Behavioral and Personal Finance
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Module – 02
Personal Finance
Lecture – 31
Fixed Income Investments

Hello, hello; welcome back to the course Behavioral and Personal Finance. In last session we discussed about, what factors to consider while investing in equity funds, or funds which are typically known as mutual funds, with basically our instruments or investment avenues, where funds from different investors are pooled together. And, expert's financial managers invest those funds for better returns and better risk management purposes.

Now, we have already discussed that mutual fund investments carries some risk, because the investment is exposed to financial markets. And, the basic concept of investment says that we have to diversify our risk. So, that the return can be optimized and the return that we generate out of our investment should be considered as per the risk taking ability of the investor.

So, when we diversify our portfolio or when we diversify our investment portfolio, we basically try to gain as much return as possible for a given level of risk. To adjust to the risk management purposes, we consider investment avenues which are basically low risky and they get some assured return.

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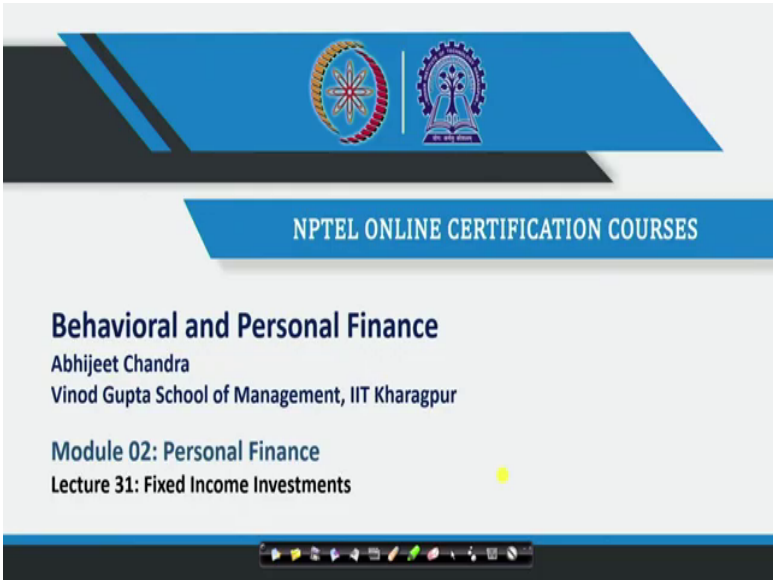

So, that our return cannot be compromised too much, but risk can be adjusted. Today's session focuses on that aspect. In this session we will discuss about fixed income investment.

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And, basically we will try to cover topics, which are fixed income instruments, where we will discuss different instruments of fixed income investments. Mainly, we will discuss about bonds and certain other fixed instrument investment instruments known as money market instruments. Now, the first question that comes to our mind is why should we consider fixed income investment as an investment choice at all.

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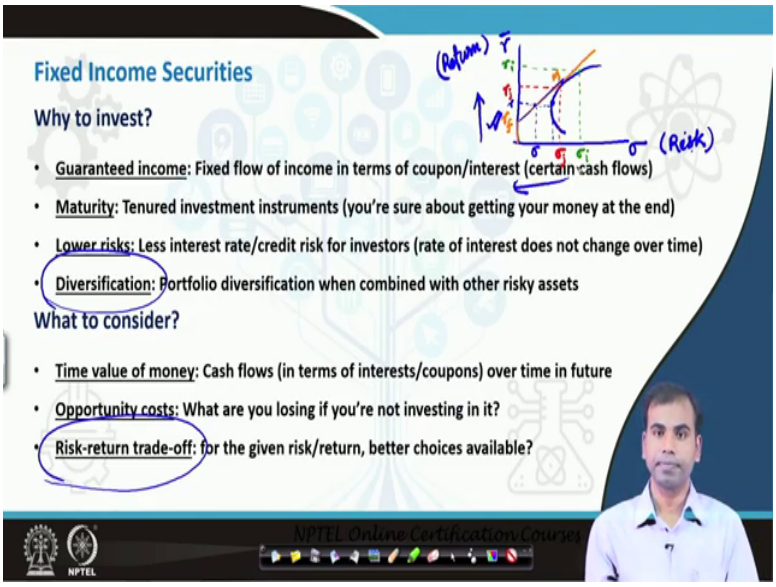

The reason for which we can consider our choices of investment of avenues towards fixed income investment are as follows. First of all fixed income in investment gives you assured return, basically it guarantees that you are going to get a fixed amount of return in terms of interest or coupon that comes to you as cash flow on a periodical basis. So, you are assured of certain cash flows every period.

So, if you are hoping to get some fixed return on your investment you should consider fixed income instruments. Second reason for which people prefer fixed income instrument is the maturity. Typically, the instrument of fixed income carries of a maturity period, which implies that the investment will become mature after certain number of years or after certain period.

It basically assures you that at the end of maturity, you are going to get the investment that you have made in terms of principal repayment. At the same time fixed income instrument

typically carries lower risk, which means there are less interest rate risk or in some cases no risk at all and lower credit risk and default risk, which indicates that the investment, that you have made is assured of getting back to you after maturity period.

However, when we invest in some fixed income securities, these investments carry certain market risk and in some cases exchange rate risk as well. So, we are fixed income investments are not assured of these risk, that carries through markets and in international financial markets. And, finally, the diversification aspect of fixed income security suggest that, if we include fixed income investment instruments in our portfolio, we try to reduce the risk exposure whereas, we maintain certain amount of fixed return in our portfolio.

Now, when we try to discuss and consider different type of fixed income securities; the factors that we should always keep in our mind are time value of money, opportunity cost and risk return trade-off. We have already discussed how time value of money determines the present value of cash flows occurring at different points of time. And, just like any other investments fixed income investments also provides you return, or cash flows at different points of time, which should be considered with a perspective of time value of money.

Second thing is opportunity cost, which basically indicates the cost of next best opportunity that you have suggesting that, if you have taken a decision, what is the cost associated with the next decision that you could have taken. If that opportunity cost is lower than the gain that you are getting from this investment, this investment should always be preferred. So, if you are losing and you are not investing this money anywhere, you should consider this as investment choice.

Third aspect that we should always keep in our mind while taking a decision with regard to fixed income securities is the risk return trade-off. Basically, it implies that every investor has a risk bearing capability and for that given risk level, he should get the best return that are available in the market. And, this risk return trade-off suggests that when you include your risk, less or risk-free investment in your portfolio you try to minimize the risk to certain extent.

For example: if you recall the discussion on portfolio and risk return discussed topics, we have understood that in a two asset case, where we have two different assets which are risky and carries certain risk return combination. And, we try to create a portfolio in terms of efficient frontier. And, then we include the risk free asset we get a frontier which carries the same amount of risk, but with lower rate of return.

For example, if you refer to that session where we had discussed that given a risk return domain. So, risk return domain as represented by the two dimensional graph, where you have returned as your r as your expected return and sigma as your risk basically and this is your return, which you are expecting from your investment.

And, you know that you have a risk efficient frontier that carries this kind of shape, where all points along this risk of efficient frontier are basically combination of some assets, which are available in the market. For example, this particular point on this risk frontier is a combination of this risk and this much of return. Similarly, if you try to find a point on frontier here, this carries this amount of risk and this amount of return.

So, basically when you are moving along this risk return frontier, you are trying to get the best possible combination of risk and return in the market. Now, we had discussed that if we have a risk free asset or an asset that carries no risk, but certain amount of return. The frontier would look like this where you have risk-free asset, which carries no return, that is 0 sigma this particular point. And, if this is this passes through this of risky frontier, where you carries the combination of all risky assets and this in tangent point is basically the market portfolio.

And, you invest some amount of money in your risk free asset and some amount of money in this market frontier or the combination of this risky asset, your portfolio move along this line, which means, if you have 50-50 percent of investment in risk-free asset and market portfolio. Your portfolio lies somewhere here, which gives you this amount of return and this amount of risk, which is certainly better than a portfolio, which lies here for the same amount of return, but higher level of risk.

So, this is why risk return trade off is a better factor to consider when you try to diversify your portfolio. It essentially means that you are trying to minimize the risk and maximize the return for a given level of risk. Now, that we understand the importance of fixed income securities and the factors that we consider while including the fixed income securities in our portfolio.

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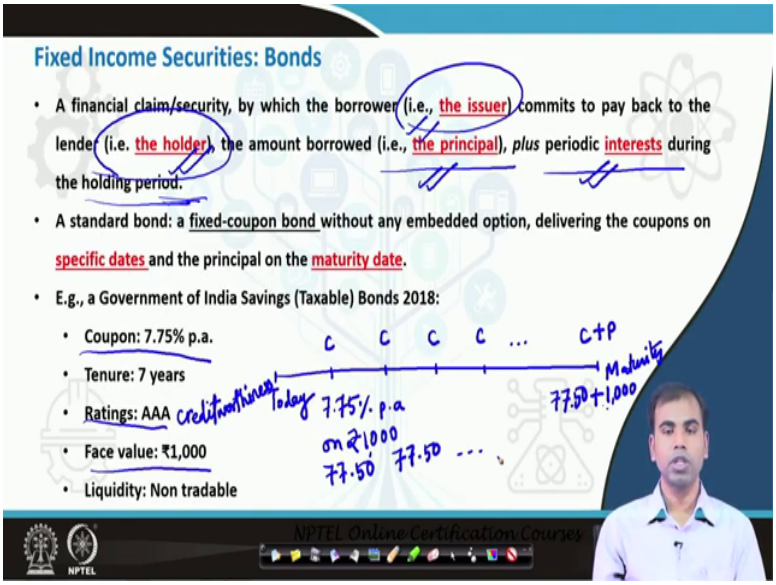

Let us try to understand, what fixed income securities should we consider. So, the first and most important fixed income security that we consider is the bonds. Basically, bonds are financial claims or financial securities, by which the borrower or the issuer basically commits some amount of money to pay back to the lender from whom it has borrowed.

So, there are issuer and the borrower which basically issue the bonds and then the lender or the bond holder. Basically, gives his or her money to the borrower and that amount typically is known as principal, which carries some interest paid periodically during the holding period.

So, basically bonds are pieces of paper which specifies a principal amount a periodic interest, the issuer and the holder. Of course, it will always have a maturity period associated with it. For a given bond the factors such as issuer and borrower remain irrelevant, because what matters most is the principal amount, which is the value of the bond, the interest rate or the coupon rate, which basically is the payment of interest paid towards the lender and the maturity period.

Typically a standard bond is a fixed coupon bond, without any embedded option and it delivers periodical coupon on specified date, which is basically interest payment or coupon payment at every period. And, it has a principal amount and a maturity date at which the principal amount has to be repaid.

So, when we try to understand the timeline of a bond, basically a timeline of a bond has the same framework as we understood from the time value of money concept, if we you are living here today and you borrow money from someone. So, you issue bond and then bond pays some coupon fixed coupon every period. And, after certain number of years at the time of maturity, you basically pay coupon and the principal amount that you have borrowed back to the lender.

For example: if you look at a bond issued by Government of India in the name of savings taxable bonds which was issued in 2018. It carries the following features the coupon rate of this bond is 7.75 percent per annum. The bond matures in 7 years, which is basically the tenure of the bond given as 7 years. The rating of the bond, which is basically the credit rating or credit worthiness of the bond is triple a given by certain credit rating agencies.

So, this basically indicates the creditworthiness of the bond, which is basically associated with the creditworthiness of the issuer as well. This bond has a face value of 1000 rupees and

liquidity is non-taxable, which implies that this bond cannot be traded in the market. So, once you buy that bond or once you invest your money in this bond you cannot trade it or you cannot transfer it to someone else unless specified in advance. So, here in this timeline basically you are paying 7.7 percent of coupon per annum on 1000 rupees which is your face value.

And, then at the maturity you are paying 7.75 percent which is basically amount plus 1000 rupees at the end of the maturity period. So, basically you are paying 1077 rupee 50 paisa at the end of maturity. So, every period the investor would get 77 rupee 50 paisa of interest or coupon and at the end of the maturity, the person the bond holder will receive 1077 rupee 50 paisa for 7 years. This is how a bond functions? Now, if you try to understand more technical terms related to bonds we can see, how these bonds can be evaluated and their pricing can be done.

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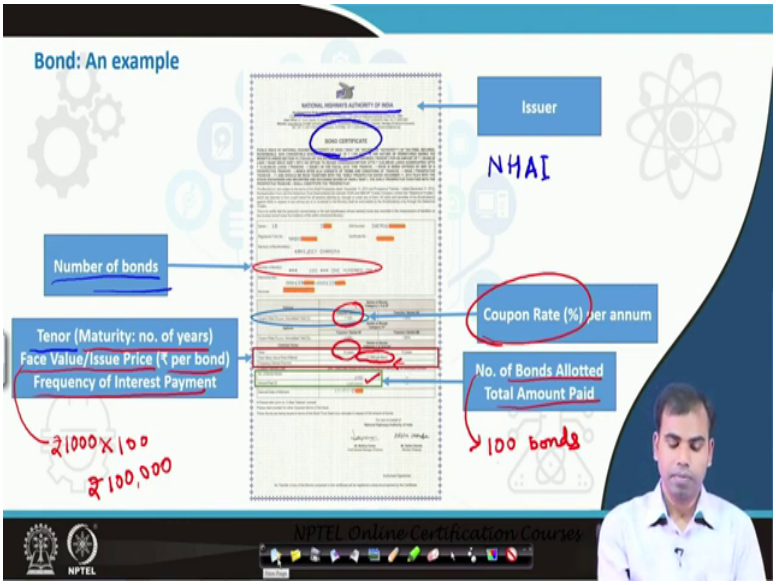

Here I show you an example of a bond issued by some agency or an organization. So, if you look at the bond characteristic this is basically known as bond certificate. So, this is a bond certificate. The issuer is national highway authority of India, which is basically given at the top of the bond certificate. This bond has certain data certain information embedded in it.

So, the information that are of the interest of the bondholder of those who are interested in buying the bonds are basically number of bonds, which is basically the number of bonds that the bond certificate carries or bond certificate specifies in terms of the holding. Then, tenure of the bond basically this indicates the maturity of the bond in terms of number of years.

So, here if you see the bond has a maturity of 10 years, then it has a face value or issue price which is basically the price per in terms of rupee per bond. Here, it is given as thousand rupees per bond and then finally, it is the frequency of interest payment which is annual so, which is given here. So, these are other factors that we should consider at the same time we should also be interested in knowing the coupon rate per annum.

So, coupon rate given here is 7.14 percent for this particular bond and number of bond allotted is 100 and total amount paid is 1 lakh rupee. So, face value is if you see face value is 1000 rupees per bond number of bonds allotted is 100 bonds, which means you have paid 100 into 1000, that is rupees 100 1000 rupee in terms of the total value of the bonds. So, if you are holding this bond every year you are going to get 7.14 percent of coupon paid annually.

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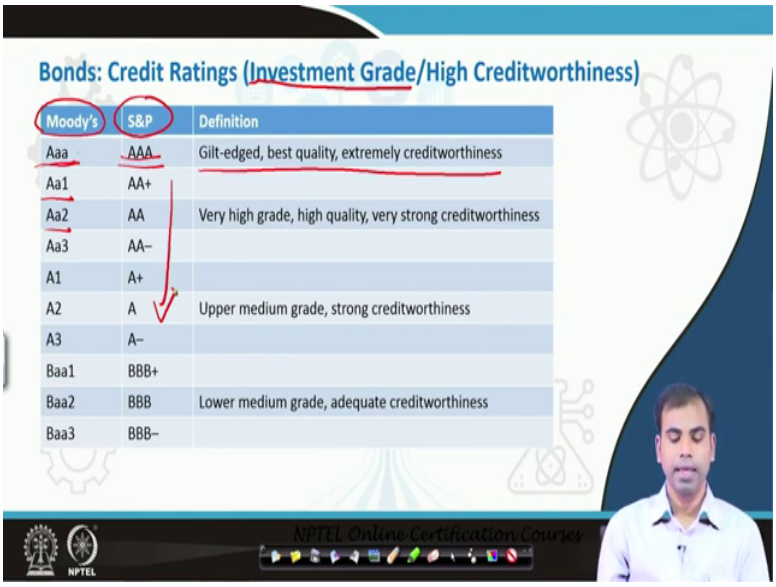

So, this is how a bond looks like when we talk about the creditworthiness of the bonds creditworthiness are recorded or represented in terms of credit rating. There are certain credit rating agencies in the world, in the financial world, who basically gives credit rating to different financial instruments including bonds. In this case there are two categories of credit rating of bonds.

First type of credit rating is basic indicated as investment grade, which indicates high creditworthiness of the financial instrument or the bonds and these are as following. So, there are two companies or two agencies which provide credit rating Moody's and S and P. So, Moody's provides certain credit rating two investment instruments, in terms of triple A double A 1 double A 2 and so on. And, associated characteristic the comparable ratings of S and P that is standard and poor's company are also given.

And, you can see if a bond is rated triple A by either moody or S and P, it is considered to be gilt edged best quality and extremely creditworthy instruments, which indicate that if you invest in these bonds the likelihood of losing your money, and not pay receiving the interest or coupon payments is very limit low or almost nil. These are the best rated or highest rated financial instruments for investment.

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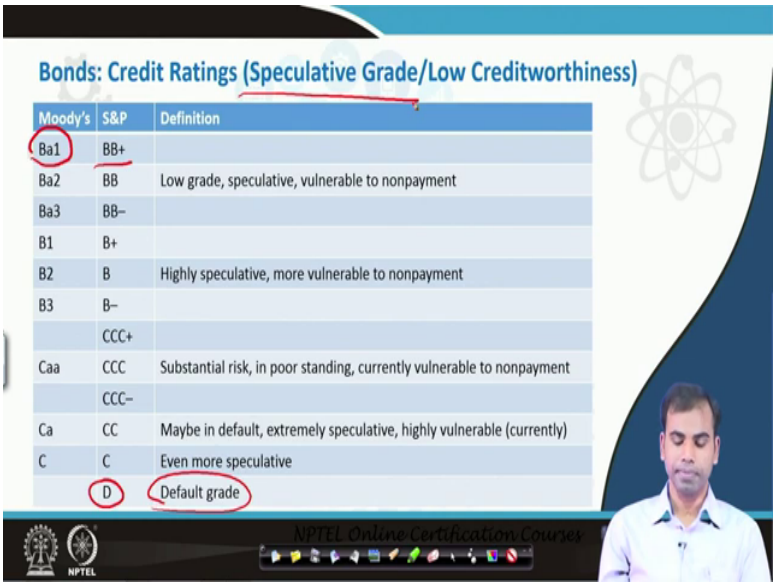

As you move further towards other credit rating, you see that the quality of instrument are decreasing with every rating given by either Moody's or S and P. And, when we move on to speculative grade of bond rating or credit rating of bonds, we see that it starts with Ba1 by Moody's or double B plus by S and P. And, every rating has certain explanation which are associated with those ratings such as, if you buy or if you invest your money in D rated bond D given by S and P rating agency.

You know that these are default grade in investments and it is very unlikely that you are going to get your money back. Now, the question comes that, if we know that these are the rating given to bonds or any other financial instrument in general, why would anyone want to invest our money in such instruments. Well the reason is these bonds, which are basically known as speculative grade bonds, offer a huge amount of return or very high coupon rate or rate of return on investment.

Such that, if you are able to take calculated risk and you are able to take this risk and this turns out to be positive for you, you get multi time return compared to the investment grade bonds, that are going to give you in terms of coupon rate. So, it always goes along with the level of risk that you are taking with the level of return that you are receiving. So, high risky bonds or high risky financial instruments in general are liable to pay you higher rate of return, but along with a very high level of risk.

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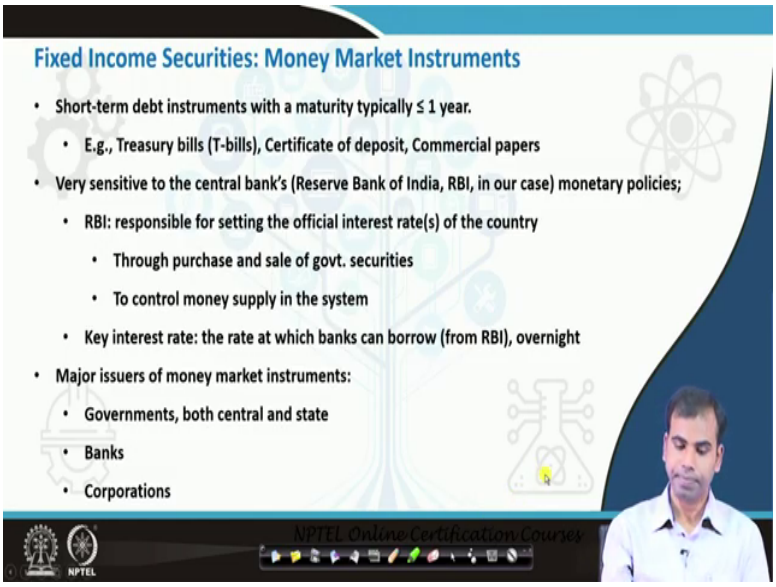

Taking our discussion further, there are other fixed income instruments of fixed income securities, which we should always consider while investing our money in portfolio. And, these instruments are market money market instruments. Money market instruments are typically short term debt instruments, which have maturity of typically less than a year, which means the maturity of these instruments are typically spanning between two days to a 1 year.

In some cases it goes beyond one year as well, but generally the maturity lies within 1 year. These instruments include treasury bills certificate of deposits and commercial papers, there are certain other instruments, which are not typically popular among individual investors, they are mostly invested by institutional investors or financial institution, such as repo contract, forward contracts.

And, these instruments such as treasury bills also known as T-bills, certificate of deposits, or commercial papers are also popular among individual investors. The unique characteristic of these money market instruments is such that, these instruments are very sensitive to the central bank monetary policies. In India's case the monetary policy as specified by Reserve Bank of India always affects the valuation and the popularity of these money market instruments.

Mainly, because RBI is responsible for setting up the official rate of interest for the country, or for the Indian market in general, RBI does this through buying and selling of government securities while making some funds available for financial institutions to do their business. And, by this way RBI also maintains or attempts to control money supply in the system, which basically means, that if it try to control the supply outwards supply it will control the interest rates such that not many people are interested in taking money from banks and if it tries to reduce that it takes a decision other way around.

So, the idea of RBI controlling this money supply is to control the key interest rate, basically the rate at which banks can borrow from RBI overnight, overnight typically in indicates one trading day. So, if banks needed some money they will go to RBI and borrow for borrow some funds for one trading day, which is overnight and next day they will have to adjust for that. So, these instrument money market instruments that we are discussing now are affected by the policies governed or designed by the Central Bank, which is reserve bank of India in our case.

And, the major issues that, they face are the varying interest rate or the policy of interest rate as decided by the reserve bank of India. These instruments are issued by government typically both state and central government, financial institutions mainly by banks and in some cases corporations as well. These organization and institutions issue money market instruments to raise funds for short term duration.

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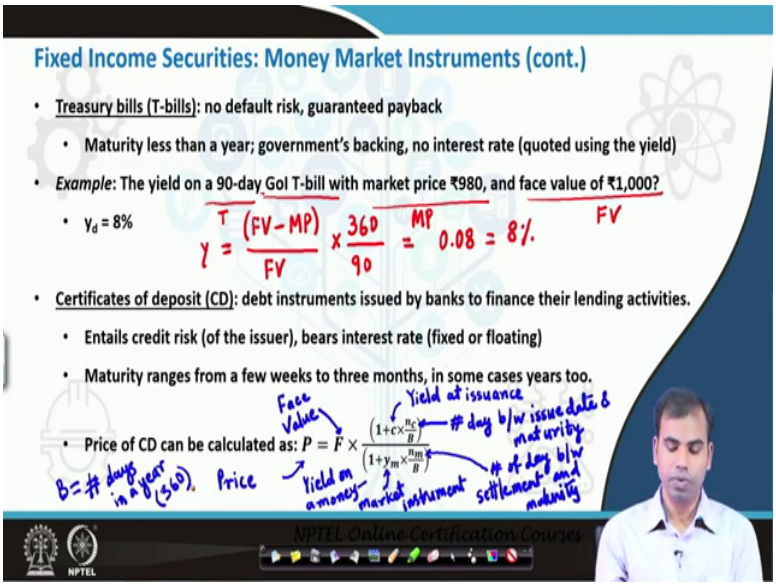

When you talk about money market fund such that the example that we discussed earlier, the first thing comes to our mind is the treasury bills or T-bills. So, T-bills basically our financial instruments of short term fund requirements, which carries no default risk because the government has the backing and it has a guaranteed payback by the government. So, T-bills or treasury bills, basically carries no default risk its maturities range between 1 day to 1 year.

And, it carries no interest basically it provides no interest rate as such, because it trade it is traded or quoted using the yield. So, if we take an example of treasury bills, what is the, what is the way we can calculate the yield or the return that a person can hold and get this is the example. So, if you see there is a government of India Treasury bill that is offered for a maturity of 90 days and market price is 980, but the face value is 1000? So, it indicates that the face value of that Treasury bill is 1000 market price is 90 980.

And, the maturity basically the time for which it is going to mature is 90 days. So, if you try to calculate yield basically we can calculate yield such that, we will have yield as face value minus market price, which is basically the difference between the face value and market price, with respect to the face value. Or, this indicates the premium that you are getting into number of days for which the year is considered typically 360 days divided by number of days for which the instrument is maturing.

So, if you consider this formula you can obtain the rate of interest or the rate of yield for which this particular instrument or this particular T bill is traded. So, the T-bill trading percentage of yield is given as 8 percent. This is how T bills are traded you can find the yield by using the formula as given, basically the inputs are the market price at which it is bought or sold. And, the face value which is typically the face value of the instrument and the maturity period for which it is being traded. This gives you the yield of the T bills as in the example.

Next instrument that we can consider or we can discuss is certificate of deposits. Basically, certificate of deposits are debt instruments issued by banks to finance their lending activities, again it carries no credit risk as such for the borrowers, but it has certain interest rate risk. And, the interest rate risk that is offered to the lender basically has some implications coming out of the RBI is monetary policy.

So, the maturity for this certificate of deposit ranges from a few weeks to 3 months in general and in some cases it may span for couple of years as well. When we try to understand the price of a certificate of deposit or this particular instrument CD, it can be calculated as given formula where the price is a function of face value the coupon rate. And, the so, basically if we try to indicate this these factors in the formula, this is the price of the certificate of deposit, this is face value, you have c as the yield rate at the time of issuing this instrument.

You have y m, which basically is yield on a money market instrument, which is your reference rate. And, then you have n c, which basically indicates number of days between the time when it was issued, between issue date and maturity. And, n m indicates number of days between settlement and maturity B is number of days considered in a year.

So, typically it is 360 or 365 can also be considered, but typically this is considered as 360. So, when we try to calculate the price of certificate of deposit, we follow this particular formula, which basically is a function of a face value, the coupon or the yield which is committed at the time of issuing that particular certificate of deposit. And, then we have a reference rate as y m, which is nothing, but yield on a money market instrument.

And, then we consider that number of days between the time when it was issued and the time it is going to mature and number of days between the settlement and maturity date. If we keep this particular formula in our mind, we can calculate the price of certificate of deposit.

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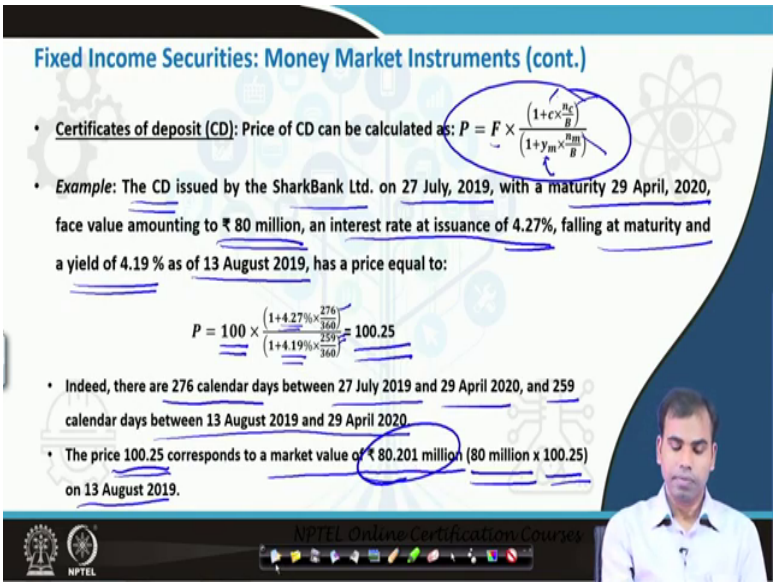

For example, if we see this particular case where we have this certificate of deposit instance in this particular example, which suggests that a bank issued a certificate of deposit on 27 July, 2019 and maturing at 29th April 2020. The face value is amounting to 80 million rupees and

interest rate issuance at the time of issuing that say, certificate of deposit is 4.27 percent, and maturity at the reference yield as 4.19 percent, which is on 13 August 2019.

So, if we follow this formula that we just discussed, which has face value and coupon rate at the time of issuance, reference rate at the time of bond money market instrument number of days between issuance and maturity, and number of days at from settlement to maturity, and B is basically the number of days in a year. So, we have these numbers fixed in this particular formula.

Let us assume that if the instrument is of 100 rupees and we plug in these numbers in here, 276 days from issuance to maturity and 259 from settlement to maturity, we obtain a price of 100 rupees certificate of deposit as 100 rupee 25 paisa. So, we know that 276 calendar days between 27 July 19 and 29th April 2020. Similarly, 259 days between 13th August and 2019 and 29th April 2020.

The price 100.25 corresponds to a market value of 80.201 million rupees, which basically is a function of 80 million of face value and 100.25 rupee of the price that we have obtained on the date of settlement. So, this is the market value of the certificate of deposit as on 13th August 2019. This is how we can calculate the price of a certificate of deposit.

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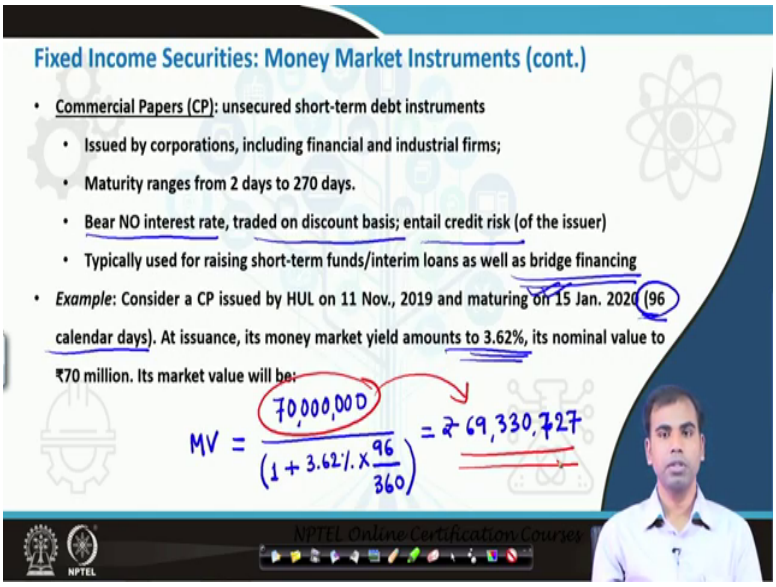

Moving our discussion forward there is another example of commercial paper, which is basically another way to raise money for a short term period. These are also unsecured a debt instrument issued for short term. Typically, commercial papers are issued by corporations including financial and industrial companies. Maturity ranges from 2 days to 270 days that is less than a year. Commercial papers, typically carries no interest rate or no specified interest rate; rather it is traded on discount basis.

And, to some extent it carries credit risk of the issuer. Companies use this for short term fund requirement or the funding requirement which are for interim activities or interim loans. In some cases they also use for long term capital requirements, in terms of bridge financing, which are basically another way of financing your business activities. For example, if you are setting up a business and you are hoping that some investor would pump in lot of capital in

some time. Before that capital actually comes in your business you try to find a short term source of money.

So, that you can start your business immediately and that certain source of money is known as bridge financing. So, commercial papers are issued as form of bridge financing as well. If you look at the example given here, the example suggest that consider commercial paper issued by Hindustan Unilever Limited on 11th November 2019 and maturing on 15 January 2020, which basically entails 19s 96 calendar days. At issuance the money market yield amount to 3.6 2 percent and nominal value is 70 million. So, if you try to calculate the value of this particular commercial paper.

The market value can be calculated as market value will be 70 million, which is 70 million divided by 1 plus the rate of mark money market yield, which is 3.62 percent into number of days for which it has been issued that is 96 divided by number of days in a year. If you use this particular approach, the value that you are going to get is close to 69 million 330000 to 727 rupee. So, we have seen that commercial paper worth 70 million is trading or available for investment at today's market value of 69.33 million of market value.

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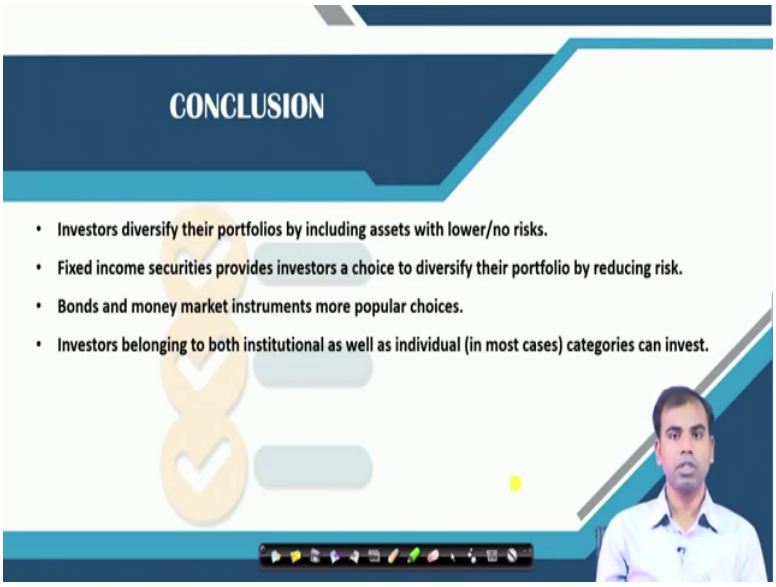

So, this is how we can calculate the value market value of commercial paper to some of the discussion that we have had in this session, basically we discussed that to diversify the investment portfolio, investors should also consider along with risky investment choices such as mutual fund and equity investment. The funds or the investment avenues, which carries lesser risk or no risk at all and fixed income securities or instrument of investment offer this combination of lower or in some cases no risk with certain guaranteed return.

And, this helps investor in diversifying the portfolio. In this session we have discussed some basic idea about the bond, its associated features. And, other money market instruments such as treasury bills, certificate of deposits and commercial papers. These three are popular choices among investors both institutional and individuals. The best part is as an individual investor you can also invest part of your investment, part of your savings in the instruments which are fixed income securities, such as treasury bills, commercial paper and certificate of

deposits. Investment in bonds is always popular in retail and individual investors, because it offers fixed income with lesser risk.

In next session we will discuss how do we determine the prices of a bond, for now this is it.

Thank you very much.