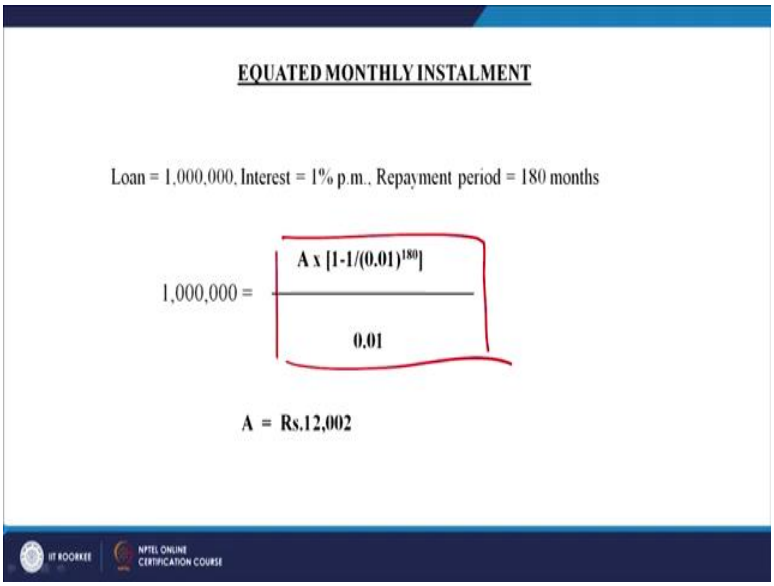
Financial Management for Managers
Professor. Anil K. Sharma
Department of Management Studies
Indian Institute of Technology Roorkee.
Lecture 16
Time Value of Money Part 7

Welcome all, so we are in the process of learning about the different concepts of the time value of money and this is our last leg of discussion on this particular concept, time value of money. In this class I will close the discussion on this very interesting, important concept of the overall financial management because without time value of money I told you many times in the previous classes also we cannot take any kind of investment decisions or any kind of the borrowing decisions.

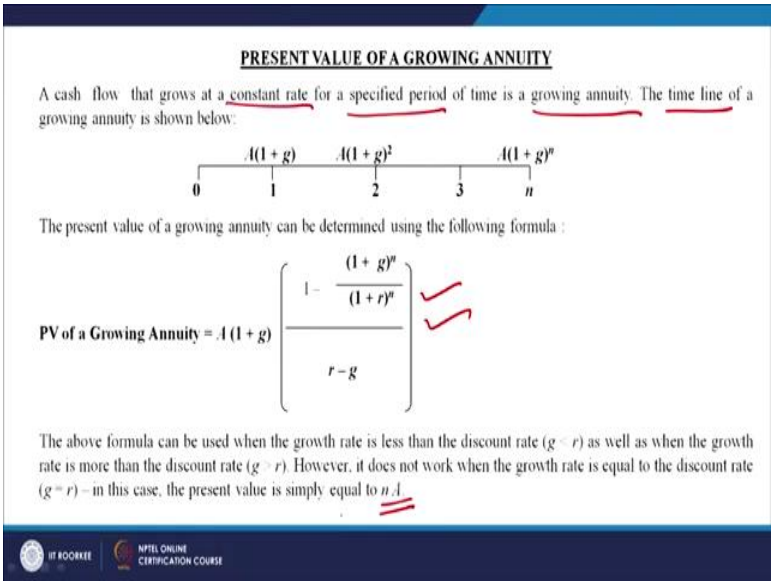
So, in the previous class we were talking about that equated monthly installment or EMI; how to calculate the EMI? This is one of the application of the, your present value of the annuity. So, here all other information is given to us.

(Refer Slide Time: 01:10)



You are given the borrowing amount you are given the interest, but interest is per month here and the repayment period is also given to us in the months. So, finally, you can means make use of this particular model and with the help of this model, you can find out that how to calculate the EMI.

(Refer Slide Time: 01:33)



Now, we will move to the next part and the next part here is that is the present value of a growing annuity. It is means the annuity which is we are going to have or we are going to say earn over a period of time, that amount which is going to come back to us over a period of time is not going to be the same amount, but it will be growing over a period of time that will be affected by the growth rate also over a period of time. So, maybe it is the annual growth rate or maybe semi-annual growth rate or bi annual growth rate, but the growth rate has to be there.

Whether is the cash flow is going to be there with us? That is not going to be the same cash flow, it is going to be the say cash flow with the grown up rate. Now, what is the say the growing annuity? First of all, because we are going to learn about the present value of our growing annuity. So, let us understand what is the growing annuity. A cash flow that grows at a constant rate for a specified period of time for a specified period of time is a growing annuity,

A cash flow that grows at a constant rate for a specified period of time is the growing annuity, it does not remain same, it does not remain constant, it grows over a period of time. The timeline of a growing annuity is shown below. If you look at the timeline, they are more important to know for the timeline, the timeline of a growing annuity is given below to us. And if you look it at, the same normal annuity, timeline of the normal annuity, this is basically called as the ordinary annuity.

So, it means because the cash flow is coming at the end of the year. So, it is called as the ordinary annuity and any annuity on which the cash flow comes back to the investor in the beginning of the year that is called as the annuity due. So, ordinary annuity, annuity due I will discuss with you in the next slides, but here it is ordinary annuity and if for example, if you are not multiplying A with the 1 plus g, 1 plus g is basically the, g is basically the growth rate.

So, if you are multiplying A with the g so, it means itself it becomes a growing annuity. So, in the first year it is 1 plus g, in the second year, it is 1 plus g power 2 then over the number of years it becomes 1 plus g power n, So, means we are getting this annuity certain sum is assured but that is also growing at a given rate of say growth and that rate of growth is the constant rate of growth,

The present value of a growing annuity can be determined using the following formula. Means finally, with the help of this formula, we can calculate the present value of growing annuity and with the help of this model here, what you are doing is only change, we have done here is that earlier it was only A multiplied by the rest of the things.

But now, we are multiplying that annuity value also, that A value also, that cash flow also, which is occurring at the end of the year is multiplied by the growth rate and then in the inside this, this model, you are say writing it here as a 1 plus g divided by 1 plus r power n and here we are talking about is divided by the, earlier it was only r, earlier it was only r, but now, it is r minus g.

So, it means discount rate will also be adjusted against that the growth rate. So, it means a growing annuity when the, there is a growth in the annuity and the discount rate remains the same. So, it means your overall value finally the discounted value of that annuity increases, that goes up, that increases. But here a point of caution is given to us, let us read it what is given here the other formula can be used when the growth rate is less than that discount rate, there are the two important things, r is the discount rate, g is the growth rate,

So, this model is usable only in case r is say, the growth rate is less than the discount rate if the g is lesser than the r or if the g is more than the r. When there is a difference in the g and r, g is something and the r is different, then this model is workable this model is usable, but if the g and r are equal if there is no difference in this in case g is equal to r, if both are equal to for example,

in that case the model will not be applicable and in this case what will be the say present value of that annuity, it will be n A.

So, n means the total annuity which is coming to us. Because the amount it is means the amount of the annuity which is reducing because of the discount factor that is also being appreciated because of the growth factor, So, it means in that case r is equal to g it means how much reduction is coming because of the time value of money, because that cash flow is occurring us 1 year from now.

So, it means the value of that cash flow will not be equal to the same amount I will say coming to us or is available with us in the 0 period. So, that will be what we normally we adjust, When you discount it, it comes down future inflow future annuity when compared as per the today's valued comes down, but when it is supplemented by the growth rate.

So, what is going to happen in future for example, at the end of the 1 year, we are going to get say your 1 lakh rupees and we are going to get 1 lakh rupees, which is growing at a constant rate of 10 percent over the years, but at the same time if the growth rate, if the discount rate is also 10 percent then what will happen?

The value of 1 lakh will be 1 lakh even after 1 year, which is we are going to earn after 1 year, it is going to be 1 lakh is equal to 1 lakh even after 2 years that 1 lakh rupees is going to be there with us if the value of that to 1 lakh rupees coming to us after 2 years will be equal to 1 lakh rupees of the today, because that discounted value the reduction in the value is being made good by the growth rate.

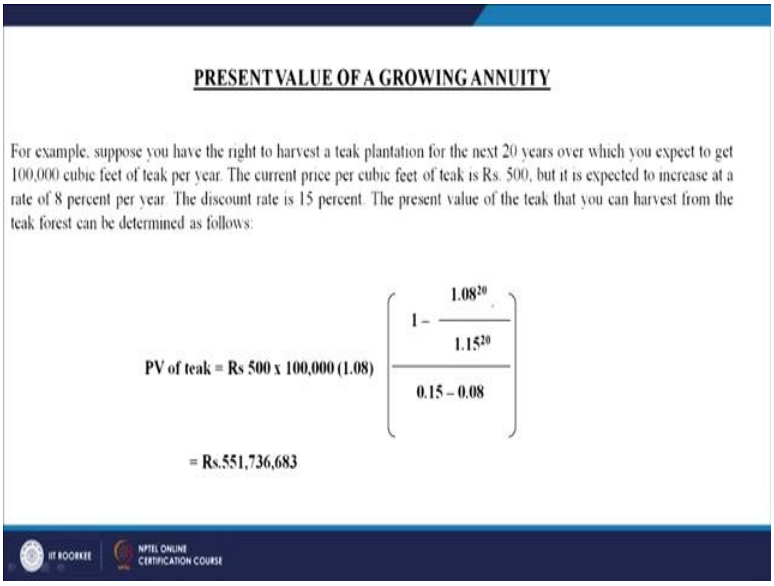
So, if the say r is equal to g or g is equal to r then what will be there the discount they say the present value of the growing annuity will be simply the annuities number of annuities means sum of the annuities, but if there is a difference if the say g is lesser than r or g is more than r in that case, this model is applicable and this model adjust for that if there is any growth rate in the annuities and even that you discount it against certain discount rate.

Then finally the, whatever the discounted value comes or is worked out more than the value of an annuity when it is not growing. Then the value of annuity is constant and you discount it and then sum it up something else will come up some total value different value will come up, but when in this case, if you say get the value, which is growing at a certain rate and then you

discounted. So, increased value will be able to find out, so we will have to adjust here for the growth factor.

So, there is some difference in that simple annuity and the growing annuity and the growing annuity has to be say adjusted for the growth rate and after that it has to be discounted. So, it means if you want to find out the discounted value of the growing annuity that will be certainly more than the discounted value of the simple annuity or the constant annuity. Now, how you can calculate the say for example, this application of the say a present value of a growing annuity. This is one important example or the application of the present value of the annuity.

(Refer Slide Time: 09:02)



For example, suppose, you have the right to harvest a teak Plantation for the next 20 years in 1 field of the teak. We have purchased that field and trees are planted there which we can, which we can have a harvest plantation for the next 20 years means for the next 20 years every year for example, we are harvesting that or every 2 years we are harvesting that for next 20 years that right have been purchase to harvest at the teak plantation and over the next 20 years over which you expect to get 100000 cubic feet of the teak per year. 100000 cubic feet of the teak per year the current price per cubic feet, the, say current price per cubic foot of the teak is rupees 500.

The current price per cubic foot of the teak is 500. What it is expected to increase at the rate of 8 percent. What it is at expected to increase as the rate of 5 percent per current prices, how much current price per cubic feet of the teak is 500 rupees, but it is expected to grow at the rate of 5

percent the discount rate is 15 percent and the say, say the present value if you want to calculate of this annuity which is a growing annuity means here what is happening number of years for which we can harvest the, this plantation of that teak for 20 years,

And we are going to get we ever going to get that say total per year output in that field is going to be 100 and 100000 cubic feet. But the per price, per you say cubic feet is going to be, we are going to sell that say to put in the market for 500 rupees per se cubic feet. But that price of 500 rupees is not static, it is not constant, it is going to increase over a period of time and increase in the price for the same per cubic feet of the teak is the growth rate is 8 percent and discount rate for calculating the present value of this say annuity growing annuity is 15 percent.

So, with the help of this model you are means what you are doing here is you are giving the power of 20 years and then you are finally adjusting it against the growth rate and growth is going to be, so yeah this is 1 minus 1 plus g power 20 and in the denominator also, we are adjusting the discount rate with the growth rate. So, finally, you can call it as a discount factor has come down to 7 percent rather than 15 percent.

And when this because of the growth of the price selling price of the per cubic feet of the teak, final value, which we are calculating here which we will be getting here for this total investment proposal, which the rights we have got for harvesting the teak plantation for the next 20 years is going to be 551736683 rupees.

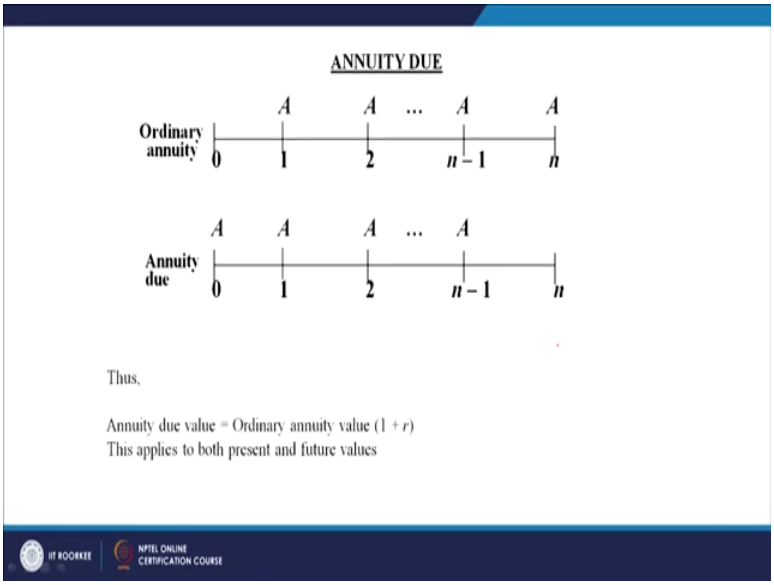
So, roughly you can call it as 500 and 51 million and 7 lakhs almost you can call it a 700 thousands, you call it as 551 million and 700 thousands worth of the teak is going to be harvested over a period of next 20 years period of time, because the selling price is not going to remain the same per cubic feet of the teak plantation The price is not going to remain the same, it is going to increase.

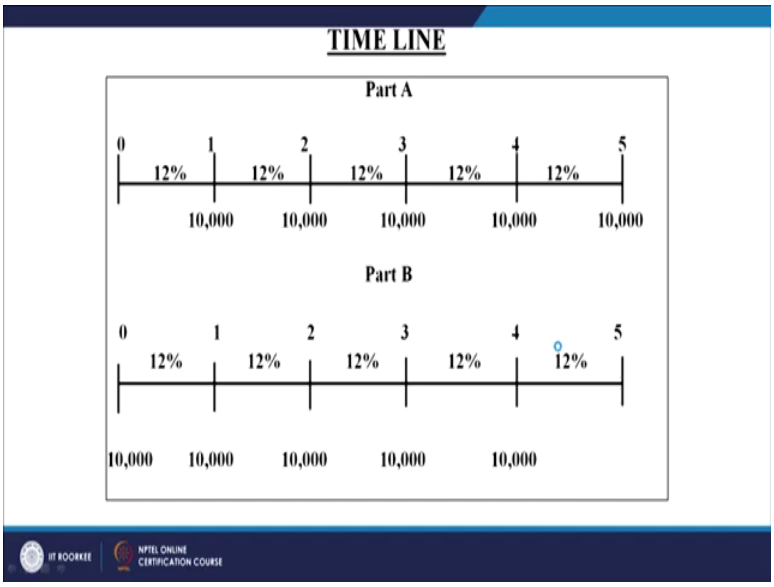
So, what we have done is we have multiplied the price per cubic feet and multiply by the number of cubic feet is going to grow and going to be available with us and then it is multiplied 500 by 100,000 and the growth rate is 8 percent. So, this value of that growing annuity we have calculated first, then factor with the certain other values and the growth rate. Finally, we are going to find out that the total crop is going to be worth 551 more than 551 million rupees, which

is the result of the growing annuity because slowly prices not constant selling prices going up at the rate of 8 percent per annum,

So, this is a growing annuity. So, there is a difference between the say static annuity and the say growing annuity. So, if any annuity is going to grow this inflow, cash inflow which is coming over the period of say subsequent future years is not going to remain the constant but is going to increase and is going to get affected by the growth rate, then you can understand that how to calculate the value of that growing annuity with the help of this model we can easily find out and we can easily calculate.

(Refer Slide Time: 13:41)





Now, I was talking to you about something that is an annuity due, ordinary annuity and annuity due. We should be very clear about it because in the beginning if you remember, I started the process of means when I started the process of time value of money. I say discussed with you are timeline, If you go back, it was a timeline which we discussed. And in this timeline we can go back in that timeline in the beginning, we started that up something about the cash flows, cash flows coming in the beginning of the period or cash flows coming at the end of the period.

This is the timeline I talked to you about in this case, the basic difference here is that in the 1 say structure the part if you talk about cash flow is occurring at the end of the period at the end of the year means at the point 1 not at the point 0 and in this case the cash inflow cash outflow is also occurring at the point 0 cash inflow is also occurring get the point 0. So, this these are the 2 different kinds of the annuities.

So, this is I am going to talk about the timelines here. In terms of the annuity due, so if you talk about what is the difference between the ordinary annuity and the annuity due so we can understand with the help of this timeline again. Ordinary annuity is the one where cash flows occur at the end of the period at the end of the annuity period or normally one year, we also means normally assume it that whenever any investment is made, that investment is made in the 0 period, this is a 0 period during this period we make the investment and this is a period of cash outflows, not of the inflows.

So, when any investment is made in the market, it is made in the 0 period, it works in the market or it operates in the market for a period of next 1 year, 12 months, and then at the end of the 1 year, we get something back in the form of the cash inflows. So, normally ordinary annuity, we assume that the cash inflow will come at the end of the year, but in this case in the annuity due this annuity due is that both the cash inflow and outflow are occurring at the beginning of the year.

Both these cash inflows and outflows are occurring at the beginning of the year, which is called as the annuity due. Here 0 period cash outflow is going and in the same period the cash inflow is coming for example, I told you this in some previous class also, there is somebody say, say purchase the building for 10 lakh rupees, And immediately after purchasing that building for say one million rupees, he rented out that building or he leased out that building to some company or some organization,

Company or any, any maybe financial institution, companies or financial institutions do not prefer to construct their own building or other they say believe in doing the business in the rented buildings. So, somebody purchased that building for 1 million rupees in the year, maybe 2019 and in the beginning of the 2019.

In the same year, he rented out that building and the lease agreement says that first year the rent will be paid at the time in the beginning of the year, when the building will be leased out that the rent lease, rental for that building by the user of that building will be paid to the owner in the beginning of every year and first years rent will be paid, right at that time when the building is leased out.

So, it is coming in the beginning of the say beginning of any arrangement, So, this is coming in the beginning of the year, when it is annuity is the cash flow is occurring at the beginning of the year, it is called as the annuity due otherwise, the normal annuity which we expect is the cash flows occurring. Which we assume that in the zero period in the current period, the cash outflow will occur and over the subsequent years the cash inflow will occur and when the cash inflow will occur that will normally occur at the end of the year, not in the beginning of the year.

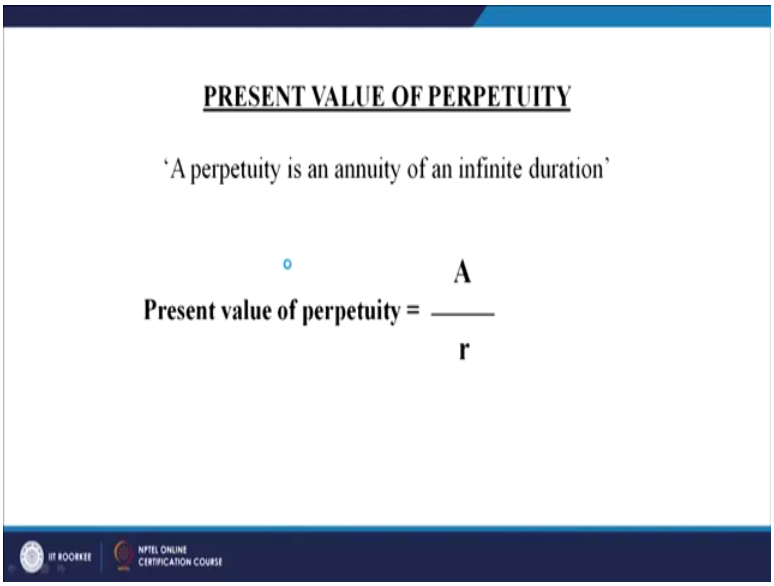
So, the basic difference in the 2 is that annuity due value if you want to calculate the sum total value of the annuity due. It will be something more than the ordinary annuity, because you are going to pay this amount is going to come to us here not at this level. So, the interest for this period you have to calculate, interest for this period here you have to calculate.

So, annuity due is ordinary annuity multiplied by 1 plus r, So, 1 plus r is a period for this interest under ordinary annuity your inflow coming at this point, but under the annuity due your inflow coming in the beginning. So, rather than coming at this it is coming at this point. So, the interest for this period has to be calculated, which has to be multiplied used for multiplying the ordinary annuity.

So, that amount will become the annuity due, so be careful always about the point of cash flow and the period of cash flow these are 2 important things. Time and again I am discussing this point, time of cash flow and the period of cash flow if in the beginning, then it is the annuity due but if it is at the end, then it is ordinary and annuity.

Now, there is another thing which we call it as perpetuity. It is not annuity now, it is called us perpetuity. Perpetuity means something related to the perpetual like something of the nature of the perpetual existence, uninterrupted existence. Perpetual means uninterrupted existence. So, if It may be possible that sometime when we purchase any investment and the benefit of that is going to be there for say unlimited period of time, infinite period of time, unending period of time, that investment is called as the say perpetuity or the perpetual, perpetual investment.

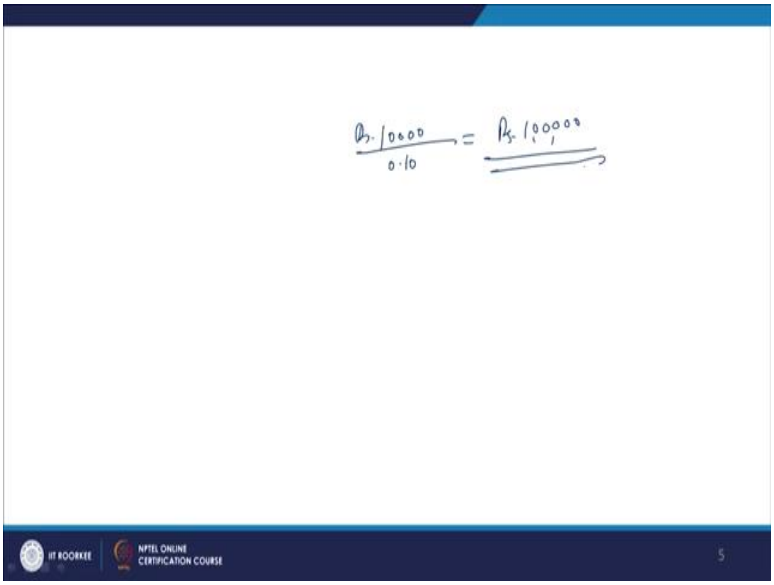
(Refer Slide Time: 19:25)



Now, what is the meaning of it, a perpetuity is an annuity of an infinite duration. A perpetuity is an annuity of an infinite duration. So, infinity is involved here means when any duration which is not countable means on fingers or otherwise are which is not foreseeable, which is an infinite duration.

Once you have got the right over any particular asset, that is going to remain there forever unlimited number of years for the infinity number of years, then that investment is called as the perpetuity and the present value of that perpetuity can be worked out the present value of that perpetuity can be bugged out as it with the help of this formula that A by r, A is the cash inflow is the cash inflow which we are going to find out and the r is the discount rate and otherwise also you can easily find out.

(Refer Slide Time: 20:19)



That for example, A is that 10,000 rupees and r is that say 10 percent that discount rate is 10 percent if you try to find out this amount becomes how much this amount becomes 100 and 100000 rupees 1 lakh rupees.

It means the any perpetuity which is giving us the constant cash flow or the return of 10,000 rupees at the end of every year and the discount rate for that is 10 percent it means the value of that perpetuities 1 lakh rupees. Otherwise also for example, if the, the value of 1 lakh rupees remains 1 lakh it does not go down over a period of time, It is it is not impaired because of the period of time or because of inflation factor or because of any other factor which causes a reduction in the value of the money.

So, you invest that 1 lakh rupees anywhere in any investment and annual rate of interest on that is going to be 10 percent certainly, how much is we are going to get the annual cash flow 10,000 rupees. So, this is called as the perpetuity present value of perpetuity or the perpetual investment where the return comes back or the cash flow occurs for the infinite number of years, unlimited number of years.

It can happen and we can use this also in many business decisions. Now, we will talk about some other interesting concepts shorter compounding period, shorter compounding period and this is a very practical concept these days till now we were talking about the compounding concept, we

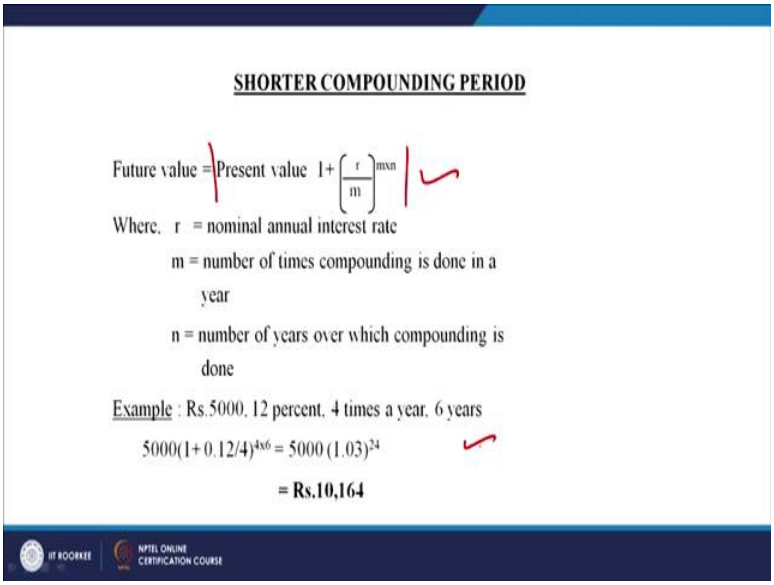
have talked about the discounting and compounding concept. So, till now we were talking about that is that is the, say we discuss the concept of the future value of the annuity.

So, when we are talking about the future value of annuity, it means we were talking about the compound interest there also, but there till now, the compounding the period of compounding was considered as 1 year period of compounding was considered as 1 year that annually the interest has to be compounded.

So, for example, we are investing 1000 rupees at the rate of 10 percent rupees. So, at the end of the year, it will be compounded once in a year. So, that at the end of the year the amount will become how much 1000 plus 100 is 1100, 1100 rupees in between we are not compounding it, but if you are compounding it for a period of more than a year or rather than going for annual compounding, if you are compounding it for the multiple periods within a year, sub periods within a year then how to go for it?

This is a concept of the shorter compounding periods. So, in the shorter compounding periods, what you can do is? You can take here means you have to make some minor change in the say a future value formula for calculating the compounded value.

(Refer Slide Time: 23:12)



In this future value formula, what we are doing it present value and that is 1 plus r divided by M and m is what m is basically the number of times compounding is done in the year, So, what is given in this model if you look at this model. So, in this model you are given certain things and

what these things are, are is the nominal annual interest rate and if for example, if compounding is annually, then we will not divided by m, it will remain r only.

But m is a number of times compounding is done in a year, these days. I told you the compounding is done say, say you can call it as twice a year, 6 monthly compounding, quarterly compounding monthly compounding and these days nowadays if you talk about the banking system in India, then there is a daily compounding on the borrowing also, if you are borrowing or borrowing anything from the bank, they are compounding it on the daily basis.

If we are investing or depositing anything in the bank, we are also getting the interest on the daily basis for daily compound interest. It is not a simple interest, it is a compound interest. So, here r is the nominal annual interest rate, m is the number of times compounding is done in a year and is a number of years or which compounding is done n is the number of year for which the compounding is done.

So, if the compounding has not to be done once in a year, but it has to be done for more than a times more than 1 time in a year, then whatever that interest rate we are going to get back annually that has to be divided by the number of the compounding number of the times of compounding, number of the times of compounding. So for example, we have this information here say 5000 rupees we want to invest.

Rate of interest annual rate of interest is 12 percent and the compounding rate is times of the compounding is 4 times a year and total number of years for which this amount will be invested is 6 years, So, you can with the help of this particular model, you can find out that what is going to be the compound value or the compounded value of the 5000 rupees invested for a period of 6 years at the rate of 12 percent of the interest, where the compounding is done 4 times a year, this amount becomes more than double of the 5000s and this amount works out as 10164 rupees, 10164 rupees.

So, this is the magic of compounding. This is the say you can call it as the power of compounding I would say and the number of times when the compounding increases, when there is the annual compounding the return will not be very high but if it is a quarterly compounding, it will be more and nowadays this is a daily compounding, you can understand how much difference it makes, whether it is the borrowing from the banks or it is the depositing in the

banks, but the sorry part of it is that whatever the interest we earn from the investment in the bank deposits that is subject to the tax.

So, in this entire case means we can answer a question that if the compounding periods are more than 1 in a year, then how to means try to find out the value of that investment, given the rate of interest annual rate of interest, number of compounding times and the number of years for which the investment can be made. One more important corollary of the time value of money is that effective versus nominal rate of interest, effective versus nominal rate of interest.

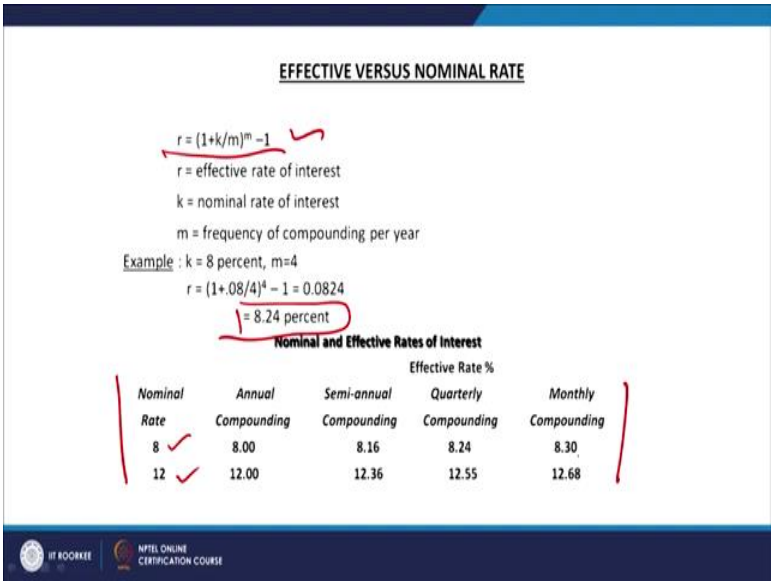
So, what happens that when we go to the bank or any financial institution, we asked them that I want to deposit my say, sum maybe 1 lakh rupees, 2 lakh rupees for a period of 3 years, or for a period of 6 years for a period of 5 years or for a period of 1 year. How much interest will I get, then bank talks in terms of the simple rate of interest or the nominal rate of interest that they say that, yes for the fixed deposit of 3 years we pay 16.25 percent rate of interest per annum.

So, that is called as a nominal rate of interest, but, you see, as I told you that interest will not be a simple interest when it will be calculated, it will be the compound interest, it will be the compound interest. So, on the simple interest daily compounding will be done and on that deposit and when you do that daily compounding. So, what happens the effective rate of interest becomes a certainly more than the nominal rate of interest, effective rate of interest certainly becomes more than the nominal rate of interest.

So, many times you must have heard about that many private companies even banks when they advertise for seeking the deposits from the public, they say that rate of interest is this but the effective yield is this. So, yield on the investment is this. So yield I am talking about is the compound rate of interest. What is the interest rate of interest they are, say they advertise they are advertising for is simple rate of interest, nominal rate of interest.

But practically when it comes back to us provided we do not take the interest back every period every year or every month or every 6 months, we do not take the interest back, if we allow the company to reinvest the back also. So, that interest is known as the effective rate of interest and that is different from that or more than the nominal rate of interest.

(Refer Slide Time: 28:23)



So, in this case, you can calculate with the help of this model, the effective rate of interest can be calculated with the help of this model. And here you can see that effective rate of interest is r is equal to 1 plus k divided by m. The m is number of compounding periods and power m minus 1, r is effective rate of interest, k is the nominal rate of interest, right and m is a frequency of compounding per year and in these days banks there is a daily compounding.

So, this is a compounding and means on the daily basis that say deposits are compound loans are also compounded on the daily basis. So, finally, in this case, for example, a simple rate of interest for example, in this case is 8 percent and m is 4 times a year compounding you will be done 4 times a year.

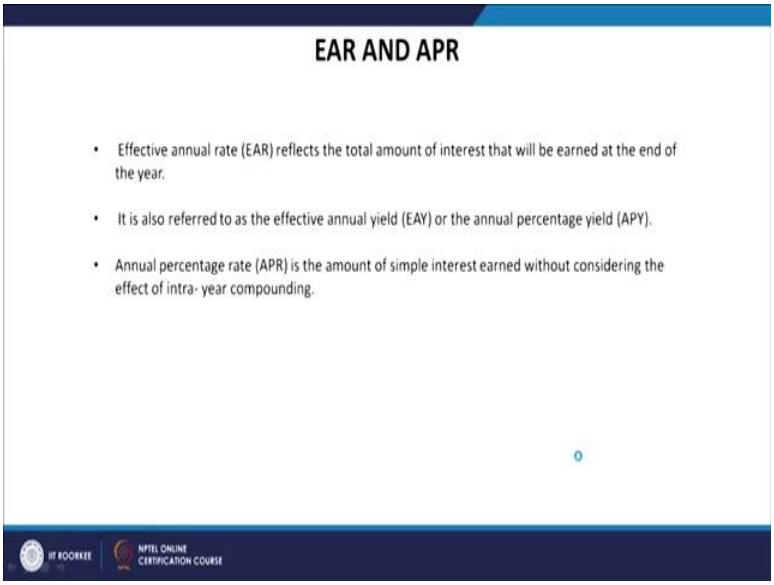
So, r in this case becomes how much this becomes as 8.24 percent. This is called as EFR effective rate, effective rate of interest ERI, this is the effective rate of interest ERI, if as compared to nominal rate of interest the nominal rate of interest is 8 percent, but the effective rate of interest is more than that, that is by 0.24 percent, it is more.

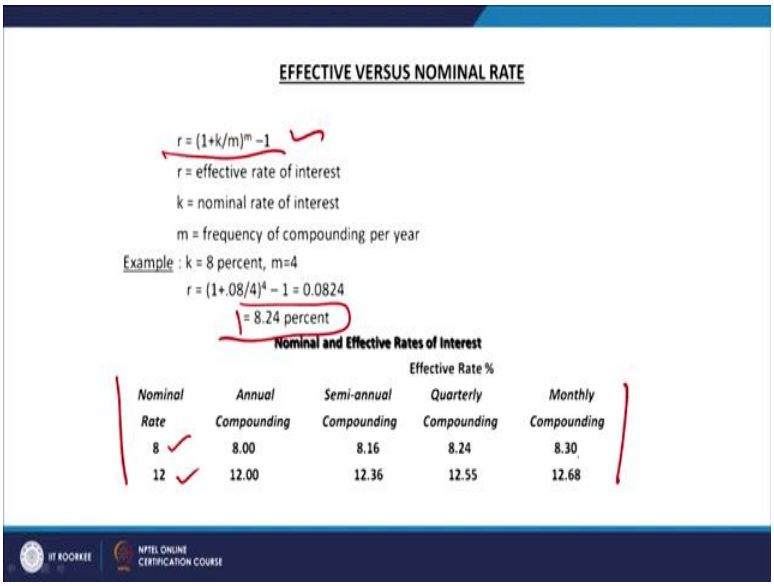
So, it becomes 8.24 percent. So, always be careful when you make the investment in the any financial institution or in any bank always asked for that he has this is a nominal rate of interest, but what is the see effective yield available from this investment and that will be known as the compound say output available. So, here is a chart which has been calculated again in the same book by the Prasanna Chandra, I have taken this directly from that book.

So, nominal and effective rate of interest are given here is some chart is given for example, nominal rate of interest is 8 percent or to 12 percent annual compounding is done once. So, it will become 8 and 12 means, no compounding almost you can see annual compounding. So, at the end of the year you will find it out 8 percent 12 percent.

But if it is semi-annual compounding means every 6 months if it is compound, then it is 8.16 or 12.36, quarterly compounding 8.24 percent 12.55 percent and monthly compounding if it is done. So, actually it works out as 8.30 and 12.68 percent. So, you can understand the magic of compounding, you can understand the power of compounding here, the movement the number of compounding periods increase or times of compounding increase, the effective rate of interest is going to increase at the same speed or the same pace.

(Refer Slide Time: 30:54)





So it means in this case when we talk about here is effective earnings, that effective annual yields and the you call it as the simple say applied rate of interest this EAR and the, APRs. So, in this case you can find out is that see effective annual rate and the annual percentage rate, APR and EAR if you want to find out there is a basic difference and we should be very, as a student of finance, we should be very clear about this difference, that effective annual rate is the one that reflects the total amount of interest that will be earned at the end of the year, total interest which will be earned at the end of the year.

In this case, we have found out is that we will not be earning 8.28 percent but on this investment, if the compounding is done 4 times a year, we will be earning 8.24 percent. So, in this case, the amount of interest that will be earned at the end of the year. It is also referred to as the effective annual yield. I told you that effective annual yield or that annual percentage yield which is called as APY annual percentage yield.

So, there is a difference in the interest and the yield, there is a difference in the interest and the yield when you talk about interest you talk about the nominal interest, but when you talk about the yield you talk about the compound interest. So, if we are not taking the interest back over the periodical intervals, we are allowing this investment to be given once we will be taking it back at the end of that investment period along with the principal and interest. In that case, the, the interest which we will be earning will be the different one and that will be called as the effective annual rate and not that is simply the annual percentage rate.

So, annual percentage rate is the amount of simple interest earned without considering the effect of intra year compounding. This is the simple rate of interest earned without considering the effect of intra year compounding. So, this is a basic difference in the 2. One is the compound interest and second one is that simple interest.

So, when we go for any investment revenue and try to find out what is the interest their offering, whether it is a bank deposits, whether it is any bonds of the companies or any other investment revenue, always be means clear about that if they are talking about rate of interest or they are talking about the yield either rate of interest they are talking about.

So, whatever the rate of interest they're offering, always be sure that the total effective rate of interest annual yield will be certainly more than that, and not the one which is means they are talking about they are simply at the moment they are talking about the simple interest and the actual output or the actual yield which will be called as the effective annual rate EAR that will be certainly more than that.

So, you can compare your investment means in the one revenue with the other revenue in terms of the yield available and not in terms of the nominal or the simple interest available. So, with this, these are some of the, you can call it as that important applications of the time value of money, where we could discuss the different concepts and my objective here was to make you

clear about with the basic techniques of the compounding and discounting, compounding and discounting.

Because time value of money is very simple to understand that our rupee in hand today is not equal to a rupee which will be earned or will be coming back to us after a period of 1 year, rupee earned after 1 year is not equal to the rupee in hand today.

So, there is a difference in the two values of the money because one is going to come back to you after 1 year and currently 1 rupee is available. So, you can compare it say or people say that A Bird in the Hand is Worth Two in the Bush. Same is the principle applied here. So, if you say that you want to take say somebody offers you that you want to take say 200 rupees today, or 300 rupees after 1 year.

So, you can easily understand that 300 rupees coming to me after 1 year or 200 rupees I am getting at the present moment, I think it is better option to get the money what is available that is 200 rupees say presently is equal to 200 rupees, but 300 rupees coming back to me after 1 year is not certainly 300 rupees but less than that. So, there plays the role means there comes the role of the compounding and discounting.

So, when you talk about that, you want to calculate the future value of the present amount, you apply the concept of compounding and if you want to find out the present value of the future amount, you apply the say the concept of, or you make use of the concept of the discounting. So, after compounding and discounting the final value of the cash flows which occur to us and occur out of us is different and we should be clear about that.

What is that amount, how to calculate that amount and how to make use of this concept of the time value of money in the real business decisions. So, with this concept of time value of money, I will stop here, I think I could discuss some of the important concepts and again, I would emphasize upon this all discussion which I could do here is, I have referred to the book that is financial management by Prasanna Chandra if you have any doubt or you want further more information, more problems to be solved about, or you want to have some clarification about that the discussion I am doing here, which some part may not be clear to you.

Though you can ask in the say question forum later on, when the course will be run. But, if you want to have further detailed discussion or learning about what is the time value of money and

how to do it, you can again refer to the same book by Prasanna Chandra, which is a very useful book and you can make use of it for the detailed and the, say, say you call it is a very clear say the learning of the financial concepts, concepts, without any kind of the doubt.

So, for this time value of money, and to learn about this entire concept as a whole. Whatever possible was I could discuss with you. So, I will stop here for this class. And next time, we will move with the next concept of the next important concept of the financial management, which will be of a certainly very good use to the say corporates in their practical life for managing their finance, finances. Well, so this is all for today, that is all, thank you very much.