Financial Management for Managers
Professor Anil K. Sharma
Department of Management Studies
Indian Institute of Technology, Roorkee
Lecture 11
Time Value of Money Part II

Welcome all. So, with the process of a time value of money learning. This concept I started in the previous classes and we are still counting continuing with the same process of the time value of money, because it is very very important concept. And I discuss in the previous class also that if you are a student of finance or the financial management you must be well versed with the concept of the time value of money.

Because at every work of life or at every decision which is a financial decision. We will have to use this concept of the time value of money. So, we are discussing this we are learning it, and I want to spend quite some sufficient amount of time on the different concepts, and different aspects of the this concept of the value of money.

So, that we are clear that in later on, when we discuss the other concepts and techniques of the financial management, or different another say sub-components of this course or this particular area of learning. Then we are very clear about that what we are talking. When we are talking about the cash flows maybe the future cash flows or the say the present value of the future cash flows or anything.

So, means every time we will have to talk in terms of the, say discounted value of the future cash flows or the in terms of time value of money. So, I think we should be very clear about the different concepts of this sub-component that is a time value of money. I talk to you that when you evaluate the new investment proposals of the new projects.

There is very important because cash flows will come sometimes in the future, and the investment we are going to make it today. So, something coming in the future and something going out of our hands today. Both cannot be compared, so they have to make both the figures comparable and for making both the figures comparable.

We will have to have means bring them to the present value. So, every time this concept of the time value of money is important and I am discussing it at, detail I want to spend sufficient time on it. So, in the previous class we discuss just the started talking about it. That how the time

value of money is important? Why it is important? And that we discuss here something that in terms of the present consumption.

As compare to the future consumption or the productivity of the capital or the inflation factor. Because inflation is a one important factor that reduces the say value of the money over a period of time. Because in a growing economy, in a developing economy inflation is a one important factor which means keeps on going up.

So, means when there is more say availability of the money in the market. People start demanding for more goods and services and sometimes when the stock of the goods and services is not growing because we are a developing Economy. So, that leads to the inflation. So, because of the inflation or the inflationary trends in the market.

The value of the money goes down it changes also and you otherwise also in a common means language we can also understand that what we can buy for a say some of hundred rupees today. Probably we cannot buy the same amount of the goods and services 1 year hence, from now. So, it means it is important that because of inflation because of some other factors the value of the money goes down.

And we will have to means evaluate that that how much reduction is there in the value of the money? So, that when the future cash flows you are comparing with the present investment. We have to convert that into the present value.

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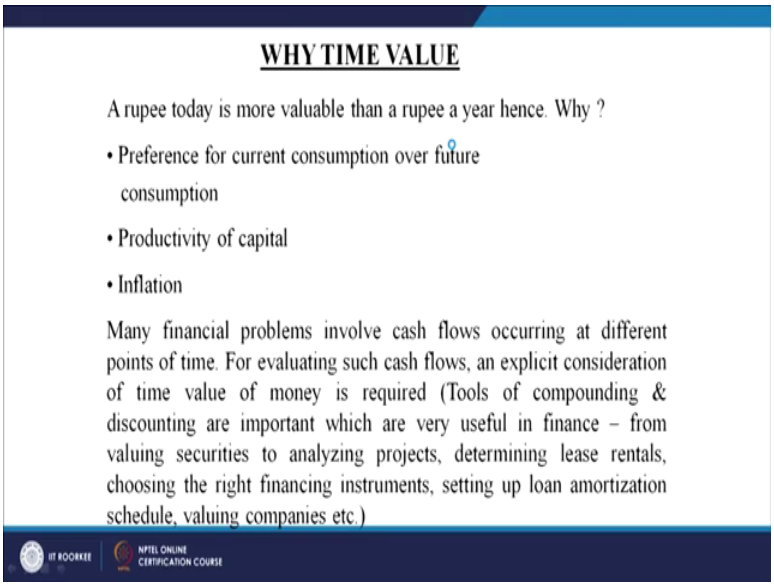

So, just beginning discussion we had about all this and we have seen that we are this time value of money is important. We have seen that right on the valuing single stock, single share or the return available from the investment in first stock of a company. Valuing the whole company or the company as a whole there means lies in between the whole spectrum of the time value of the money lies. So, you can understand the importance of the time value of money.

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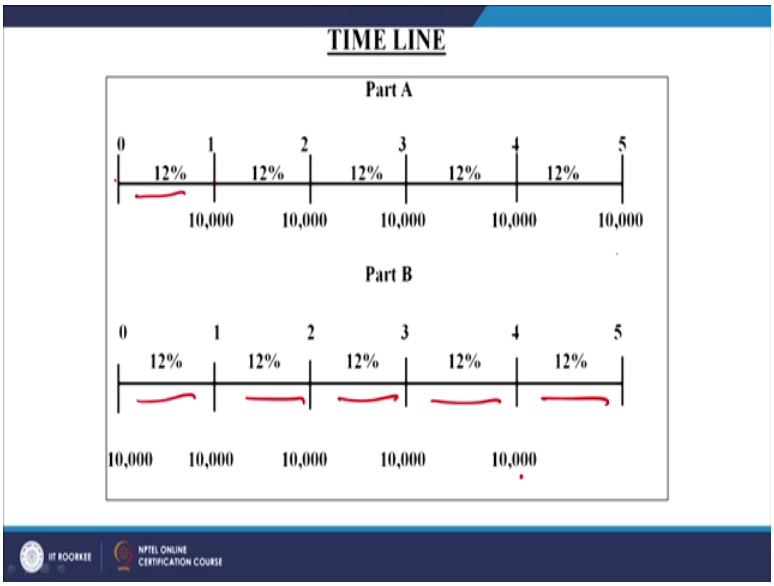

Here is the timeline. When you talk about the something here it is the timeline and understanding this timeline is very important. If you look at this timeline we are given into 2

parts. Part A and part B. In the part A if you look at it the value is same and the percentage. The rate of interest or the discount factor is also same. But there are some points were this values are put at different points in the 2 structures.

In the structure A now, we are talking about that we? The how many periods? We have the 6 periods 0 means present year present period, current period, 1 is the next 1 year, second 1 year, third 1 year, and then the fourth next year and the fifth next year. So, it means we have the, this is a 0 period is a current period. Maybe 2019 and then 2020, 21, 22, 23, 24 like this is the future number of years are given here in timeline.

In rate of interest, cost of capital or discount factor whatever you call it as it is the 12 percent and this cash flow is 10000 rupees. Now, this cash flow shown at 10,000 is at the say end of the or you can call it as here we have shown it as the beginning of the say or at the end of the say year 1. So, when you talk about here the end of the year 1, it means this cash flows are occurring to the firm.

That this investment has gone into current period whatever the investment we are making we have made that investment in the current period and then against that investment now from that project from that total investment. Cash-inflows are available, so first inflow is available of 10000 rupees that is at the end of first year that is at the end of the first year.

Second cash flow is available at the end of the second year. Then it is the end of third year that at the end of the fourth year and that at the end of the fifth year, the cash flow is available. Now, here this timeline shows that some cash flows cash-inflow are available at the end of the year. So, we have the 2 important points to be born in mind here that the point of cash flow and the period of the cash flow.

So, if you are talking about the point of the cash flow though this is are the 2 points. Point 0 and this point and this point this is the beginning point, this is the end point. For example, and this is the 1 period. This period is from 0 to 1 year, this period is 0 to 1 year. So, this at the end of the first year how much cash-inflow is coming? Back to the firm which he has made the investment in the 0 period?

Then the second cash flow is coming at the end of the second year. Third cash flow is coming same 10000 at the end of the third year at the end of the fourth year and fifth year. So, and so

forth, so this are the cash flows are coming when it is given at a point that is from 0 to 1, their the 2 point this period is connecting period from 0 to 1 from current to the next 1 year a period of 12 months, and that period of 12 months ends at the end of the first year.

So, currently in the 0 period at the current time you made investment use that investment for the 1 full year in that project, and at the end of the year at the end of the first year we got the inflow of the 10000 rupees. Then second, third, fourth and fifth? So, these inflows are coming at the end of the year and if you look at the second structure here you talk it about here we also have the again the points. And this points are 0 to 1, 0 is the 1 point, 1 is the point.

But the cash flow is shifting from the right hand side to the left hand side. So, here when we are showing that the cash flow is coming towards, so it is not coming at the say end of the first year but at the beginning of the first year. It is coming at the beginning of the first year so when any cash flow is coming at the beginning of the first year, it means that has to be discounted in that way and when it is coming at the end of the first year it has to be discounted that way.

Now, for example, when you talk about when we are making this investment in this 0 period in the current period. Whatever that investment for example it is not given here, but whatever the investment we have made here is for example, that investment is 40000 rupees, against that investment of 40000 rupees in the 0 period. We have got the first inflow at the end of the first year, 10000 rupees. So, what you have to do is now this 10000 rupees are not equal to what is the 10000 rupees at the 0 period.

So, now to make this 10000 rupees equal to this 10000 rupees in the current period, you have to discount it against the factor of 12 percent. Then the second 1 has to be discounted for 2 years at the rate of 12 percent, this for the 3 years at the rate of 12 percent, this for the 4 years at the rate of 10 percent, and this is for the 5 year at the rate of 10 percent. So, when you discount this cash-inflows by applying the say power Sn that number of years.

Then you will find it out the discounted value of this 50000 rupees 5 cash streams of the 10000 rupees each will become something that will be discounted value and that has to be compared with the initial investment of say 40000, or 35000 or 30000 rupees and then final decision has to be taken whether this investment should be made or not. In the second case when you talk about the inflows are occurring at the beginning of the year.

So, again its connecting 2 points and the 1 period is here that is 0 to 1 this is a second, point 1 to 2, this is the third and fourth period and fifth period. Periods are same periods are nor changing. Discount factor is also same that it is also not changing, but what is the difference here? That the when we are making the inflow sorry outflow, when you are making the investment in the 0 period. The inflow first inflow is also coming at the beginning of the first year it means at the beginning of the first year, means 0 period itself that inflow is coming.

So, it means when that inflow is coming at the beginning of the year means beginning of the first year is the 0 period in that case this 10000 is equal to 10000, the value of the 10000 is equal to 10000. This will be discounted for 1 year this will be discounted for 2 years, this will be discounted for 3 years, this will be discounted for the 4 years. Because this cash flow is coming at the beginning of the year so this is coming 1 year in advance. This is coming 1 year later, so here when you will applied the first cash flow as we discounted for 1 year.

Whereas, in this case the first cash flow has not to be discounted at all because it is coming in the beginning year. Which is equivalent to the value of the value of any investment we are making or inflow we are getting in the current period. So, here discounting will differ the points we have to think about at what point the investment the inflows coming back to us and for what period. This is what the period but this inflow is coming in a advance to us.

In the second period from 1 to 2 for the second year, the inflow is coming at the beginning of the year it may be possible that for example, we have made some investment in some assets. Both the options are both the situations are possible that for example, we have made some investment for some asset and that asset is rented out?

Here in this case that asset is rented out and the rent agreement that asset is leased out. So, the rent agreement is that at the beginning of every year the rent will be paid by the borrower or the person who is using that asset, or to whom it has been rent out. It maybe machine, plant building machinery anything that he has to pay the rent in the beginning of the period not at the end of the period.

So, what is happening? B purchase a machine for 100000 rupees and or for the 50000 rupees and we rented it out.. And so it means in the 0 period our outflow is how much? 50000 rupees? So, that 50000 rupees is equal to 50000 rupees or that 40000 rupees equal to 40000 rupees whatever

the price of the machine, and then it is rent out to somebody for the use then it was the agreement condition in the agreement that while you will receive the machine for using before means you start using you will pay back the first year rental value back to the supplier.

So, it means in the 0 period the investment is 40 or 50000 rupees and the 0 period itself maybe in the beginning of the first year the first cash-inflow is coming and that is 10000 rupees. So, it means the first 10000 is equal to 10000, remaining that again the 4 stings of 1000, 10000 rupees each. They have to be discounted for different periods.

So, the second one has to be discounted for 1 year this has to be discounted for 2 years, this has to be discounted for 3 years, and this has to be discounted for the 4 years. Whereas in this case it is again connecting 2 points, point 0 to point 1 and the period becomes the first year, 0 to 1 is the first year the total 1 year period is first year.

But the cash flow is occurring at the end of the year. So, when it is occurring at the end of the year it means all these 5 cash flow have to be discounted against this discount factor of the 12 percent. Whereas in this case we have to discount only 4 cash flows for a period of 4 years maximum and the first one has not to be discounted because it is occurring in the current period.

So, timeline is very very important you have to be very careful when the cash-inflow is occurring from any investment from any project when the cash-inflow is occurring if it is occurring in the beginning of the period, then the discount the period of the discounting will be different. And if it is occurring at the end of the say year then the period of discounting total period of discounting will be different

So, we have to be very careful number 1 is the point of cash flow and the period of the cash flow. If you talk about the point then here it is occurring at the 0 point, here it is occurring at the point number 1. So, at this point this is occurring at this point, this is occurring at this point. This need to be discounted because period of the 1 year is already over.

So, whatever the cash flow is coming to us after 1 year, that cannot be equal to the cash flow coming in the current period that to in the 0 period? So, this timeline is very important while understanding the concept of the time value of money.

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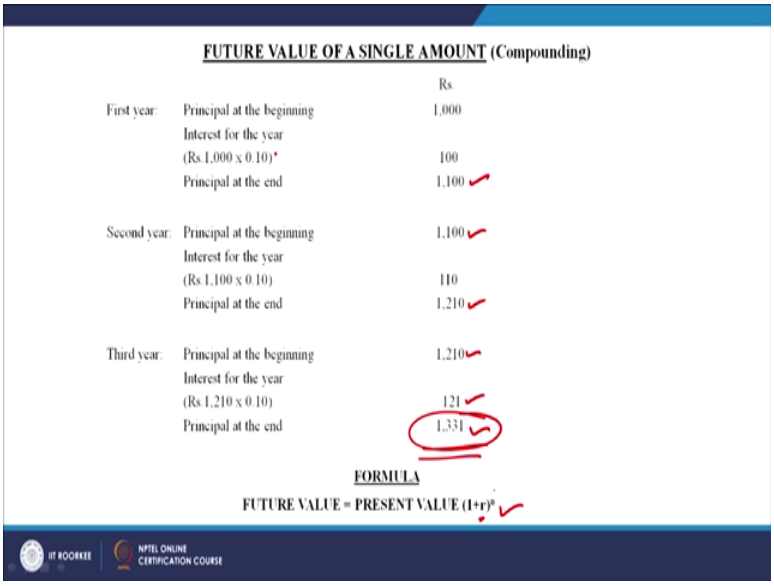

Now, we will discuss some important things I told you in the previous class also that in the time value of money, we will talk about we will try to learn about the concepts of future value of the present say cash flows future value of the present investments and the present value of the future cash flows.

These are the 2 important things we have to means make use of and we have to learn about it. Normally we confront with the 2 kind of decisions that we have certain amount, the sum in our hands we want to invest that in the market. And we want to find out that after certain period of time if I invest this 10000 rupees, after 5 years periods of time what will this 10000 rupees will become? For a given rate of interest.

For example, another way around if we make a investment of some amount in the beginning say 50000 rupees we invest in the market. And somebody says that after 5 years I will returning back 80000 rupees. So, you are now means this major question which comes in our mind is that if I am giving 50000 rupees in the beginning of a period and then after 5 years that user of those funds is returning back me 80000 rupees, then how much interest I have earn that is the annual rate of interest is going to be how much?

So, this is regarding the say the future value of the present investment or the cash flows. And second question comes up is the present value of the future cash flow. Whatever the investment we make in the market in terms of the projects or may be any kind of investments were the cash-

outflow occurs in the current period in the 0 period. But the cash-inflow comes over a say period of subsequent number of years.

So, then we have to compare the 2, I have in time and again I have been say emphasizing upon that the time value of money is important for the investment proposal also. So, here for example we learn about first we will learn about the future value of the single amount. Then we will learn about future value of an NOT, similarly we will learn about the present value of the future cash flows.

Maybe if they are even same cash flows are occurring. For example, in this case when you talk about we are getting the same cash-inflow of 10000 rupees at the beginning or at the end of every year. So, you have 2 situations either the cash flows in remaining the same or that cash flow is uneven. Normally the cash flow becomes uneven because when we receive that back over the number of years, that remains uneven and uneven cash flow has also to be discounted, so we have to solve this problem also.

So, future value and the present value this are the 2 important things we have to learn in this entire process of the time value of money. So, now I am just going to talk to you about is the future value of a single amount. If you talk about the future value of single amount. So, it means for example, we are saying here that there the 3 years given to us the period of 3 years given to us and what is happening here?

That we have a principal amount of the 1000 rupees which is invested in the beginning of the year..? The rate of interest is 10 percent. Interest for the year is 10 percent. So, what will be the amount of principal amount? That the principal amount will become 1100 at the end of the first year. Second year now, we are reinvesting back this 1100 rupees, and again the rate of interest is 10 percent.

So, this amount will become 1210, third year now this amount is reinvested back and we have the again same rate of interest and that rate of interest is say again 10 percent. This is added into it so at the end of this year, so total amount comes up is 1331. This amount is 1331 is the total amounts, so you can call it as 1000 rupees invested in the beginning of the first year at the rate of 10 percent has become 1331 rupees at the end of the third year.

But here you have to be very careful that we have to be very careful that which rate of interest was it. It is only the 10 percent is given to us here, 10 percent rate of interest is given to us, Rate of interest are of the 2 types, 1 is simple interest second is the compound interest. 1 is the simple interest second is the compound interest, and we will learn about the magic of compounding which is a very very interesting magic and it means grows increases normally money in the geometrical progression.

And means under the compounding say process. What we do is? We make investment or some basic amount and we earn interest on that after certain period of time. But we do not take the interest back from that investment. And that investor or the fund manager reinvest the interest earned on the first period, again back for the second period.

So, second period the base of the investment increases. As in this case we have seen 1000 invested in the 1st year we earned interest of 100 rupees so second year this amounts become 1100. Their could have been the another option available with you that the investor could have opted for that interest part I will be withdrawing every year and only principal amount has to be invested for the second year and the third year or maybe for the any number of subsequent years.

So, in that case that will become simple interest that interest whatever the interest you are getting it is that will become simple interest because you are getting that interest stream of say for example, in this case you got the interest of 100 rupees that you withdraw, or the fund manager has paid you the interest. So, again how much is left with us 1000 rupees.

And 1000 rupees we are investing back for 1 more year again 100 rupees is available. So, that is a simple rate of interest. So, here when you are calculating in this way when the interest earning is also reinvested back along with the principal amount. This process is called as the process of compounding and by say using the compound rate of interest, you can calculate the future value of any present amount and when you apply this concept this is the way how this process works and the future value of a single amount applying the compound rate of interest of say here in this case 10 percent become this 1000 rupees becomes 1331.

If you want to see how does happen because it is only very simple figure of the 1000 rupees and the rate of interest is 10 percent and only for a period of 3 years. But you talk about the

investment of the millions and billions of rupees. Which has to made for the next 20 years. And they there we have to means say calculate the interest rate or we have to find out the compound amount or the final amount it is becoming after 10 years or 15 years or 20 years.

There this simple calculation will not work, you cannot do it manually, you cannot do it with calculator. You have to use the say well measure say efficient. IT systems softwares were this all your formulas and everything is fade and automatically when we give the values, you put the values of any investment amount you want to make invest, rate of interest is this and period is this.

Immediately the result comes out from your computer that this amount is going to be this after the end of this desired amount of the period. That maybe a period of 10 years, 12 years or 15 or 20 years. So, what we have to is there is a formula clear cut model given to us is . Future value model is given to us and what is the future value of model? Present value present value in this case is 1000.

Present value into 1 plus r power n. 1 plus r is r is basically what is this? Rate of interest. And what is n? Number of years. So, if you multiply the present value with the 1 plus r maybe the interest factor and for the number of years with the power of say number of years. Then you can easily find out any amount will become how much for a given rate of interest.

But here the important point here is you should be knowing all this 3 things. First should be knowing the present value or the investment you want to make. Then you should be knowing the say the rate of interest, which somebodies offering where the investment is going to be made. And third important thing is the number of years for the, for which the period for which the investment is going to be make.

If this 3 things are known to us. By applying this model we can calculate the fourth thing and the fourth thing is that how much that present value investment that we are going to make in particular revenue will become how much. ? Will become how much so this is a the sub the process of compounding. And this is used for calculating the future value of any amount provided that is the single amount.

Now as I told you that for the small this calculation you can directly do it with the help of calculator or manually or maybe in any way you can do it. But for the bigger investments you

have to use a say very very sophisticated IT softwares. So, for the facilitation of calculating this future values of any amount we are already given this say multiplication factors?

This factors are already calculated in any book, good book on the financial management. The one which I am following that is a financial management by Prasanna Chandra at the end of the book the table is given and from that table all this values can be found out. ?

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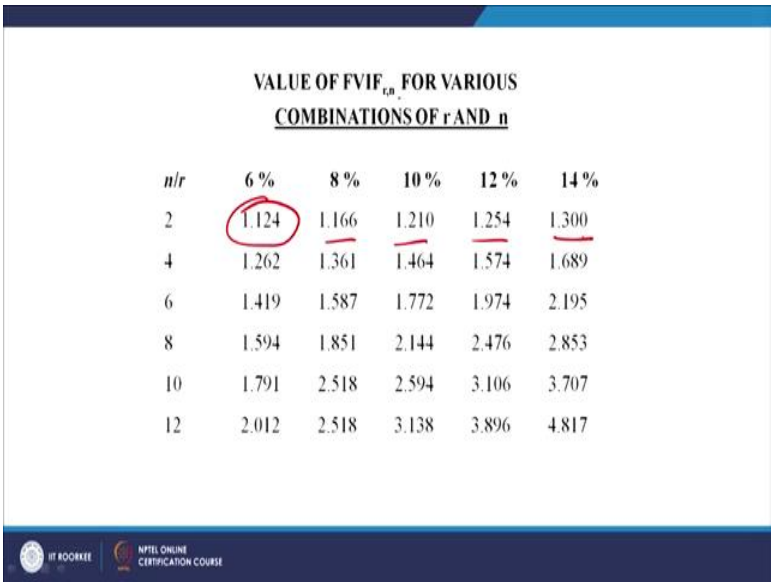

n/r	6 %	8 %	10 %	12 %	14 %
2	1.124	1.166	1.210	1.254	1.300
4	1.262	1.361	1.464	1.574	1.689
6	1.419	1.587	1.772	1.974	2.195
8	1.594	1.851	2.144	2.476	2.853
10	1.791	2.518	2.594	3.106	3.707
12	2.012	2.518	3.138	3.896	4.817

So, for example, we are given here the different rates of interest horizontally 6 percent, 8 percent, 10 percent, 12 percent, 14 percent. And on this vertical side we are given the number of years, 2 year if the period of investment is 2 years and the rate of interest is 6 percent. Whatever your basic amount is you want to invest you multiply this by this factor 1. 124. You can easily find out the value coming out will be the value which will becoming after the period of 1 year, after period of 2 years. ?

So, with the help of this table this is called as a future value inter factors table. So, with the help of this you can easily, find out and this future value interest factors are worked out. For the different say durations by assuming the certain rates of the interest which are prevailing the market. So, this tables which are pre calculated available almost at the end of every book of the good book of the financial management, you can make use of it.

So, simply you multiply any investment 1000, 2000, 20000, 100000, 200000. By say this future value interest factor and you will find out the amount which is becoming something like this.

Now, for example, if you look at this factors you there is 1 important point to be born in mind. This factors are 1 point something they are more than 1. This factors are more than 1.

So, it means you can easily find out that if you multiply any amount by this factor or this factor or this factor or this factor that amount will become more than what it is currently with us. And what is that more than? That is just 1 plus r power n 1 plus r power n. So, your amount will become there is a present value and plus interest on that and interest for that number of years, so that amount will become.

So, this table is automatically showing always 1 point something, which is more than 1. So, your investment will always grow from the present value always it will be more than that. So, this table is you are finding it out here is that all the factors are 1 point something which is more than 1. Whereas if you look at the table of the present value in interest factor.

Pvif table there the factor will be less than 1. It will be 0 point something. Because we know that the present value of the future cash flows will be lesser when you convert that into the present value, future cash flow value. When it is converted into the present value it will be lesser than what we are going to receive in the future.

Practically it is going to be lesser in the today's term. So, that factor will automatically be less than 1. But this factor is more than 1 because you are calculating the future value of the present investment. So, that will grow because of the interest plus the number of years for which we are making the investment in the market. Then now we talk about the certain say related concepts with the future value of a single amount and other things.

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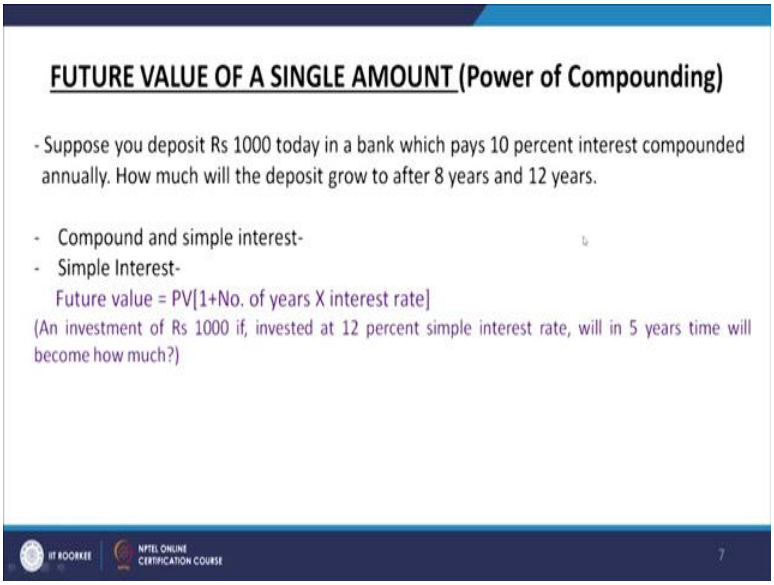

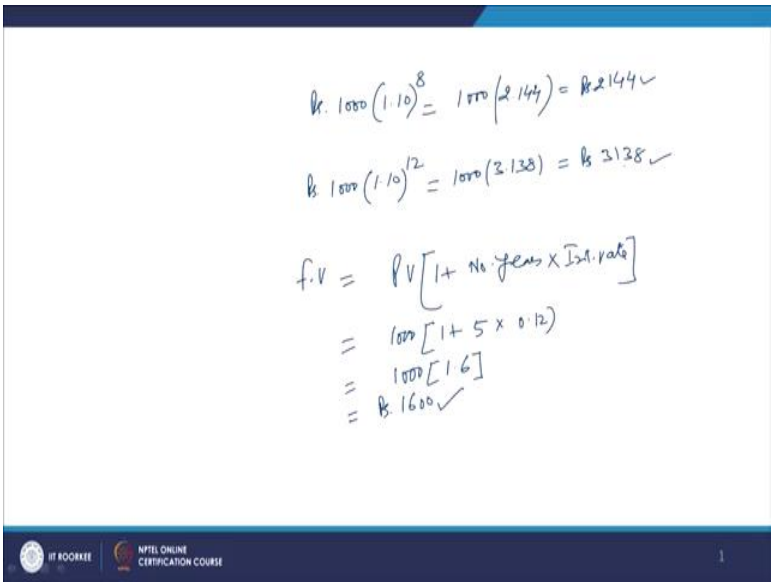

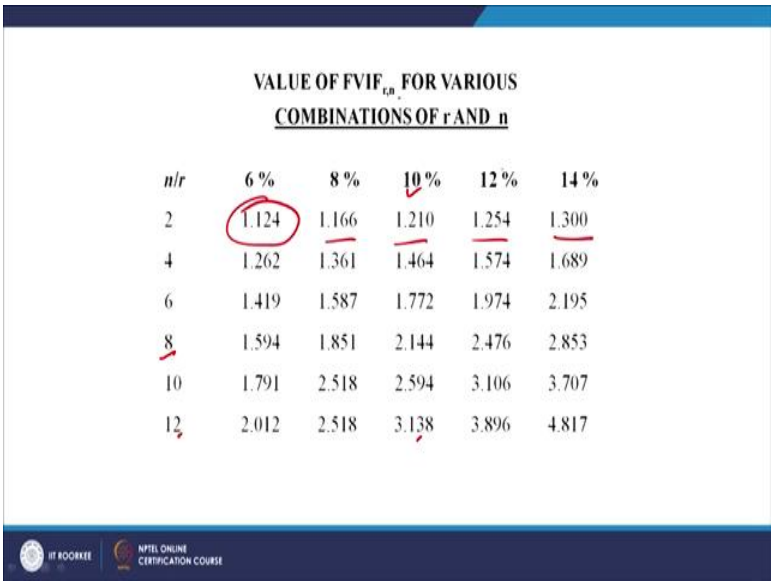

Now, for example we are given a small problem here suppose you want suppose you deposit rupees 1000 today in a bank which pays 10 percent interest compounded annually. Suppose you deposit rupees 1000 today in a bank which pays 10 percent interest compounded annually. How much will the deposit grow to after 8 years and 12 years?

Now, you see very simple thing that because the 10 percent interest which is compounded annually. Annual compounding this is the process of the annual compounding. So if you want to calculate it here, you can easily find out that how you can calculate this the amount given to us is how much is the amount given to us that is a amount is 1000 rupees? Which you want to deposit in the bank rate of the interest bank is given us 10 percent compounding is annually.

And the period is we are given the 2 periods 1 period is 8 years and the second period is 12 years. So, now how you have to put it? How you make it? So, this is the investment of how much is the investment? This investment of 1000 rupees we are going to make and what is the, this increase? The rate of interest and power is 8 years we are going to make the power is 8 years.

So, if you do like this you can find out some value, and in the second case when you are going to talk about is it maybe period of 12 years, so it is going to be how much? 1.10 and only the period is going to change. In the first case the period is 8 years power n. So, in the first case the period is 8 years. In the second case the period is 12 years.

So, if you give the power n, so what will be give this it is 1000 for example, can be go for this we can find out the factor if it is further 8 of 10 percent than for the period of 8 years. Now, let see if

it is given this values given to us or not. So, this rate of interest is 10 percent. And period is 8 years. So, this is given to us. So this is a period of 8 years, this is a rate of interest is 10 percent.

This is also given to us 10 and period of 12 years also given to us this is this. So, what will do our job is very simple now you will have to multiply this investment with this factor. So, what we are going to do here is we are going to do multiply by that factor and what are the factors we have seen from the table the factor is 2 point 144 this is the factor if you multiply this, this investment becomes how much rupees? 2144 this investment becomes 2144.

In the second case what is the factor? If you look at the factor here and if you go back and if you try to find out the factor. Factor is 3.13 3.138. This is the 3.138 and if you say multiply this 1000 with this factor 3.138. So, what will be this this investment will become 3138. This investment will become 3138. So, job is very easy because this factors are easily available with us.

Otherwise what was the case? You had to apply that model. 1 that present value 1000 into 1 plus r power n. So, you had to write there 1 plus the r is the rate of interest is 10 percent and power is 8. Same is the case with the second so we not need to do any all this calculation no or fresh this information is available from the future value interest factor table from there you pick up only you should have to know is the rate of interest and the number of years.

If this 2 things are given to us, you can simply apply the present investment or the present value of the investment, with that factor future value interest factor and you will find out the amount. In this case if 1000 rupees invested today for a period of 8 years and the rate of interest rate is 10 percent, and compounding is done annually. Then this amount will become 2144.

In the second case if 1000 rupees is invested at the rate of 10 percent for the period of 12 years and the compounding of the interest is done annually. Once in a year compounding takes places then this amount of 1000 rupees at the end of the 12 years will become 3138, very simple. So, now you can understand here the compound interest.

The magic of compounding for example, if you calculated as a simple interest for a period of 8 years and simple interest for period of 12 years this will not become this much. This will not become 2000, 1000 will not become 2144 at the end of the 8 years. Similarly, the 1000 will not become 3138 at the end of the 12 years. It will not become like this.

So, just because of the magic of compounding power of compounding this figure has grown up to this. So, this figure of 1000 has become 2144? Now, this days must be hearing about the period of compounding has come down. If you go to banks or financial institutions then the compounding is now the period of compounding is being reduced.

It maybe half yearly compounding it maybe quarterly compounding, and it maybe monthly compounding. And this days if you talk about in the banks there is a daily compounding. There is the daily compounding that on both the borrowing also on the landing by the banks also there is a daily compounding. If you borrow any money from the bank whatever the loan you are borrowing from the bank.

The interest bank is charging that is being compound on the daily basis. They are calculating the interest on the daily basis and on the today interest means tomorrow what will be the amount outstanding in your loan account? The borrowing the total for example, you borrowed 10000 rupees for a period of 1 year and you have not paid anything.

So, the day you have the amount has been transfer to your account or you have withdrawn that amount from that day onwards. You have not return any amount any solvent back to the bank. So, bank will start calculating the interest, and the interest is for a at the rate of 10 percent for a period of 1 year we have borrowed 10000 rupees.

So, at the end of the first day evening. This amount will become 10000 plus the interest at 10000 at the rate of 10 percent for that particular day 1 day. So, next day that second day in the beginning of the second day morning that loan amount will not be only 10000. It will be little more than 10000 because interest for 1 day at the rate of 10 percent has been added. So, this is called as a concept of the daily compounding.

Same is the case it is being done on the deposits also. When we give the deposits in the bank so there they are also doing calculating now the interest on the daily balances. So, daily compounding is being done. So, now you can understand how complex it is even if doing the annual compounding once in a year when we have to do the compounding, we have to apply that model of present value into 1 plus r power n.

So, if you are doing if you are means lowering down the periods. It means in 1 year the 365 days and 365 times you have to compound the amount. So, this is not manually possible we have to do

it with the very efficient IT systems. When there was no IT system available in the banking system or in our financial institutions.

Then compounding was being done very see simply once in a year annual compounding was there. When then we started introducing the IT systems compounding came down to say 6 monthly compounding. Then it came down to quarterly, then it came down to monthly, then it came down to means this days now it is a daily compounding.

Both on the borrowing, both on the deposits. The in the banking system the compounding is done on the on the daily basis. So, your amount is also growing at a very faster rate means the loan amount is also growing at a very faster rate. So, whatever you are borrowing today and whatever you return totally at the end of the period back to the bank, there is a big difference.

Banking charging a high amount and same as the case with the deposit. What you are depositing today and what you are withdrawing. For example, if it is a fixed deposit what you are withdrawing at the end of that say fix term that is a difference in the 2 amounts. But there is a another important point of caution here or maybe not caution, I would say but of interest that though the compounding has become daily.

But the rate of interest has come down. The rate of interest has come down. If you talk about the deposit. There was a time means in the 10 15 years back the banks were paying us 10 to 12 to sometime 15 times percent rate of interest. This days now the rate of interest has come down to 6 percent on the fixed deposit of 3 years and more.

And on the saving deposit it is some were 3.5 percent same is a case on the loan also the interest rate has come down. So, in both the cases means if the compounding has become very very robust. So, the interest rate has come down. So, we are being compensated because of the 1 negative factor we are being compensated by the 1 positive factor as per as the loans is concerned but in case of the deposit.

Yes we have been benefited by the daily compounding but the rate of an interest has come so down and it is for the tax also. The interest pay earning, so that say investment in the banks has not become has not remained as very very lucrative, or very very rewarding. But this is the concepts of compounding which I thought of discussing with you.

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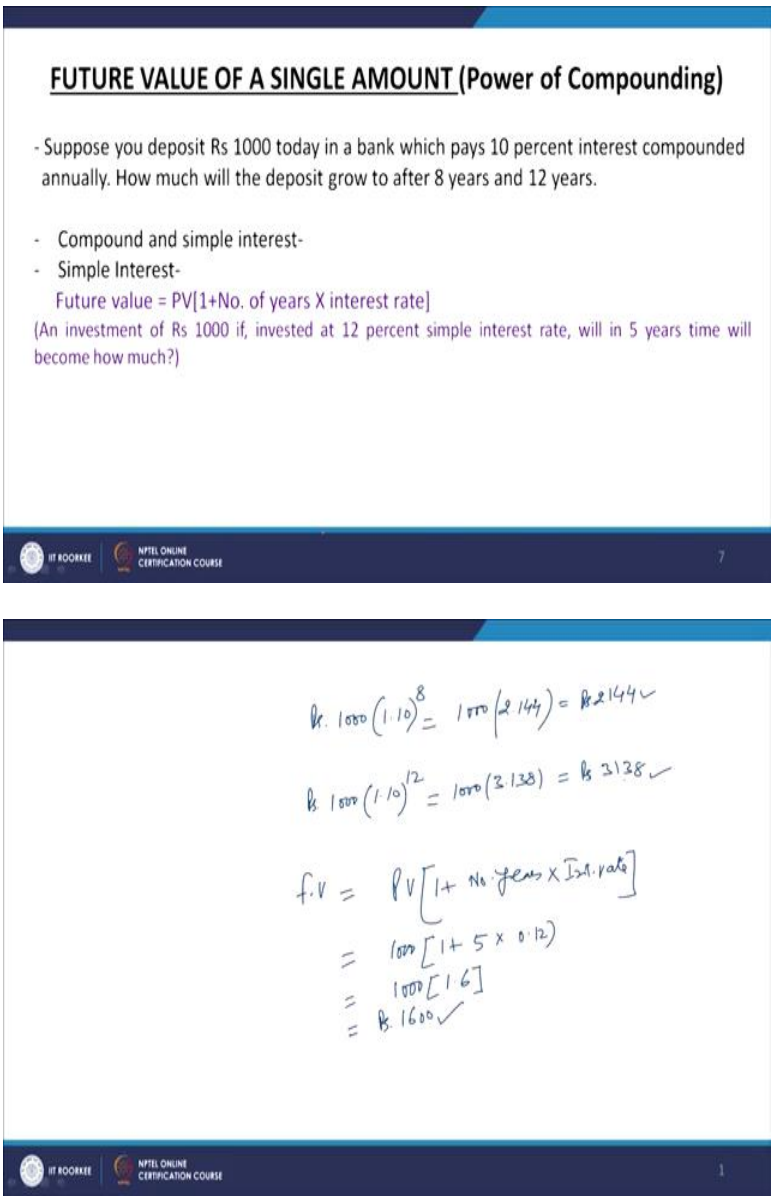

Now, we talk about the say simple rate of interest. If you talk about the simple rate of interest. So, in the simple rate of interest what we are doing? We are calculating here again the future value we are calculating, but the model is different. The model is different there the model was 1 plus r power n. Here the model is present value into 1 plus number of years into interest rate.

That is 1 plus number of years into interest rate. For example, this is the model is different there was 1 plus r the simple rate of interest. But here we are talking about 1 plus number of years into interest rate. So, and no there is no power n because no compounding at all. So, this is only for the means given number of years, simple rate of interest.

So, this difference in the model will tell you that there is a difference in the two kinds of the rate of interest. Now, here for example we given this information an investment of rupees 1000 if invested an investment of rupees 1000, if invested at 12 percent simple rate will in 5 years time will become how much? For example, an investment who is 1000 if invested at 12 percent simple interest rate will in 5 years time become how much?

1000 rupees invested at a simple rate of interest of 12 percent in 5 years of period time, how much it will become? So, what is the formula here, PV Present Value here Present Value plus number of years into interest rate. So, how we can calculate this that is the present value. We have to calculate now the future value.

So here it is the present value into what we have to do here is? That is 1 plus number of years the model says 1 plus number of years into interest rate into interest rate into interest rate. So, I think this is the model we have taken 1 plus number of years into interest rate 1 plus number of years into interest rate and what is the amount given? 1000 12 percent and 5 years.

So, here we have to take is present value how much? 1000 and 1 plus number of years is how much? 5 into what is the interest rate? Rate of interest is 12 percent. So, you can call it as 0.12 if you multiply if you solve this how much it become? 1000 into 1.6. This becomes 0.6 so if you multiply 5 0.1 to by 5 this becomes 0.6 so this becomes 1.6 and if you multiply 1000 by 1.6 this amount become as 1600 rupees.

So, this amount will be become 1600 rupees here now you can find out the difference when you are investing 1000 rupees at the rate of 10 percent, here it is 12 percent. When you are investing 1000 rupees at the rate of 12 percent, at a simple rate of interest, at the end of the 5 years. This amount is simply becoming 1600 rupees.

But when you are investing 1000 rupees just for 3 more years but at a lesser rate of interest of the 10 percent. Not of the 12 percent at the rate of 10 percent this amount is becoming more than double though the number of years is 3 more but the rate of the interest is less by 2 percent.

So, you can understand here the amount is just 1600 here the amount is becoming more than double that is 2144 and if you are increasing the number of years. At the same rate of interest of 10 percent that is amount becoming more than 3 times. So, this is called as the this is on the 1 figure on the 1 side this is another figure this say another figure.

So, you can understand the difference in this 3 figures. This is the simple rate of interest, this 2 are at the compound rate of interest, so this all is explaining very nicely very clearly the magic of compounding. The power of compounding so you can understand what is a difference between the simple rate of interest and the compound rate of interest.

So, this is something I wanted to talk to you about the future value of a single amount and how we can calculate the future value of a single amount and how we can work out the that final value, future value whether the rate of interest means were we apply the compounding or we are applying the say simple rate of interest.

What will be the say the future value of the present amount? Furthermore discussion with regard to this time value of money and the future and the present value of money. I will have in the say in the coming classes. So, for this class I will stop here. And remaining concepts we will discuss in the next class. Thank you very much.