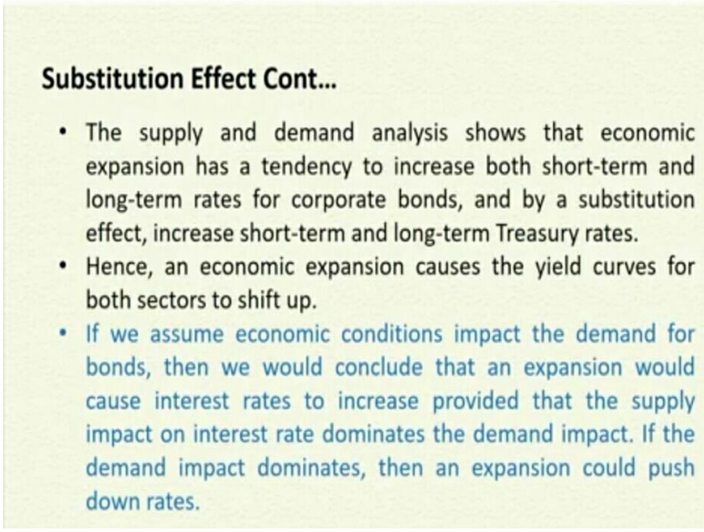
(Refer Slide Time: 21:41)



So, in this case, how the substitution effects work in this case? What here we have seen? They have let the whenever you observe that the long term and the short term corporate bonds increase, then the short term and long term government securities become relatively less attractive. Right? So, in that case, what will happen? The demand for the short term and long term government bond decrease creating excess supply in both the markets at the initial rates.

Like that, the corporate bond markets the excess supply in the government security market will cause their prices to decrease and the rates to rise until a new equilibrium is obtained. That means any change in the government securities market will have the impact on the corporate sector also. So, here what will happen that how basically that mechanism will work?

(Refer Slide Time: 22:56)



The economic expansion has a tendency to increase both short term and long term rates for the corporate bonds and by a substitution effect; it increases the short-term and long-term treasury rates. OK? So, the economic expansion will cause the yield curves for both the sectors to shift up. But here one thing you keep in the mind we are only talking about the supply side but let you bring the demand factor into the consideration.

If you assume that the economic condition also will affect the demand for bonds, then what we can conclude? The expansion would cause the interest rate to increase provided that the supply impact on the interest rate dominates the demand impact. So, if the demand impact dominates, then an expansion could push the rates down. So, which one is dominating that we have to see whether the supply is dominating and the demand is dominating accordingly the shifting of this particular yield curve will take place.

(Refer Slide Time: 24:07)

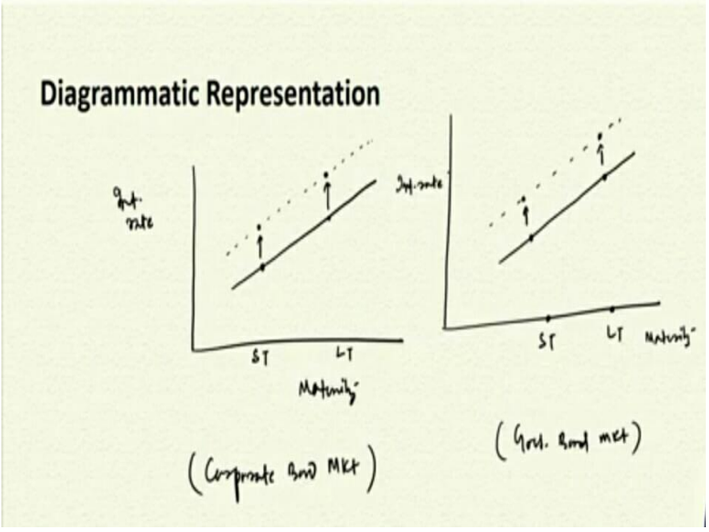
Summary

Corporate Bond Market:
Increase in capital formation ⇒ More corporate bonds sold ⇒ Excess supply for corporate bonds ⇒ Corporate bond prices decrease and yields increase ∴ Upward shift in Corporate YC

Government Bond Market:
Substitution Effect: As corporate yields increase ⇒ Demand for Treasury securities decrease ⇒ Treasury bond prices decrease and yields increase ∴ Upward shift in Treasury YC

So, let us see what is the mechanism works here? Let in the corporate bond market there is a increase in capital formation more corporate bonds sold which will lead to excess supply for the corporate bonds. Then the corporate bond prices will decrease and yield will increase so that will be upward shift in the corporate yield curve. In the same time ,in the government bond market, what will happen? There is a substitution effect which will work as the corporate yield increase the demand for treasury securities decrease and the treasury bond prices decrease then finally your yield will also increase so that will be upwards stripped in the treasury yield card. So that is the way basically the both the corporate bond market and the government bond market is getting affected due to the change in the economic conditions.

(Refer Slide Time: 25:06)



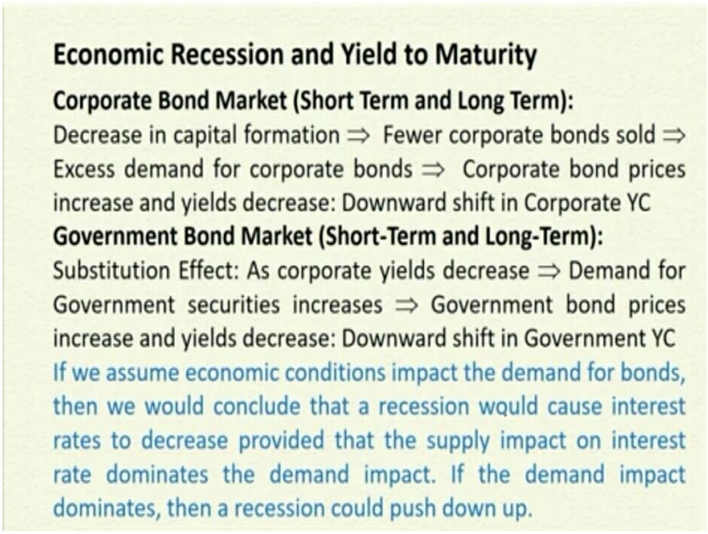
So, we can also see how this particular shape basically looks like? So let this is your maturity and this is your interest rate.Right? So, let this is your initial yield curve let this is for the short-term bond this is for the long term bond so what will happen? Due to the economic expansion, so I am talking about here it is corporate bond market. So, due to this economic expansion, what will happen? So, there will be the price will basically decline because there is excess supply.

So, there will be a movement upward movement of this particular yield curve both in terms of the short term segment and the long term segment. So, interest rate basically will automatically decline in that particular increase if the price is declining, then the intertest rate is going to be

increasing. The same thing will also prevail in the government bond market in the bomb and bond market also you will observe.

So, this is your let short term bond this is your long term bond. So, again the movement will be like this. So, there will be upward shift of the curve this is your short term this is your long term this is your maturity this is your interest rate. Right? So, that is the way basically this will work.

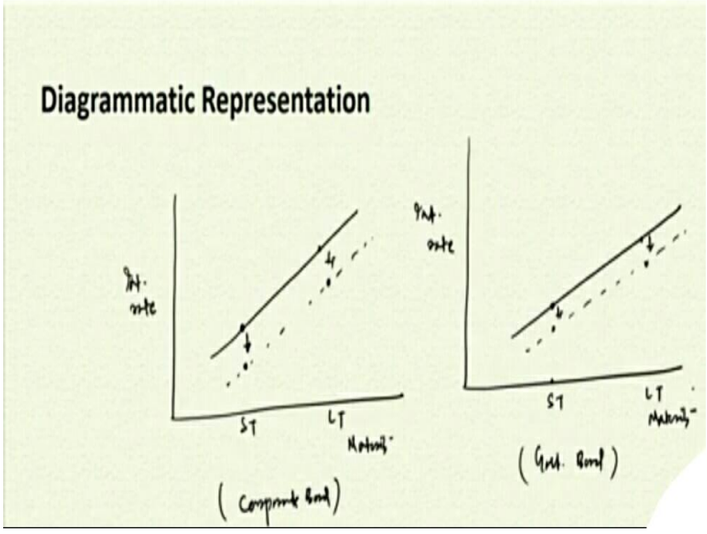
(Refer Slide Time: 27:00)



The same thing you can also see with respect to economic recession. Obviously the capital formation will decline then fewer corporate bonds will be sold excess demand for the corporate bonds then corporate bond prices will increase then yield will decline. So, there will be a downward shift in the corporate yield curve then the same thing will happen in the government bond market there will be a substitution effect. When the corporate yields decrease, the demand for government securities increase then government bond prices increase then yields become declining.

So, there will be downward shift in the government yield curve. So, again if you are bringing this demand factor into the consideration, then we have to see that whether the supply effect is dominating or the demand effect is dominating. So, finally accordingly the yield curve will move.

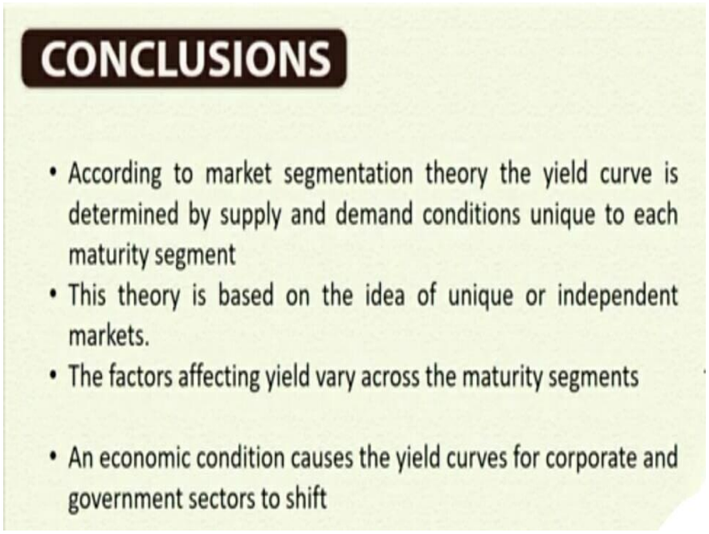
(Refer Slide Time: 27:55)



So, you can also show it through the diagram it is just reverse of that let here it is on is initially yield curve then there will be a downward shift. This is for the short term then this is for the long term. So, this is your maturity this is your interest rate. So, this happens in the corporate bond market and the same kind of observation you will find in the government bond market. OK? Again the shifting will be in the downward side. This is your short term bond and this is your long term bond. OK? The movement will be like this. This is your interest rate this is again your maturity.

So, that is the way the movement basically will happen both in the corporate bond market and the government bond market.

(Refer Slide Time: 29:05)



So, what basically we discussed today? So, the market segmentation theory says that the yield curve is determined by the supply and demand conditions which are unique to each majority segment and this theory is based on the idea of unique or independent markets and the factors affecting the yield basically vary across the maturity segments and an economic condition causes the yield curves for the corporate and government sectors to sit depending upon the expansion and recession. There will be a downward or the upward moments. OK?

(Refer Slide Time: 29:44)

This is the reference what you can go through for the detailed discussion.

Thank you.