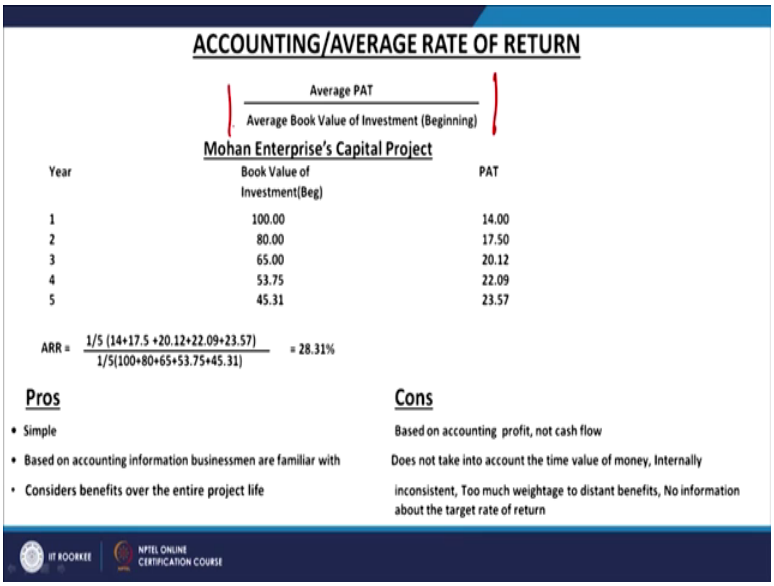
Financial Management for Managers
Professor Anil K. Sharma
Department of Management Studies
Lecture 25
Capital Budgeting - Part 9

Welcome all, so in the process of learning about the Capital Budgeting techniques or the investment criteria in the capital budgeting. In the non-discounting criteria now this is the last technique which we are going to discuss and after this, after completing this discussion on the different, say discounting and non-discounting criteria different techniques. After talking about this last one, we will discuss some problems and solve some problems which are relating to the Capital Budgeting.

And then we will learn about that how if any situation comes up of evaluating any investment proposal, then how to deal with that. Maybe whether it is by calculating the NPV, IRR, modified IRR or maybe the say your benefit cost ratio or maybe using the non-discounted discounting criteria, like payback period method or maybe the say your this one which is now the last method, which is in the non-discounting criteria.

(Refer Slide Time: 01:26)



And this is the last one is called as Accounting or Average Rate of Return. So when we will solve some problems, some sums, some problems, then you will be able to means understand

that how we can implement these different techniques, different methods, different criteria to solve these problems or some of the say capital budgeting problems or some problems relating to the capital expenditure. So this is the last technique now, we will be discussing it and after that I will take you to the some problems.

Accounting or Average Rate of Return, this is after payback period. One in the non-discounted non discounting criteria, one was the payback period method, very popular, largely used and this is a technique which is used in almost in any proposals, evaluation of any kind of proposals. And the second technique which is there available with all of us is accounting or the average rate of return right. This is a second technique or this is a second method of say called as a non, called as a non-discounted method for evaluating the capital investment proposals.

So, this is, what is the formula for say calculating or using this? This is the formula which is called as average PAT divided by the average book value of investment. Average PAT that is the average profit after tax, we take the average profit after tax, so how we take the average profit after tax? That we will see, learn. We have to see that how many number of years say cash flows are forecasted, right. How many number of years?

For example, we are going to say start a project today or maybe in the current year in 2019 and 2019 is called as the investment year and after that for the next 5 years the project will be working, or will be giving us the cash inflows. So it means we will be having the next say up to 5 years the foreseeable period is a up to next 5 years and we can say look forward that yes, the profit after tax will be known to us, projected profit after tax will be known to us.

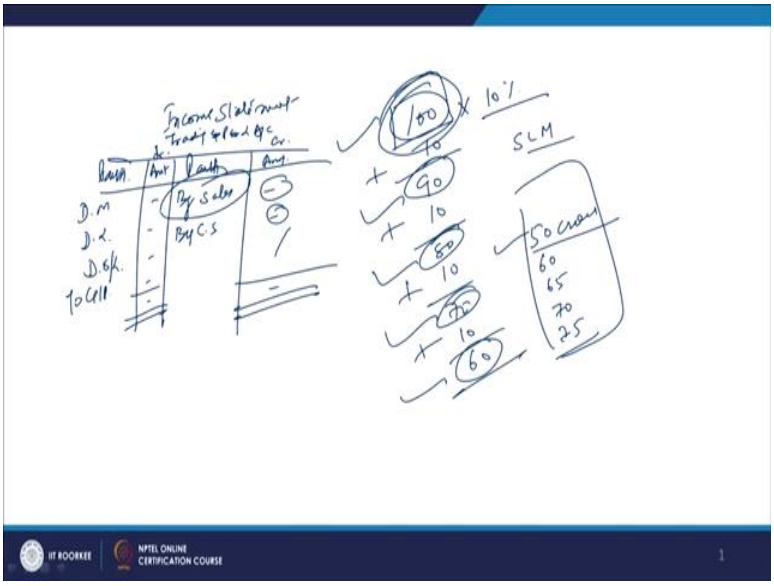
And the average investment will also be known to us that is a discounted, you can call it as the say depreciated value of the investment. So beginning, at the beginning of the year, what is the investment there, that will also be known to us and we will be, means able to calculate and find out the average for this investment. So in this case, when you try to say implement this accounting or the average rate of return.

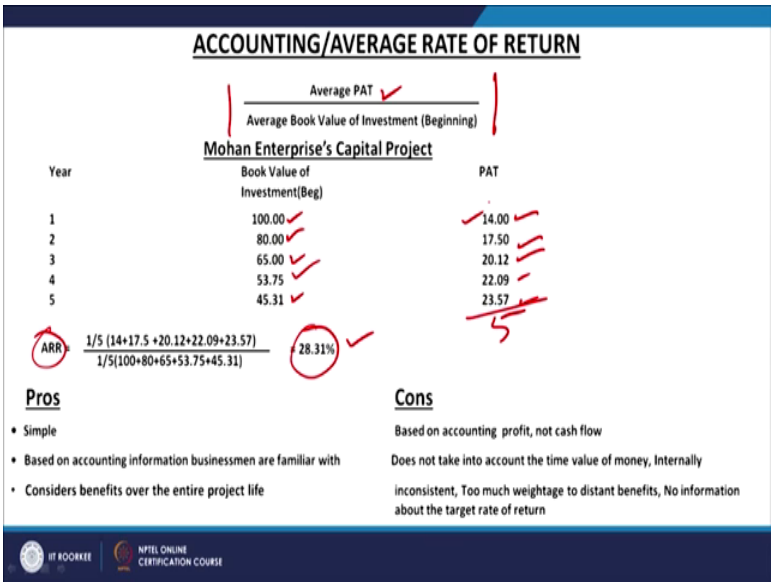
As we have seen in this model that average profit after text divided by the average book value of investment that is in the beginning of the year, what is the value of the investment is there, after calculating the depreciation whatever the value is left at the end of the year, one particular year, that becomes investment in the beginning of the year so that investment we have to take. And

now we will understand that if any investment we are making in the fixed assets of any company or in any project.

Then we are applying the depreciation, because we are not adding any new asset now, capital expenditure is only taking place in the current period that is in the 0 year. So it means if we are investing any amount.

(Refer Slide Time: 04:34)





For example we talk about that we are investing 100 rupees in any project, right, and the depreciation rate is how much? 10 percent. So what will happen next year and we are charging

the depreciation as per the SLM, Straight Line Method, so it means this amount 10 percent becomes 10.

So it means this amount will come down to 90, next year it will come down to 80, this next year it will come down to 70, so it means it is 90, 80, 70 and 100 and then you. This is outflow, and this is the investment, so you can say that this is the 90, 80, 70 then it will come down to 60, so it means over the years this investment is going down. This investment will increase if you make further capital expenditure, but that we are assuming under this method that no further capital expenditure we are making.

Maximum expenditure we are making, we are making here is 100 and we will be using this 100 rupees, so naturally say this investment is made by way of capital and converted into fixed assets, so when fixed asset is depreciated, their value will come down, so in the beginning of the 0 year this is the investment, in the beginning of first year this is the investment, in the beginning of the second year this is the investment, in the beginning of the third year this is the investment, in the beginning of the fourth year this is the investment.

And if you talk one more here, then say this is the total we are left with how many, 4 years after the say investment year. So it means total number of years is 5 and you have to take this, plus this, plus this, plus this means these values, we have to take these values and divide it by number 5, so it means you can easily calculate the average investment by taking the investment at the beginning of the years.

So same thing we are talking about here is that we have are showing here investment at the beginning of the year is how much? That is 100 rupees or 100 crores, after depreciation next year it has come down to 80, then it has come down to 65, then it has come down to 53.75 then it has come down to 45.31. So this way this investment is depreciating but we are going to take the average of this investment so average of these how many?

5 values we are going to take, so what you are going to do this, plus this, plus this, plus this, plus this and divided by 5, so that will be called as the average investment and then we have calculated the PAT for the year 1 and year this 2, 3 ,4 and 5, this PAT is available so if you divide this PAT by 5, so what will be there? You can calculate the average PAT, right. So we

have to means take it, like this is the requirement of the model, average profit after tax, average book value of investment, but the investment in the beginning of the year.

So, now we have got this information for the project that is called as the Mohans Enterprises Capital Project and here we have got the years, we have got the book value of investment, we have got the profit after tax right, and now what we are calculating here that is called as the average or the accounting rate of return, how it has been calculated? Accounting rate of return is calculated here that we have taken the PAT in the numerator and we are summing it up the 5 values dividing it by 5 and then we are talking about the, say information given here and then we are summing it up, dividing it by 5 and then we are getting calculating some percentage rate in this case it has come up as 28.31 percent, 28.31 percent is the average or accounting rate of return available here from this project, right.

So very simple, means there is nothing complex about it. Complex part is only to forecast the cash flows and then to calculate the profits and then to calculate the investment, that is the complex part. So this will all depend upon the detailed project feasibility report because when any new project is taken up, and this deciding or working out this amount of investment of 100 crores and then say the operations of the first year and the profit at the end of the first year, profit at the end of the second year.

So for this entire process we have to prepare the projected financial statements. Until and unless you prepare the profit and loss account for the first year, you cannot get the PAT. Until and unless you prepare the profit and loss account for all the 5 years, you cannot say get the profit after tax. So what we have to do is, we have to prepare the projected income statement or projected profit and loss account. So if the projected income statement is ready, but I tell you, preparing the projected income statement is a million dollar question is very complex job and there we need the so many other kind of information.

One information is the forecasting of sales. One important information is the forecasting of sales, because if we have the sales figure with us, for example that we have identified that if we go for any investment proposal and we are able to sell for the first year say goods worth rupees 50 crores right. Second year we are going to increase it to 60, then it is going to become 65, then it

is going to become 70, then it is going to become 75. So this growth rate can be worked out and this is very-very important because this all depends upon the market and demand analysis.

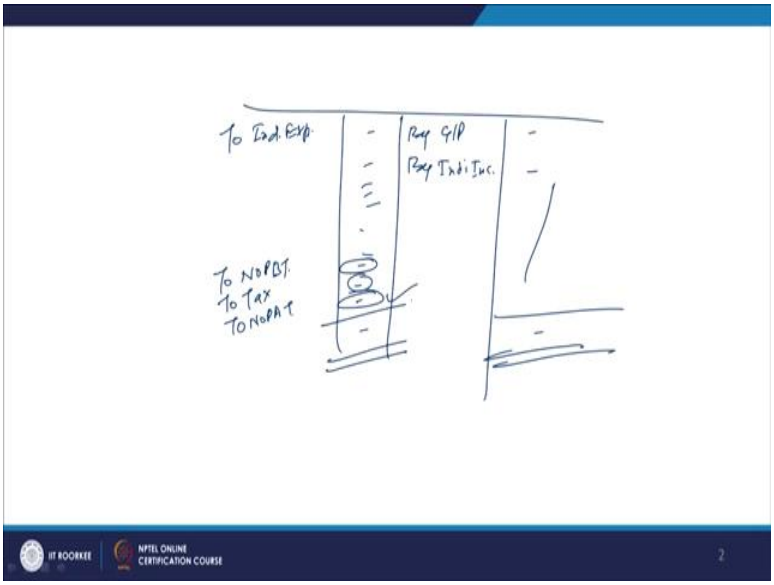
So, we need a Detailed Project Feasibility Report based upon the DPFR, we will get the sales figure, and once you have got the sales figure then we will start backtracking. And now, for example when you are preparing the profit and loss account right, here we are preparing the profit and loss account, so what we do is, we for example you write here as the income statement.

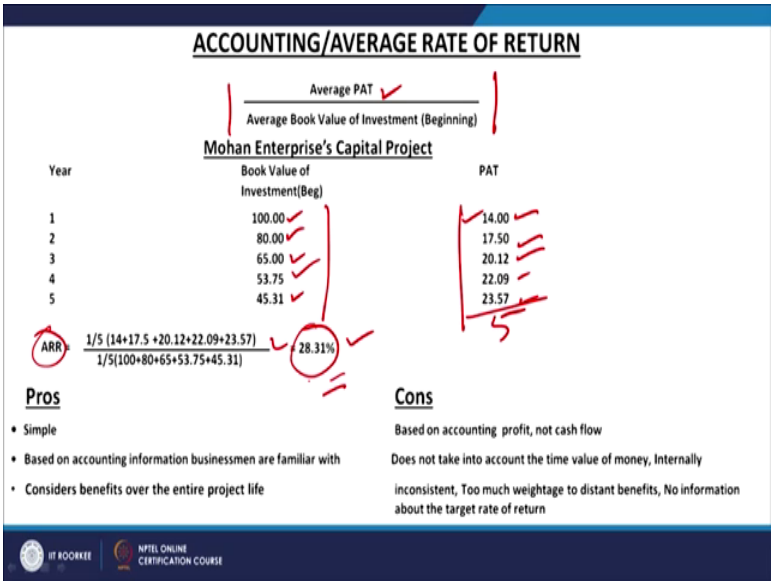
This is a income statement and in this income statement what we write here is that is the it has two parts, one part is called as trading account, trading and profit and loss account, right. So here we are going to prepare the profit and loss account like this, this is called as the particulars and this is the amount, this is particulars and this is amount right. And this is the debit side, this is the credit side right. So what we are going to do here is now we are starting with the by sales.

So if you have forecasted the sales then this figure will be there. Then we write here by closing stock, if we have the closing stock figure, we will calculate here and this will become the total amount and this will give you the total production value and this side we need the information about the cost, that is the direct material, direct labor and the direct overheads right. This cost will be available, and the difference of this will be called as the To Gross Profit.

So you will calculate the first the gross profit, and then you will say take the statement forward, and when you take the statement forward so how you do it?

(Refer Slide Time: 11:27)





You prepare then the profit and loss account, and profit and loss account is means continuing the trading account, so you will write here what? By gross profit and then by indirect incomes, other indirect incomes, you can call it as non-operating incomes, you will keep on adding, something becomes here and then it will be called as to say indirect expenses or non-operating expenses, right.

So this all expenses you will take here and then it is a sales figure finally means the closing revenue figure, you will total it up, you will close it and then you will get here something that is a true net operating profit before tax PBT. This amount will come here, then it will come as true

tax, it will come here and then it will call as the true profit or you call it as you will be able to find out here is that is the true net operating profit after tax, right. And this will be the figure.

So arriving at this figure which we are taking here in this our case of the 14, 17.5, 21.12, 22.09 and 23.57, this will depend upon this so much of the analysis, and this analysis begins from where? This analysis begins from this sales figure and getting the sales figure depends upon the market and demand analysis. If you do the proper market and demand analysis then only the things can be taken care of right.

So it means now in this whole case when you means try to find out, it looks very easy that implementing this method is very easy, that we have got one the side the investment figure, on this side we have got the PAT figure, but look at getting this PAT figure and getting this investment figure is very complex job, right. If we have this information available, then after that calculating the average rate of return is very easy and it can be done, but getting this information is very-very complex.

For that we need to have to prepare the total detailed project feasibility report and once that DPFR is ready with us, then only you can apply this method and finally you can calculate in this case for example, we have taken the one fifth of the profit after tax and then we have taken the one fifth of the book value of investment that is in the beginning of every year and this is the total rate we have worked out which is called as average or the accounting rate of return and we have calculated in this case is 28.31 percent.

Now, to take the decision if you want to apply this method for say evaluating the capital investment proposal, to take this decision what we have to do is you have to now compare it with the required rate of return, this is the expected rate of return and then you have to compare it with the required rate of return and required rate of return depends upon my cost of capital. So if for example, the required rate of return is 35 percent or maybe 30 percent and available rate of return from this is 28.31 percent, we will reject the proposal right.

But if the my required rate of return is for example 20 percent or 25 percent and available rate of return is from this is expected rate of return EROR, expected rate of return is 28.31 percent then we will accept the proposal because my requirement is 25 percent and it is available here it is 28.31 percent. So certainly I will go for this and I will means accept this proposal and I will go

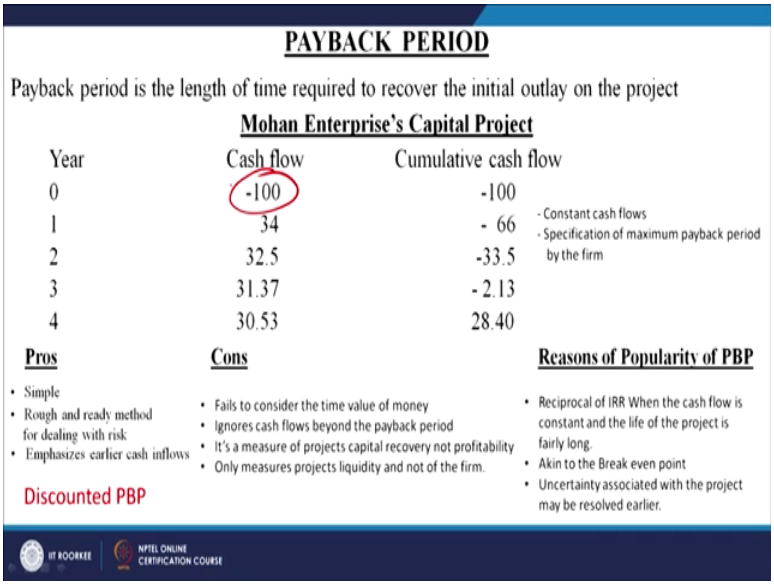
for this capital expenditure, right. So one rate is available, one we have to find out that what is our requirement then we have to compare that available rate of return with the required rate of return and finally we have to take the decision accordingly, right.

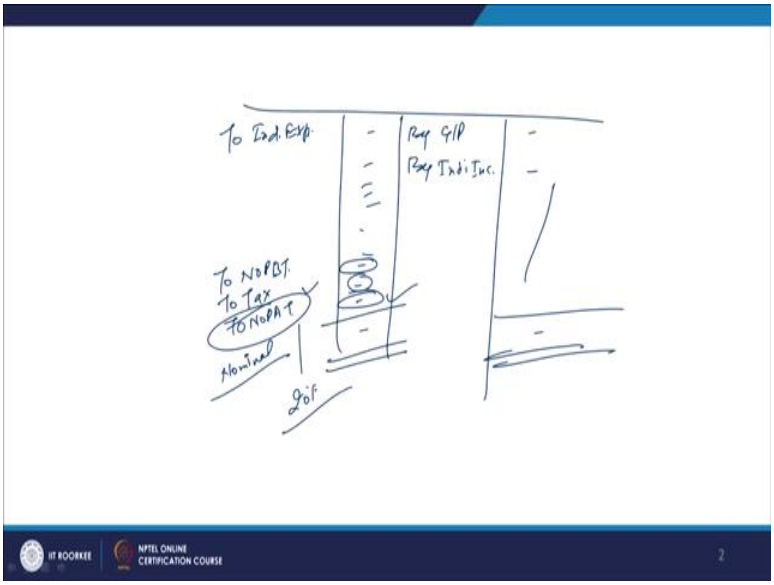
So, this is a very simple method and depends upon the availability of the profit for the future number of years and the availability of the investment for the future number of years right. And then taking the average PAT and then the average investment here. Now, we will compare it with the say discounted criteria, as compared to discounted criteria and as compared to payback period method, there are some means points of comparison with the discounted criteria like NPV, IRR and the benefit cost ratio and some points are here of the comparison with the non-discounted criteria means the other method that is the payback period method.

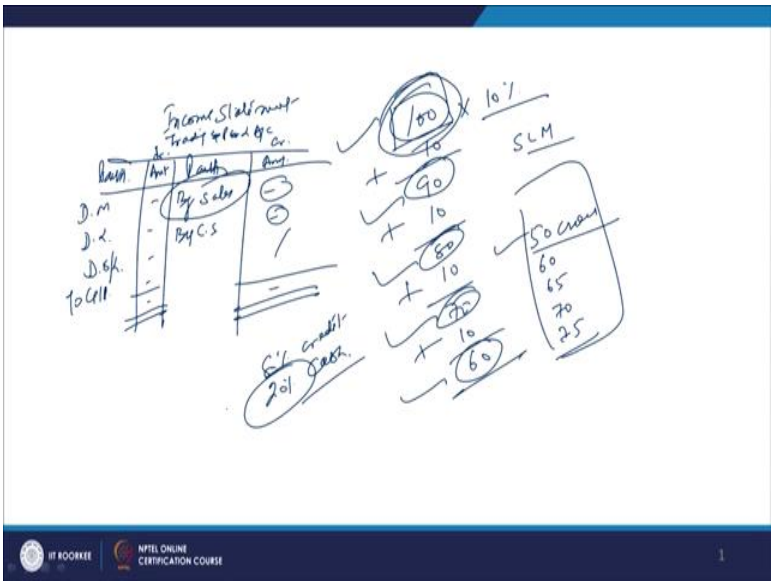
So, when you talk about the pros, merits of this method it means it is very simple. Simple means once you have got the profit figures or the investment figures after that, calculating the average rate of return is very simple. Second thing is, based on accounting information businessman are familiar with means it is based upon the accounting information, business man are the familiar with.

Everybody knows that what is the profit after tax, how to calculate the profit after tax and how to interpret the profit after tax, availability of the say profit after tax, how to interpret that so that can be easily found out, that can be easily evaluated. So it means, in this whole case you can easily apply this method, this is a second important merit. Third one is, considers benefit over the entire life of the project.

(Refer Slide Time: 16:43)







If you talk about the say payback period method, we have seen in the payback period method that we are talking about here is that we are taking the payback period method only is considering the cash flows for the period up to which this basic investment of the 100 crores is recovered. This is a cash out flow in the 0 year and till the time this investment is recovered after that how many, or how much cash inflow is available from the project, we are least bothered about.

So we are only limited about that much amount of the cash flows which are sufficient for recovering the initial investment. We do not take the cash flows of the entire life of the project into consideration in the payback period method. But in the accounting rate of return, we take the this into account and then we try to find out that yes that the average rate of return depends upon the entire projected period of the project.

We are not only limiting our analysis up to recovering our investment, we are means taking it up to, the total foreseeable period, and if the total foreseeable period is available for the information is available for the next 10 years then we will calculate the investment, average investment for the 10 years and the average profit for the 10 years and then we will calculate the say accounting rate of return.

This is one important means you can call it as improvement over the payback period or maybe say other way around you call it as a limitation also that you have to have find out the cash flows for the total or the profit after tax for the total foreseeable period. Whereas it is not the case in the

payback period there we are only finding out till the investment is recovered. Here in this case, what is the total foreseeable period, we are calculating the cash flows, profit after tax, investment and then we are calculating the average or the accounting rate of return.

So, these are 3 important merits or the important positive points of the this particular method. And then we have the cons, means demerits of this particular method. That is why it is not very popular because in the non-discounted criteria, most popular is the payback period method and remaining are the let us say discounted criteria, and there also two are very popular NPV and IRR.

Since it there are some limitations of IRR which have been done away with the help of MIRR but largely because IRR is in the percentage terms and NPV is also means having so many positive points. So in the discounted criteria we largely use NPV or IRR and in the non-discounted criteria we use PBP payback period method but this method is also available that is why we are discussing here.

So cons are based on accounting profits, not cash flows right. So we are calculating this means average rate of return we are calculating upon the accounting profit. Accounting profit as I just explained it to you, how to calculate the accounting profit and then by preparing the projected profit and loss account and balance sheet, we are means preparing this, say we are calculating this average rate of return and we are not concerned about the cash flows largely.

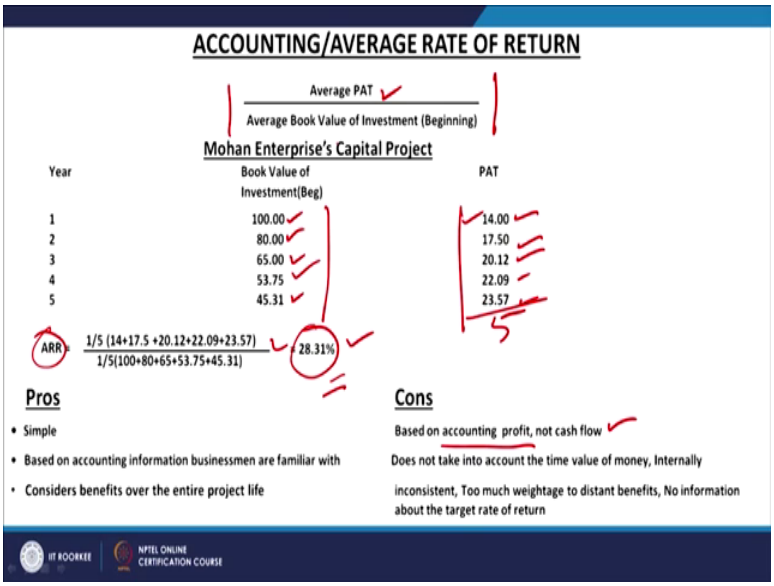
Though we are indirectly concerned with the cash flows also, because with the help of this profit, we can calculate the cash flows and then we can means take the decisions but largely if we do not have even the total cash flows, you do not have to work out, we can calculate the cash flows but you do not have to work out the cash flows even by simply calculating the profits you can say apply this method, this is a con.

So, it means cash flow is a wider term and the profit is say limited term and here also, one important limitation of the profit is that it is the only profit whether it is a cash profit or it is a say non cash profit that is not discussed here. Because when you calculate this profit, when you are calculating this net operating profit after tax, this net operating profit after tax is normally nominal in the value. This is the nominal in the value and this is not the real, why is it nominal,

because when you talk about here this by sales, when we are calculating the sales figure, the sales figure is not only on cash.

These sales when we are including in trading and profit and loss account, not only the cash sales we are including, this are the total sales and in this sales the part of the sales are on the credit also. So, it may be possible that 80 percent of the sales are on credit and only 20 percent of the sales are on cash, right. So it means, if 20 percent of the sales are on the cash it means whatever the profit you are working out here, this profit, only 20 percent of the profit will be on cash.

(Refer Slide Time: 21:29)

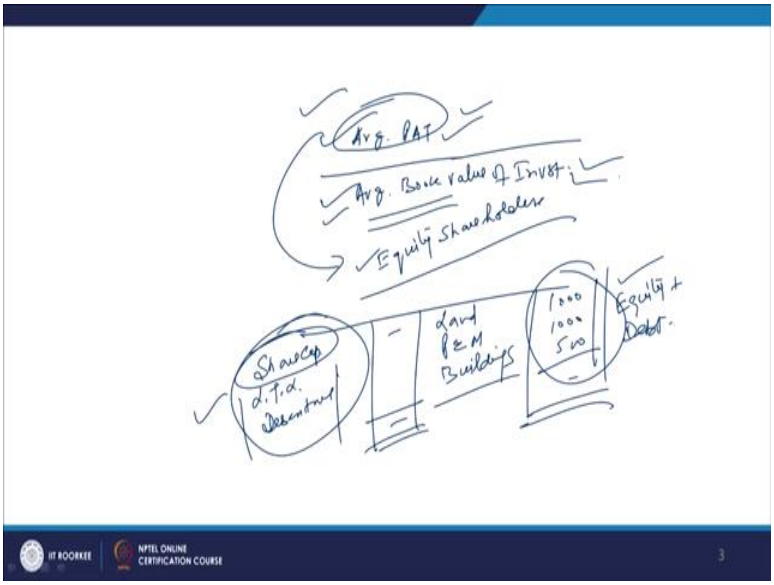


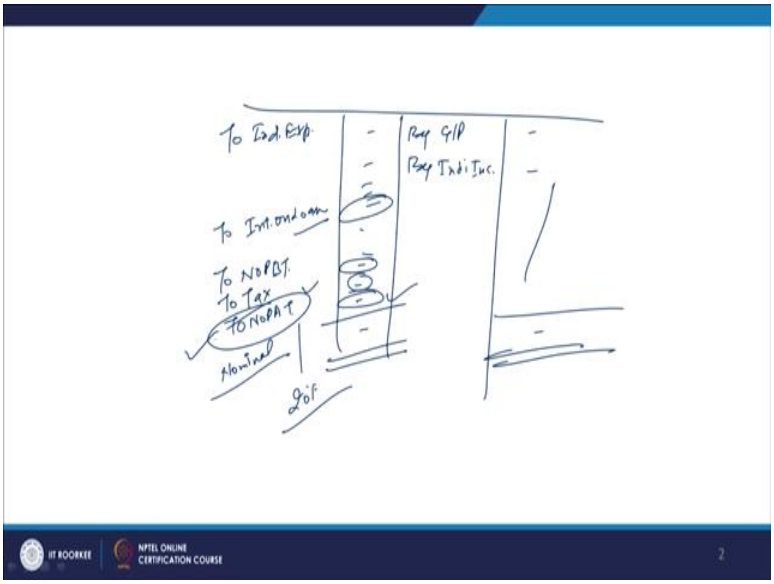
So this is a major limitation because we are here depending upon something which is called as the accounting profit and accounting profit itself has some inherent limitations and when you talk about the cash flows, it is a different thing, it is the real thing. Cash flows are real, accounting profits are nominal, so taking some decisions on the basis of the accounting profits sometime may not be wiser step.

Then, is the next one is does not take into account the time value of the money, certainly because it is a non-discounted criteria. Like payback period method, it does not take into account the time value of the money. It does not take into account the time value of money so it is not means discounting the cash flows, whatever the profit we are calculating here, these profits are even to be to be to be discounted, we are not discounting these say profits.

Number one, they are not cash flows and second thing is they are only profits so we are not discounting these profits. Internally inconsistent, this is a very-very important point here as a limitation of this accounting rate of return, why is it internally inconsistent? I now explained it to you that when you talk about this profit, this profit is the profit after tax right and here we are talking about is the investment which is average book value of the investment. Average book value of the investment, so it means, how can you interpret it?

(Refer Slide Time: 22:52)





You are talking about the method says that it is the average profit after tax divided by the average book value of investment right. When you are talking about this average profit after tax,

this average profit after tax is the profit now left only to the, to whom? To the owners or the to the equity shareholders that is to the, that is available only, this profit is available to the providers of the funds called as equity share holders. They are equity share holders.

So it means, because when you calculate the profits in the profit and loss account here, you are subtracting to interest cost, to interest on loan. So it means any kind of the borrowing, what is the cost of that borrowing, it has already even subtracted, after this subtraction, we have got this profit. So once you have already paid the amount due or the cost of the borrowed funds or the loan funds it means, after that whatever now the residual value left as a average PAT, that is only sufficient for the equity share holders, right.

But when you talk about the denominator here, this denominator as a investment that includes the total funds coming from all the sources, whether the coming from the share capital or coming from the borrowings in the form of the loans from the financial institutions or in the form of the bonds and debentures issued to the different investors. So this investment is the investment coming from all the sources.

Whereas this profit is the one which is only the now the residual profit left for the equity share holders for the internal say resource providers. So it means sometimes it is called as inconsistent that the funds coming from total sources are dividing the residual profit available only to the equity share holders to the internal say owners of the firm. So it means, sometimes it becomes inconsistent, it either it should be taken the total cash flow here that is without paying the interest against this total investment.

Or then, or we should make some change in the denominator where you can do one thing that you can only take the equity capital not the borrowed capital but that we are not doing. This we are taking as the total investment because in the balance sheet, when you are making investment into the land, right, then it is the plant and machinery, then it is the buildings. So whatever the investment you are making, that investment for example we are making here 1000, here it is 1000, here it is 500 rupees.

This investment has come from both the sources that is one is the equity plus debt, there we are not segregating that only equity capital will be invested here. And here this time, this side, you write here as share capital and then you call it as the long term loans and then you can call it as

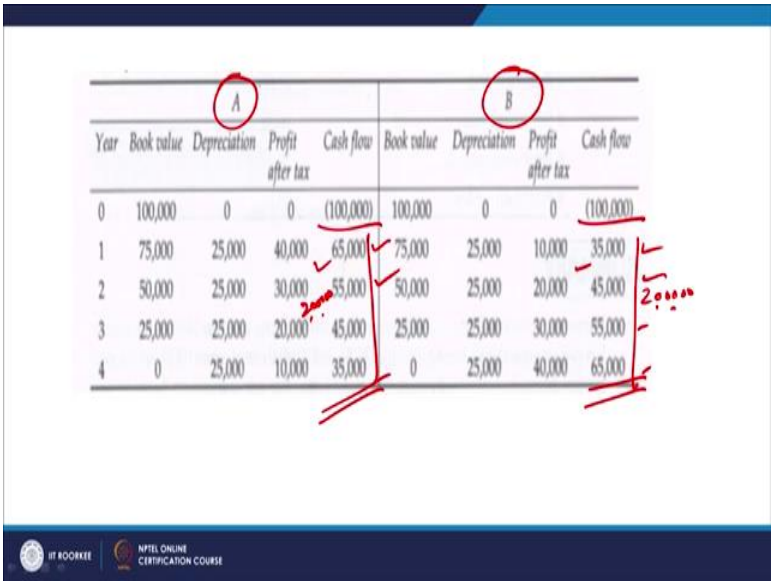
the debentures. So this side becomes the total capital, this side becomes the total liabilities. So these total funds are making these total assets or say causing or requiring the investment in the total assets.

So it means these total funds are involved for this side of the total assets, then here it is the same case that average book value of this investment is sum total of all these three or sum total of all these and then it is becomes the denominator. But in the numerator, this is available only to the share capital providers and this PAT is left only to the share capital providers, so it means their claim has already been settled so why it is included in the denominator.

So this is why it is sometimes called as the inconsistent method but still we have to take a broad idea of say calculating the accounting rate of return or the average rate of return and largely even the accounting rate of return is calculated like this. So it means we means use this method sometimes but because of some so many limitations because time value of money is also not there, it is internally inconsistent also and takes the cash profit for the entire life of the project also which maybe sometime not possible to calculate the correct profits for the total life of the project and then is too much weightage to the distant benefits.

Too much weightage to the distant benefits is given and what is how it is to we get talk about too much benefit to the too much weightage to the distant benefits. I will explain it to you.

(Refer Slide Time: 27:29)



Here for example, now you look at this these two projects, this is a project A and this is a project B right, now if you look at here, the values some total of these values is same. If you take sum total of these two values it is same.

It is also 100000, it is also 100000. Investment required, cash outflow required for the two projects is same in the 0 year, 100000 rupees, 100000 rupees and then we calculate here, the cash flows coming, profit after tax and then the cash flows coming. So if you take here into account we are again getting the total amount is how much? Total amount becomes again 200000 in both the cases. This is the 200000 and this is also 200000, in both the cases it is 200000 rupees.

But in this case, if you talk about the project A, here it is means within first 2 years the cash flows are very high and here in this case for example if you talk we have to go up to for recovery of this amount of the say entire investment of this amount and this 200000 rupees, initially the cash flows are very less and in the later year the cash flows are increasing. So if you talk about, the accounting rate of return, if it is a payback period method we will only limit our analysis up to first 2 years because our investment is recovered in the first two years.

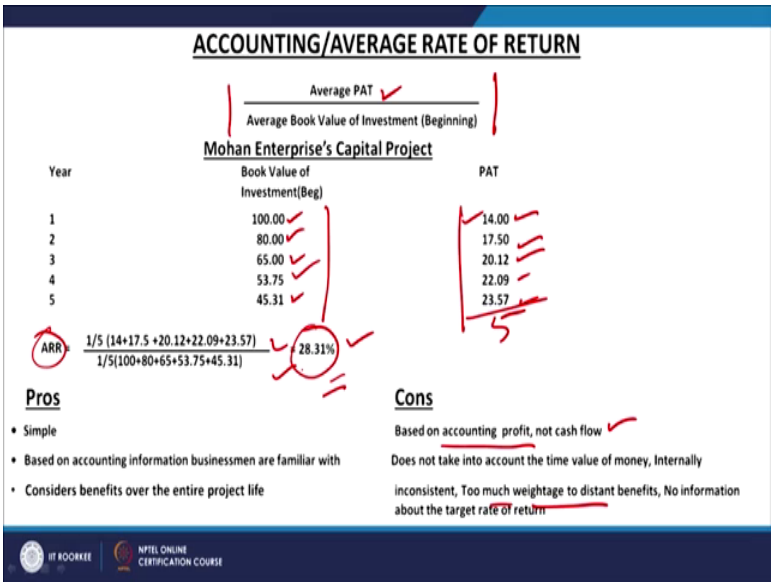
But here because here we are talking about taking the entire life, so you can call it as, as per the time value of money, if you calculate the time value of money of this project it will be much better as compared to this. So it means, we are saying both the projects are giving us a equal

returns because it is also giving us 200000 rupees, it is also giving us 200000 rupees but here the profits and cash flows are coming at the distant years and it coming in the beginning year.

So because it does not differentiate between the two, it does not differentiate that this project is better than this project, so it takes means give the equal weightage to the cash flows coming either in the beginning or coming at the end or in the later years. So that is the another limitation of this that though it takes into account the cash flows of all the years.

For example, if we calculate the average rate of return of this and average rate of return of this it will come as same right, but here there is a million dollar question, large difference because here the cash flows are coming in the later years it is coming in the beginning years, so any cash flow, any profit earned much in the higher amount in the beginning years and lesser in the later years, that makes a difference. But in this method, this difference is not taken into account right. So, this is the one another important limitation.

(Refer Slide Time: 30:05)



Last one is the no information about the target rate of return. No information about the target rate of return so it means we are only getting that from this project only 28.31 percent is available or expected to be available. But what is our required rate of return? That we have to calculate separately, that is not given by this. For example, when you apply the NPV method. In the NPV method, we say that we know the cost of capital and when you discount the cash flows, cash

inflows and cash outflows with the help of that cost of capital, you know that this project is ending up with the positive NPV, 0 NPV or negative NPV right.

In case of the internal rate of return, we are going to find out some rate of return, which is available from that project right. So there is no point means say bothering about anything. But in this case we are not having any target rate of return, so it means it is only giving us 28.31 percent and that too not based upon the cash flows, mind it, that too not based upon the cash flows, it is based upon the profit after tax. So, there is a difference in the cash flows and profits and since the target rate is not available that how much target profit is there we are not able to find out of it.

So it means say another limitation that now you have to calculate your cost of capital and then you have to find out that yes my cost of capital is 25 percent, accounting rate of return is 28.31 percent then yes, I can go for it, but otherwise I will not go for it. So because of so many limitations associated to this method, this method is there as one of the non-discounted criteria and when the discounted criteria was not there, we were equally using it along with the payback period method.

But now, since very effective and logical and genuine discounted criteria are available where NPV and IRR are the much better replacements of this method. So we depend less on the accounting rate of return in the no- discounted criteria, we largely use the payback period and in the discounted criteria we use NPV or the IRR method so as we do not use much the benefit cost ratio in the discounted criteria, similarly we do not use the accounting rate of return in the non-discounted criteria.

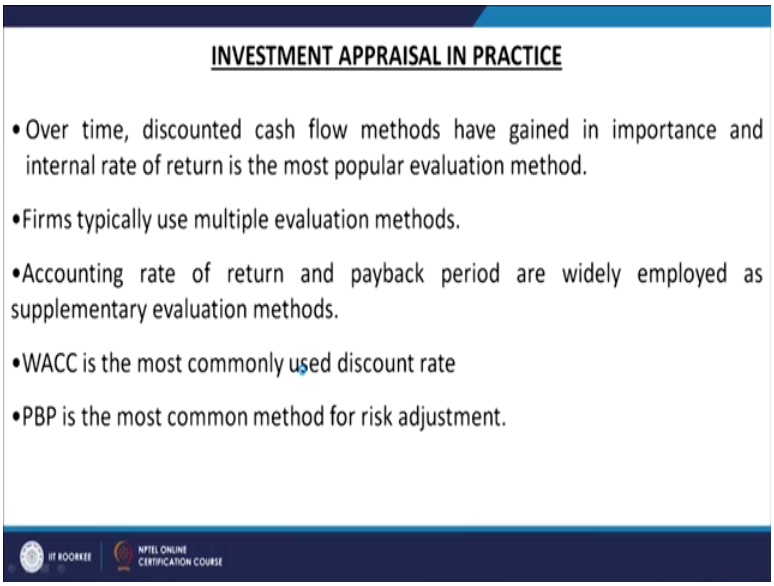
So with this I complete the discussion, conceptual discussion on all the 5 criteria. 3 methods are in the discounted criteria, 2 methods are in the non-discounted criteria. After having talk about all these 5 methods, we are now going to be means clear about that how to evaluate the capital investments proposals, how to take decisions about the capital expenditure proposals and how to decide whether to go for one particular say investment to be made anywhere in any case or not.

And means, whether we should accept that investment proposal, whether we should make that investment, we should not make that investment. By taking into account the time value of money, we can apply the discounted criteria and just to have the rough idea about the recovery of

that investment we can apply the payback period method right. So this is the all about the different methods of the say investment criteria, evaluation of the investment can be done if you quickly want to take the idea about the recovery of investment always use PBP and then in say the detailed analysis we can use the discounted criteria.

But I would tell you that normally we do not use either of the method in isolation, we use this method together. Every means project where we use the discounted criteria, we use the payback period method also, so both the criteria go hand in hand. And if you ask me, then we can say, three methods are more popular NPV and IRR in the say discounted criteria and the payback period method in the non-discounted criteria. So, this is something about the different methods in the say investment criteria.

(Refer Slide Time: 34:09)



Now, we have to discuss some important points here that in the practice which one of the methods are most popular or popularly used in India that investment appraisal methods in the practice, which ones are there, so this particular component and some problems with regard to the say some problems where we can learn about the evaluation of the capital expenditure and applying some methods that we discussed here, NPV, IRR, Benefit Cost Ratio or Accounting Rate of Return or PBP, how to apply them.

We will do certain problems sum, say practical problems, some sums and then we will be clear about that if we have to evaluate any investment proposal, how we can do that. So this particular

part, investment appraisal in practice, and then some practical problems I will discuss in the next 2-3 classes and then I will close the discussion on the, this particular topic that is the capital investment say evaluating the or techniques of evaluating the capital investments proposals. Till then, thank you very much.