

Investment Management
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Lecture - 07
Bonds as an Investment

Hi there, so continuing with our discussion about the approaches or tools that we apply for understanding the value of financial securities. In this session we will talk about Bonds as an instrument for Investment.

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CONCEPTS COVERED

- Bonds as an instrument for investment
- Advantages and disadvantages of bonds
- Calculating yields for bonds

The slide features a timeline diagram with two points, t_0 and t_{10} . At t_0 , there is a handwritten annotation of $-100,000$ with a downward arrow. At t_{10} , there is a handwritten annotation of $??$ with a circle around it. A horizontal line connects t_0 and t_{10} . Below the line, there is a handwritten annotation of X with a circle around it, and an arrow pointing from t_{10} towards t_0 . The slide also includes a video inset of the professor and logos for IIT Kharagpur and NPTEL.

Effectively, we are going to discuss about the characteristics of the bonds and also advantages and disadvantages that bonds as a financial instrument carry. And we will try to understand

how we calculate yields for bonds and subsequently we will try to find a relationship between yields and the price of a bond.

So, as we understand previously the value of any financial security depends on the expected cash flow that it is supposed to be generating for the investor. So, as an investor if we believe that while investing in a particular financial instrument. Today let us say we are investing 100,000 rupees, today in order to get a benefit in future let us say 10 years down the line what benefit should I get to invest 100,000 rupees today.

Or vice versa if we are promised certain amount of benefit in future let us say a value, what should be the value of that future promise value or future promised benefit in today's term; so that we can compare whether it is more or less than the initial investment that we are making.

And this is true for most of the financial instruments, we have to pay a price today and we hope that we are going to get some benefit in future. So, if the present value of the future benefit is less than the promise that we are the price that we are paying today, then it is not worth an investment.

And if the present value of future promised benefit is greater than the initial investment that we are making today, then it is worth an investment. One of the tools that or one of the financial instruments that most of us talk about as a tool for investment or as an investment avenue is bonds.

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CONCEPTS COVERED

- Bonds as an instrument for investment
- Advantages and disadvantages of bonds
- Calculating yields for bonds

The slide features two handwritten diagrams illustrating bond calculations. The top diagram shows a timeline from t_0 to t_2 . At t_0 , there is a value of ₹100. At t_1 , there is a value of ₹57. At t_2 , there is a value of ₹100. The interest rate $r = 5\%$ is indicated between t_0 and t_1 , and between t_1 and t_2 . Below this timeline, the formula $FV = PV \times (1+r)^t = ₹100(1+5\%)^2$ is written. The bottom diagram shows a timeline starting at 'Today' with a value of ₹100. After '1 year', there is a value of $100 + 5\% \text{ of } ₹100$, which is also written as $100 \times (1+r)$. Below this, the value $t+1$ and the number 105 are written.

t_0 t_1 t_2
₹100 $r = 5\%$ $r = 5\%$
 $FV = PV \times (1+r)^t = ₹100(1+5\%)^2$

₹100 $r = 5\%$ $100 + 5\% \text{ of } ₹100$
Today 1 year $100 \times (1+r)$
 $t+1$ 105

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Bonds as an Investment

Characteristics of a bond

- Bonds: debt securities that pay a rate of interest based upon the face amount or par value of the bond.

coupon

face value/par value
maturity

So, bonds are basically bonds are basically financial instrument where they carry the characteristics of a debt instrument and pays a fixed rate of interest based upon the face value or par value of the bond. So, if you try to understand the characteristics of the bond then we need to understand it is essentially a debt security, where whoever issues the bond is basically the borrower and whoever buys the bond or receives the bond in lieu of sum of money is the lender.

So, if I invest my money in the bond issued by Government of India or XYZ company, then XYZ company or Government of India acts as a borrower here and I am acting as a lender. So, essentially, I am giving my money to the Government of India or the XYZ company in lieu of some promised return that basically the rate of interest also known as coupon on the bond and this coupon is typically based on the face amount or par value of the bond.

So, whenever we look at the bond as a financial instrument, we find certain peculiar characteristics. These are coupon face value or par value and most of the time the bonds will also have something called maturity, which means bonds will have a promised period of maturity after which the payment of coupon will stop.

So, if I have to invest my money in a bond I should typically look up to these information. What are the coupon rates? Most of the time bonds are coupon bearing bonds which means you the investor is entitled to receive a coupon. There is a coupon calculated on the basis of face value or par value which is the face value of the bond or the initial value of the bond. And most of the bonds have a maturity period, which is essentially the time period for which the coupon is due and after which the coupon will stop.

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Bonds as an Investment
Characteristics of a bond

- Bonds: debt securities that pay a rate of interest based upon the face amount or par value of the bond.
- Price changes as market interest changes
- Interest payments are commonly semiannual
- Bond investors receive full face amount when bonds mature
- Zero coupon bonds – no periodic payment (no interest reinvestment rate)
 - Originally sold at a discount

The slide features a video inset of a man in a light blue shirt speaking. At the bottom, there is a navigation bar with icons and logos for IIT Bombay and NPTEL.

So, whenever we try to find the financial characteristics or in grain characteristics in a bond, we typically see that price change price of a bond changes and market interest changes. We will see how these two are interrelated. Typically, whenever we invest in a bond, we hope that we will receive semiannual coupon which means the coupons are due or interest payments are due twice a year.

Bonds investors also receive full face value when bonds mature, which means at the time of maturity an investor is going to receive not only the coupon that was promised in the beginning, but also the face value or the initial value of the bond. One unique type of bond is called Zero coupon bond, where there is no payment of coupon or there is no periodic payment of interest and usually it is sold at a heavy discount that is why it is also known as deep discount bond.

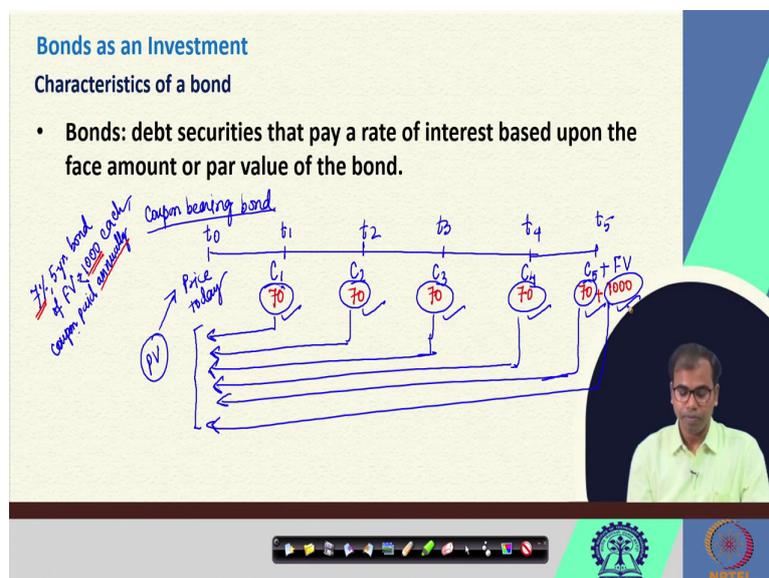
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Bonds as an Investment
Characteristics of a bond

- Bonds: debt securities that pay a rate of interest based upon the face amount or par value of the bond.

Handwritten notes:
2% 5yr bond
FV = 1000
Coupon paid annually

Diagram: Coupon bearing bond
Timeline: t_0 to t_5
At t_0 : Price today, PV
At t_1, t_2, t_3, t_4 : C_1, C_2, C_3, C_4 (each 70)
At t_5 : $C_5 + FV$ (70 + 1000)



So, if you look at the cash flow characteristic of such bonds then we can differentiate between a normal coupon bearing bond, where a coupon bearing bond is a bond where we have let us say a fixed maturity let us say 5 year. So, t_0 , t_1 , t_2 , t_3 , t_4 and t_5 which means t_5 at the end of 5 year the coupon will stop. So, if an investor invests a sum of money there will be a coupon.

So, 1st coupon then there will be 2nd coupon, 3rd coupon, 4th coupon, 5th coupon and at the end of 5 year the investor will also receive face value of the bond. So, if a bond has 5 let us say for the sake of simplicity let us say 7 percent coupon bearing bond 5 year maturity bond of face value let us say rupees 1000 each; which means after every period and here the coupon paid let us assume annually. As highlighted earlier coupon can be paid semi annually also, which means twice a year.

So, in this case it is paid annually which means after every period the investor in this bond is entitled to receive 7 percent of interest on face value of 1000, which means 70 rupees of coupon will be due will be paid to the investor for every period for next 5 years. And at the end of 5 year the investor will also receive 1000 rupees. So, essentially the cash flow that you are expecting is 5 payments of 70 rupee each and 1000 rupees.

So, all you have to find the present value of these cash flows that are being generated as coupon and face value and the present value of this 1000 also to find the present value of this bond which will essentially be the price in terms of today's value. So, to find the coupon price of coupon bearing bond, what we can do is we can find this present value of all the coupon that are due for the investor and the face value and try to see what is the intrinsic value of the bond and accordingly we can decide whether it is worth investing or not.

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Bonds as an Investment
Characteristics of a bond

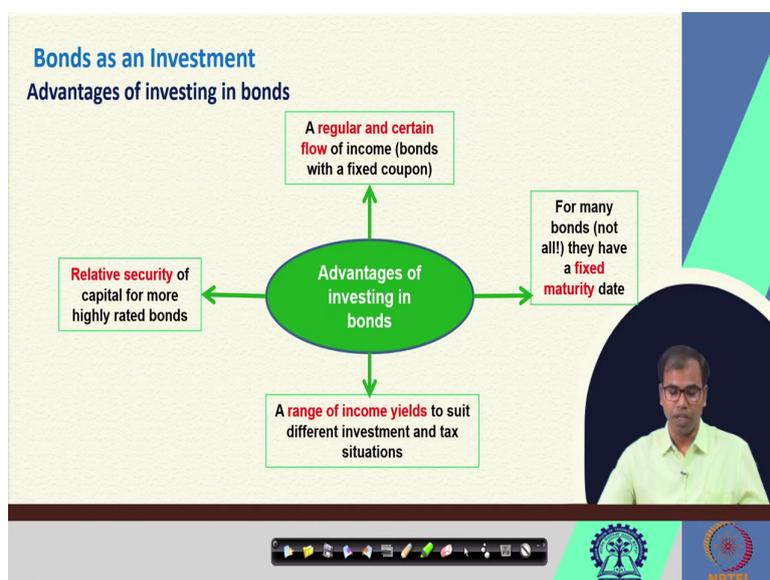
- Bonds: debt securities that pay a rate of interest based upon the face amount or par value of the bond.

$PV = \frac{FV}{(1+r)^t} = \frac{1000}{(1+r)^5}$

In case of a 0 coupon bond, we typically know that in 0 coupon bonds let us say if it is 5 year maturity 0 coupon bond then there is no coupon payment in the time of holding this bond. So, what you are entitled is at the end of the period you will receive only face value. So, if face value is 1000 rupees an investor is going to get only 1000 rupees after 5 year.

So, all you have to do is find the present value of this face value future value which is 1 plus r to the power t, which means we will find this 1000 future value 1 plus r whatever discounting rate we can relate to and t is going to be 5 year. So, this will be the present value of the bond today and accordingly you can decide whether to invest or not. So, as pointed out earlier most of the time 0 coupon bonds are deep discount bonds and they are sold at a heavy discount that is how typically we find the value of the bond in general.

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So, talking about characteristics or advantages of investing in bonds, so there are 4 major advantages. First advantage for investor is entitled to receive a regular and certain flow of income wherever there is a coupon bearing bond. So, if as an investor I am investing in a coupon bearing bond, I am entitled to receive a regular and certain cash flow every period if it is semi annually then twice a year, if it is annually then once a year if it is quarterly then 4 times a year.

Second advantage is for most of the time bonds have maturity period which means I may have an investment in bond that will mature in 5 year, 10 year, 20 year depending on what kind of bond we are investing. So, most of the time they have a maturity date and depending on at what point of time you invest you can calculate the range of income yield to suit different requirements of investors and tax situation also.

And finally, bonds provide some sort of relative security of capital for more highly rated bonds, because whenever we invest in highly rated secure bonds, we are sure that we are going to get the coupon as well as the face value at the end of maturity. So, we have very little risk to lose the investment or for that matter coupon as well.

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But when it comes to disadvantages and the risk that have been associated with investment in bonds typically there are certain risk that we carry. First risk is about inflation risk. So, essentially when inflation rises the real value of bonds coupon and redemption payments are eroded. We all know that inflation reduces the actual real value of money.

So, if we are going to get fixed coupon every period. So, the real value of that fixed coupon is going to be less if there is high inflation. So, inflation risk is there, then price risk or market

risk is there where fluctuation in interest rates prevailing in the market can cause bond prices to change accordingly when they are traded in the public in the market.

Third risk is about default risk, but this is only possible when there are lower rated or riskier bonds where there is a possibility that the issuer might default in terms of not being able to pay the coupon or the initial face value back to the investor. Another risk that bonds carry is seniority risk and exchange rate risk.

Seniority risk essentially implies that some bonds may be ranked behind more recently issued bonds in terms of being repaid if the issuer is unable to pay the bond back. Because if the bonds have been issued older the value of that bond versus bonds have been that have been issued recently will be different and that is actually causing the seniority risk.

Exchange rate risk implies that bonds denominated in foreign currency or a currency that is different from that of the local currency or investors home currency are typically subjected to adverse exchange rate movements.

Which means if I invest in bonds which are going to pay me in terms of pay me or the coupon or the face value in terms of dollars, then every time there is a change in dollar and Indian rupee exchange rate, I might have a risk of losing certain value on the coupon that I am receiving or the face value that I will be receiving at the end of maturity.

And finally, there will be a liquidity risk, essentially it is the liquidity implies the ease with which a security can be converted into cash or can be traded. Some bonds are easily traded, but most of the bonds particularly in the context of Indian market are less traded. So, there will be some sort of liquidity risk associated with investment in bonds.

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Bonds as an Investment
Disadvantages of investing in bonds: Price risk

There is an inverse relationship between interest rates and bond prices:

If **interest rates increase**, **bond prices will decrease**
If **interest rates decrease**, **bond prices will increase**

Interest rates are approximately 5%, and the government issues a bond with a coupon rate of 5%. Three months later, interest rates have doubled to 10%. What shall happen to the value of the bond?

Interest rates are approximately 5%, and the government issues a bond with a coupon rate of 5%. Three months later, interest rates have fallen to 2.5%. What shall happen to the value of the bond?

Why?
Its **5% coupon is no longer attractive**, so its resale price will fall to compensate and make the return the bond offers more competitive.

Why?
Its **5% coupon is very attractive**, so its resale price will rise to compensate and make the return it offers fall to more realistic levels.

If you try to understand the disadvantages of investing in bonds particularly in the context of price risk, so there is an inverse relationship between interest rate the prevailing interest rate in the market and the price in bonds which means, if interest rate increases bonds prices are supposed to be going down and vice versa, which means if interest rate decreases then bond prices will increase.

What typically happens assume these this scenario? Suppose interest rates are approximately 5 percent at the point of time current point of time and the government issues a bonds with a coupon rate of 5 percent. 3 months later if interest rate have doubled to 10 percent because of macroeconomic boom or any other external factors what should typically happen to the bond value of the bond as pointed out earlier.

If interest rate increases the price of the bond will decrease. So, here also interest rates have doubled, so the price rate price of the bond will decrease. Why? Because, it is 5 percent coupon that is no longer attractive, earlier the interest rate were 5 percent so people would be willing to invest in a bond which will have a coupon rate of 5 percent.

So, whenever there is an interest rate increase in the market the bond with lower coupon rate will no longer be attractive, which means its resale price will fall to compensate the return that bonds offer and make it more competitive. On the other hand, if interest rates are approximately 5 percent and the government issues a bond with a coupon rate of 5 percent that is fine, but suppose three months later the interest rate have fallen to 2.5 percent which is lesser than the coupon that the bond is offering.

What should happen in this case? Again, we will go by the previous argument if interest rate decreases then bonds price will increase. So, the reason here is the 5 percent coupon is very attractive compared to the prevailing interest rate and that is why it is resale price will rise to compensate and make the return rate that the bond offers fall to more realistic level and that is why the price will increase. So, that is the basic idea behind the relationship or inverse relationship between interest rate in the market and bond prices.

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Bonds as an Investment

Bond Yields

Yields are measures of the return that can be earned on bonds.

1888 US railway company issues a 30-year bond certificate
'4.4% Pennsylvania Railroad Company 1931'

Timeline: t_0 — t_1 — t_2 — t_3 — t_5

Handwritten notes:
 $r = 5\%$
 $PV = 2100$
 $t = 5 \text{ yrs.}$

Handwritten formula:
$$FV = PV (1+r)^t$$
$$= 2100 (1+5\%)^5$$
$$= 2100 \times (1.05)^5$$

The slide also features a video inset of a presenter and logos for IITM and NIFTM at the bottom.

We will discuss more about the inverse relationship and their significance for decision making later on. Let us try to touch upon another aspect of a bond as an investment tool that is known as yields. So, yields are basically the measures of the return that can be earned on bonds. So, essentially let us say for example, if there is a company that issues a 30 year bond in terms of you know as pointed out earlier let us say this is the coupon rate and this is the issuer name that is issuing for 30 years.

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Bonds as an Investment

Bond Yields

Yields are measures of the return that can be earned on bonds.

1888 US railway company issues a 30-year bond certificate
'4.4% Pennsylvania Railroad Company 1931'

Annually paid

↓

An investor buys US\$1,000 nominal of this bond

How much in coupons does the investor receive annually?

The slide features a video inset of a man in a light green shirt. At the bottom, there is a navigation bar with icons and logos for IITM and NIPTE.

If a particular investor buys or invest 1,000 dollars in this bond or invest 1,000 dollars in this particular bond of 4.4 percent for 30 years, the investor is supposed to receive certain amount of coupon annually. So, as pointed out earlier. So, if the investment is made to the tune of one hundred 1,000 dollars and coupon rate is 4.4 percent assuming that it is annually paid.

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Bonds as an Investment

Bond Yields

Yields are measures of the return that can be earned on bonds.

1888 US railway company issues a 30-year bond certificate
'4.4% Pennsylvania Railroad Company 1931'

↓

An investor buys US\$1,000 nominal of this bond

How much in coupons does the investor receive annually?

US\$44

What is the yield of the bond (at par)?

4.4%

Remember that the coupon reflects the interest rate payable on the nominal or principal amount

Of course, this will be paid for 30 years on the coupon, but for this particular period the investor is entitled to receive 44 dollars that is 4.4 percent of investment and the yield calculated on this bond at par will be 4.4 percent. So, essentially, we need to understand that the coupon reflects the interest rate payable on the nominal or principal amount and that is how we typically calculate the yield.

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Bonds as an Investment

Bond Pricing

Present value of a Bond = Present value of interest payments + Present Value of Principal

- PV of Annuity (pmt, i, N) + PV (FV, i, N)

$$PV = \sum_{t=1}^N \frac{PMT}{(1+i)^t} + \frac{FV}{(1+i)^N}$$

Where, N = time to maturity
 i = market interest rate
 PMT = semiannual interest payment
 FV = face value

The slide includes a timeline diagram with points $t_0, t_1, t_2, \dots, t_n$. Handwritten annotations show cash flows: C at t_1 and t_2 , and $C+FV$ at t_n . Below the timeline, the present value calculation is shown as $\sum \frac{C}{(1+r)^t} + \frac{FV}{(1+r)^t}$. A small video inset shows a man in a green shirt.

So, when we try to relate this with the pricing of the bond as indicated earlier we have seen previously that if we have certain cash flows coming in the form of coupon. So, let us say t_1 , t_2 and t_n . So, if we receive coupon. So, let us say here it is indicated as PMT or we can also call it coupon every period and face value at the end of the period.

So, we know that the present value will be the sum of all these future all the future coupons. So, we bring all the future coupons to present time. So, bring coupon divided by 1 plus r to the power t and we sum the present value of all these coupons that are to be received in future and we take this face value that we are going to receive 1 as 1 time payment and 1 plus r to the power 2.

I have already indicated that in some context you might find this t as n and r as i which is essentially indicating the interest rate and t or n is indicating the time to maturity here this is

essentially indicating the coupon. So, that is how we typically calculate the present value of a bond. So, present value of all the interest payments or the coupon and present value of all the principles combined together is essentially the present value of bond.

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Bonds as an Investment

Bond Yields – Calculating Flat Yields

An investor **may not have paid the par value** – they may have paid a different amount to purchase the bond, so a method of calculating the **true return** to him or her is needed.

Flat yield

The most straightforward yield is to look at the coupon paid on a bond as a percentage of its market price – known as the flat or running yield

$$\text{Flat yield (\%)} = \frac{\text{Annual coupon (\pounds)}}{\text{Bonds market price}} \times 100$$

(Price paid to purchase \pounds100 nominal)

When a bond is kept by the holder from when it is purchased at the nominal value until the maturity date:

Coupon rate = The yield

The slide includes a video inset of a presenter in the bottom right corner and a navigation bar at the bottom with various icons and logos, including NPTEL.

When we try to calculate the yield basically talking about particular flat yields we understand that an investor may not have paid the par value right, because not all an investor might have entered the market when the bond was issued or not all the bonds are sold at par value. Which means a bond having a face value or par value of 1000 rupees might not be sold at 1000 rupees rather at discount or at premium.

So, it can be sold for more than 1000 rupees or less than 1000 rupees like in case of 0 coupon bond it is most of the time sold at discount which means a 1000 rupees 0 coupon bond will be sold for less than 1000 rupees only. But sometimes if the issuer has better credibility and it

has greater future prospects, then the issuer can issue the bond at premium as well which means 1000 rupees bond can be issued at more than 1000 rupees as well.

So, in this case investors may have paid a different amount to purchase that particular bond. So, a method of calculating the true return to the investor is needed and that is known as that is known as flat yield. So, what we do is the most straight forward yield is to look at the coupon paid on a bond as a percentage of its market price and that is what is known as flat yield or running yield.

So, the coupon that is paid in terms of the percentage of market price is known as flat or running yield and this is the formula which we apply to calculate the flat yield or running yield. So, here what we do is we use annual coupon which is in terms of dollar or pound or rupee and we use the bond market price which could be in terms of dollar pound rupee whatever currency we are dealing with and we use this ratio with multiplying with 100 to find the flat yield in terms of percentage.

And it is worth it worth to be noted here that when a bond is kept by the holder from when it is purchased at the nominal value until the maturity date, then coupon rate is equal to the yield that is to be received by the investor. So, this is to be discussed in more detail further, but for right now let us try to understand the calculation of flat yield with the help of some examples.

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Bonds as an Investment

Calculating Bond Yields: Examples

1. A bond with a coupon of 5%, issued by XYZ Ltd., redeemable in 2025, is currently trading at ₹100 per ₹100 nominal.

The diagram shows a horizontal timeline starting at t_0 and ending at t_{2025} . A vertical tick mark is placed at the start of the timeline, with a circle containing the number 100 below it, representing the current price of the bond. Above the timeline, the text $r=5\%$ indicates the coupon rate. The timeline is drawn with a blue line and has vertical end caps at t_0 and t_{2025} .

The video feed shows a man with glasses and a light green shirt, speaking into a microphone. He is positioned in the bottom right corner of the slide.

The bottom right corner of the slide features two logos: the IITM logo on the left and the NIFTM logo on the right.

So, let us say for example, a very small example here could be a case of a bond where the coupon rate is 5 percent issued by a company and it is having maturity in 2025. And right now, it is trading at 100 per nominal which means just to bring this in the context. So, there is a bond which was issued at some point of time and it is going to be maturing at 2025. Let us say this is the time when we are talking about and the coupon is 5percent and the price is 100 right now.

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Bonds as an Investment

Calculating Bond Yields: Examples

1. A bond with a coupon of 5%, issued by XYZ Ltd., redeemable in 2025, is currently trading at ₹100 per ₹100 nominal.

Flat yield = $(\text{₹}5 / \text{₹}100) \times 100$

Flat yield = 5%

2. A bond with a coupon of 4%, issued by ABC Ltd, redeemable in 2025, is currently trading at ₹78 per ₹100 nominal.

Flat yield = $(\text{₹}4 / \text{₹}78) \times 100$

Flat yield = 5.13%

3. 5% treasury stock 2028 is currently priced at \$104 per \$100 nominal.

C/P FV

So, this is current market price and this is face value. So, what when we try to calculate the flat yield, we use market price as the denominator and coupon as a percentage of face value as a numerator and try to calculate the flat yield here in this case flat yield is 5.13 percent.

Another example could be a case where there is a 5 percent treasury stock which is due or which is maturing at 2028 and currently it is priced at 104 dollar; whereas, the face value is 100 only. Again, face value is 100, but current market price is 104 and coupon rate is 5 percent maturity is going to be 2028.

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Bonds as an Investment

Calculating Bond Yields: Examples

1. A bond with a coupon of 5%, issued by XYZ Ltd., redeemable in 2025, is currently trading at ₹100 per ₹ 100 nominal.

Flat yield = $(\text{₹}5 / \text{₹}100) \times 100$

Flat yield = **5%**

2. A bond with a coupon of 4%, issued by ABC Ltd, redeemable in 2025, is currently trading at ₹78 per ₹100 nominal.

Flat yield = $(\text{₹}4 / \text{₹}78) \times 100$

Flat yield = **5.13%**

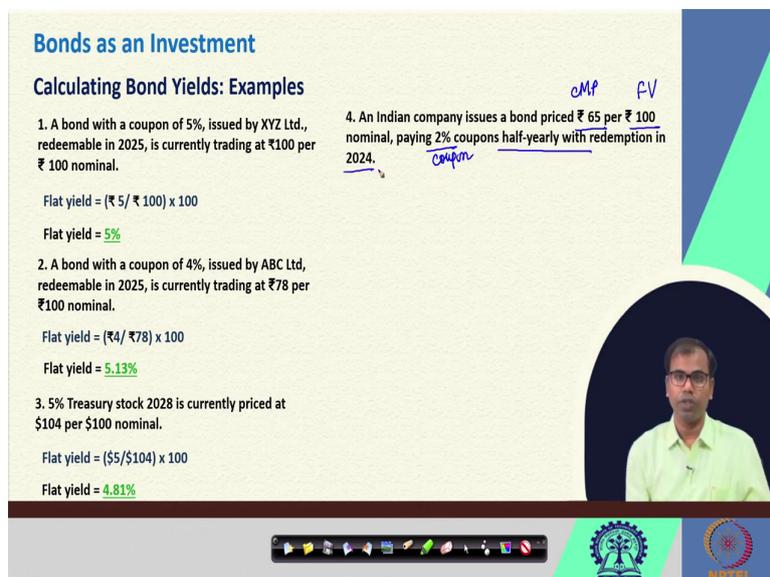
3. 5% Treasury stock 2028 is currently priced at \$104 per \$100 nominal.

Flat yield = $(\text{\$}5 / \text{\$}104) \times 100$

Flat yield = **4.81%**

4. An Indian company issues a bond priced ₹ 65 per ₹ 100 nominal, paying 2% coupons half-yearly with redemption in 2024.

CMP *FV*
coupon



So, when we try to calculate the flat yield in this case, we can calculate the 5 dollar that is 5 percent of 100 dollars of face value divided by current market price into 100 and this gives us flat yield of 4.81percent. One more example could be a company which issued a bond priced at 65 per 100 nominal. Here again this is the current market price and this is the face value. This is coupon which is paid semiannually and maturing in 2024.

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Bonds as an Investment

Calculating Bond Yields: Examples

1. A bond with a coupon of 5%, issued by XYZ Ltd., redeemable in 2025, is currently trading at ₹100 per ₹ 100 nominal.
Flat yield = $(\text{₹}5 / \text{₹}100) \times 100$
Flat yield = **5%**
2. A bond with a coupon of 4%, issued by ABC Ltd, redeemable in 2025, is currently trading at ₹78 per ₹100 nominal.
Flat yield = $(\text{₹}4 / \text{₹}78) \times 100$
Flat yield = **5.13%**
3. 5% Treasury stock 2028 is currently priced at \$104 per \$100 nominal.
Flat yield = $(\text{\$}5 / \text{\$}104) \times 100$
Flat yield = **4.81%**
4. An Indian company issues a bond priced ₹ 65 per ₹ 100 nominal, paying 2% coupons half-yearly with redemption in 2024.
Flat yield = $(\text{₹}2 / \text{₹}65) \times 100$
Flat yield = **3.08%**
5. A bond priced at \$110 per \$100 nominal, with a variable coupon of 1.5% above LIBOR has a redemption date of 2036. LIBOR is averaging 1.2%.
Flat yield = $(\text{₹}2 / \text{₹}65) \times 100$
Flat yield = **3.08%**

So, in this case also if we try to calculate the flat yield, we will use the coupon divided by current market price into 100 to find the flat yield. And one last example if a bond is priced at 110 dollars per 100 nominal with a variable coupon rate, so here it is current market price, here it is face value this is 1.5 percent above LIBOR which is variable coupon.

So, if we understand the market rates, we know that London Interbank rate is one of the benchmark rates, in India we have MIBOR which is Mumbai Interbank rate which is used for transactions between institute financial institutions most of the time. So, if this variable coupon rate is calculated on the basis of LIBOR that is 1.5 percent above LIBOR and LIBOR is 1.2 percent. So, we can calculate the flat yield here.

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Bonds as an Investment

Calculating Bond Yields: Examples

1. A bond with a coupon of 5%, issued by XYZ Ltd., redeemable in 2025, is currently trading at ₹100 per ₹ 100 nominal.

Flat yield = $(\text{₹} 5 / \text{₹} 100) \times 100$

Flat yield = **5%**

2. A bond with a coupon of 4%, issued by ABC Ltd, redeemable in 2025, is currently trading at ₹78 per ₹100 nominal.

Flat yield = $(\text{₹} 4 / \text{₹} 78) \times 100$

Flat yield = **5.13%**

3. 5% Treasury stock 2028 is currently priced at \$104 per \$100 nominal.

Flat yield = $(\text{\$} 5 / \text{\$} 104) \times 100$

Flat yield = **4.81%**

4. An Indian company issues a bond priced ₹ 65 per ₹ 100 nominal, paying 2% coupons half-yearly with redemption in 2024.

Flat yield = $(\text{₹} 2 / \text{₹} 65) \times 100$

Flat yield = **3.08%**

5. A bond priced at \$110 per \$100 nominal, with a variable coupon of 1.5% above LIBOR has a redemption date of 2036. LIBOR is averaging 1.2%.

Flat yield = $(\text{\$} 2.7 / \text{\$} 110) \times 100$

Flat yield = **2.45%**

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So, in this case flat yield will be 1.5 plus 1.2 which is 2.7 percent on face value of 100 dollars or 2.7 dollar divided by current market price into 100 and flat yield is 2.45 percent. So, this is how we calculate flat yields we can use this flat yields to compare with different rate of return or different cost of funds in terms of opportunity cost and then we can take a decision whether to invest in bonds or not. We will learn about pricing of bonds in more detail further.

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CONCLUSIONS

- Bonds are one of popular financial instruments for investments.
- Price of a bond is calculated as the present value of expected interest payments and the present value of the principal.
- There is an inverse relationship between (prevailing) interest rates and bond prices.

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For now, this is all because this session was focused on understanding the characteristics in terms of advantages and disadvantages of a bond and trying to understand the relationship between a bond's yield and prices. We will discuss more about yield and prices as a tool for investment in bonds in subsequent session. That is all.

Thank you very much.