

Financial Management for Managers
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Lecture-39
Estimation of Project Cash Flows Part XI

Welcome all. So, now we are in the last leg of this discussion of the Estimation of the Cash Flows in the capital budgeting decisions and this is as I told you in the previous class, we are going to discuss one more problem which is basically the replacement decision, means the replacement of the old asset with the new asset, because of certain I mean changes in the market or because of certain changes in the technology, many a times firms have to say replace their assets, maybe the say old assets with the new assets.

It may not be the case that the asset has become obsolete or maybe the technical value has become 0, it is not the case. But it maybe the situation that if we replace the old asset with the new asset, it is going to give us a better revenue means our savings are going to increase, our cost of production is going to decrease and sometimes the quality of production which comes out of the new asset or by using the new asset maybe much better, so it may have a better place in the market, better acceptance amongst the buyer of the customers.

So, if there is a situation that we have to take the replacement decision because if the sum required for replacing the old asset with new asset is quite bigger, quite higher, so it means certainly it also comes in the category of the capital budgeting decision. So, again we have to evaluate it in the same manner, how we normally take the normal capital budgeting decisions in case of the new asset, new projects or the fresh beginning of any business activity or adding up of a new product into the existing product line.

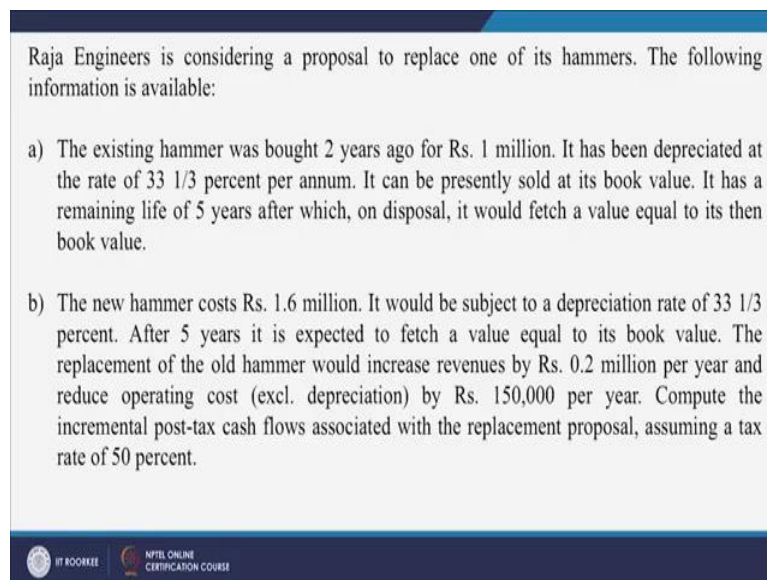
So, it is a independent capital budgeting decision, only difference is that whatever the cash flows we work out here, they are incremental cash flows because something is already existing with us. So, we have to replace that with something new, so the good and bad effect of the old thing or the old assets also have to be kept along with the say the positives or may be the negatives of the new thing we are putting in place.

So, ultimately it is going to be something called as a incremental. So, we are going to calculate the incremental cash flows that is a only difference in the replacement decisions, otherwise the estimation of the cash flow cash flow process is same, we try to find out that

how much cash out flow is going to be there in the current period, in the 0 period and how much cash inflow is going to be there over the coming years foreseeable life or useful life of the asset, same way we are going to do.

And ultimately we begin with the investment outlay in the current period and we end up with calculating the net cash flow, which will be available out of this replacement decision. So, let us do it and like as we have seen the previous problem in the previous class, now I will again read this problem for you so that we can understand the problem well and then we can calculate the cash flows.

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Raja Engineers is considering a proposal to replace one of its hammers. The following information is available:

- a) The existing hammer was bought 2 years ago for Rs. 1 million. It has been depreciated at the rate of $33\frac{1}{3}$ percent per annum. It can be presently sold at its book value. It has a remaining life of 5 years after which, on disposal, it would fetch a value equal to its then book value.
- b) The new hammer costs Rs. 1.6 million. It would be subject to a depreciation rate of $33\frac{1}{3}$ percent. After 5 years it is expected to fetch a value equal to its book value. The replacement of the old hammer would increase revenues by Rs. 0.2 million per year and reduce operating cost (excl. depreciation) by Rs. 150,000 per year. Compute the incremental post-tax cash flows associated with the replacement proposal, assuming a tax rate of 50 percent.

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So, what is the problem here, see simple problem, Raja Engineers is considering a proposal to replace one of its hammers. It maybe technical asset or a machine, the following information is available. Number 1, the existing hammer was bought 2 years ago for 1 million rupees. It has been depreciated at the rate of 33 and 1 by 3 percent per annum. It can be presently sold at its book value, it can be sold at its sold value.

So, you have to calculate the book value, that is the say depreciation that total is 10 lakhs rupees, the purchase price for which it has been purchased and the depreciation rate is 33 and 1 by 3 percent per annum, method is the written down value, so you have to calculate the depreciation for 2 years on the WDV method.

And then calculate the book value and that is the value which can miss this asset can fetch from the market if it is disposed of after miss acquiring the new asset. It has a remaining life

of 5 years after which, on disposal, it would fetch a value equal to its then book value. Today after 2 years, the book value is different and after 5 years, the book value is different.

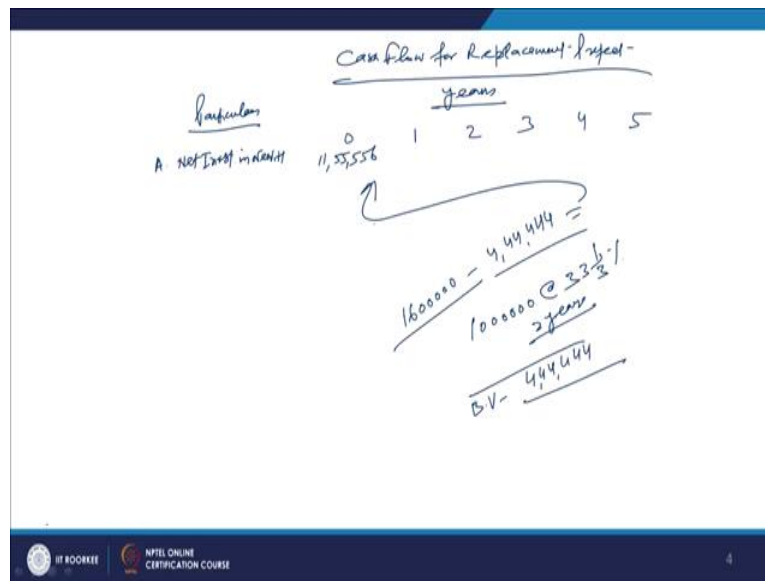
B, point number 2. The new hammer cost 1.6 million; it will be subject to a depreciation rate of 33 and 1 by 3 percent, after 5 years it is expected to fetch a value equal to its book value. Again means fetch a value after 5 years that is expected to fetch a value which is equal to its book value, because we have to calculate the terminal cash flows, so this amount is important.

The replacement of the old hammer would increase a revenue by 0.2 million or 2 lakhs rupees and reduce its operating cost excluding depreciation by 1.5 lakh per year or 150,000 rupees per year. Now, what we have to do it, on the basis of it we are given both the informations, we are given the information about the old asset also, we are given the financial information about the new asset also, we are given the information about the savings in terms of the cost also and the increase of the revenue also.

So, what have to do now? Required is, compute the incremental post tax cash flows associated with the replacement proposal, compute the incremental post tax cash flows associated with the replacement proposal assuming a tax rate of 50 percent. Assuming a tax rate of 50 percent.

So, now our job is that we have to evaluate this replacement decision capital budgeting decision, but before that at this particular point we have to only estimate the cash flows later on as a next step we can discount the cash flows both outflow and inflow if it is in the subsequent period, the outflows are in the subsequent period also and then we can calculate the NPV out of this decision and then finally we can decide whether to go for this particular decision or not.

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Raja Engineers is considering a proposal to replace one of its hammers. The following information is available:

- The existing hammer was bought 2 years ago for Rs. 1 million. It has been depreciated at the rate of $33\frac{1}{3}$ percent per annum. It can be presently sold at its book value. It has a remaining life of 5 years after which, on disposal, it would fetch a value equal to its then book value.
- The new hammer costs Rs. 1.6 million. It would be subject to a depreciation rate of $33\frac{1}{3}$ percent. After 5 years it is expected to fetch a value equal to its book value. The replacement of the old hammer would increase revenues by Rs. 0.2 million per year and reduce operating cost (excl. depreciation) by Rs. 150,000 per year. Compute the incremental post-tax cash flows associated with the replacement proposal, assuming a tax rate of 50 percent.

So, now let us calculate the cash flows. So, same way I am perusing further, for this case we are going to calculate the cash flows, so we write here Cash Flow for Replacement Project or the replacement decision cash flow for the replacement project or the replacement decision and similarly we are going to have the columns like here is the particulars, then we are going to have the years, particular and years, we are going to have the same years, we are going to have the 0 year, then we are going to have 1 2, what is the life given here? 5 years, 3 4 and that is 5.

So, first item is as usual first item A is the net investment in the new hammer, Net Investment in New Hammer, we have to now calculate the net investment in the new hammer, because

what is the cost of new hammer? 16 lakhs rupees, 1.6 million rupees, but I have calculated here it is that is 11,55,556, 11,55,556. And what is written here? Net investment in the new hammer, it is not investment in the new hammer, it is a net investment in the new hammer.

So, how we have arrived at this figure? I would like to explain it to you that what is the say cost of the new hammer 16,00,000 rupees, this is the cost of the new hammer 16,00,000 rupees, but this we are not going to, we are going to shell out 16,00,000 rupees to purchase to pay to the supplier, but we are going to get back something as a book value of the old hammer.

So, we have to first calculate the book value of the old hammer. And if you calculate the book value of the old hammer, so what is the cost of the old hammer? That was the, that was a called for the 10,00,000 rupees, 1 million rupees. And what is the depreciation rate? At the rate of 33 and 1 by 3 percent, it has depreciated at the rate of 33 and 1 by 3 percent and for a period of how many 2 years.

So, you have to calculate the depreciation on this 10,00,000 rupees for a period of 2 years by applying the or by falling or by adopting or by working on the WDV method written down value method and finally if you calculate that depreciation, so the book value which will be you will be arriving at after subtracting the depreciation for the 2 years on the written down value method the book value will you be arrived at is 4,44,444, this is the book value of the old hammer.

So, it means this book value can be realised after selling this hammer in the market as a second hand machine and once we are shelling out 16 but we are getting back 400, 4,44,444 so what is the net investment we are making? We are making the net investment of 16,00,000 minus 4,44,444 this investment we are the missed total investment we are making and this works as out the same amount here that is 11,55,556.

So, we have to calculate the net investment incremental investment? We have not to calculate only investment. So, that is a very important consideration here, so I will remove all this because it decided for explaining it to you.

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Cash flow for Replacement Project -

Particulars	Years					
	0	1	2	3	4	5
A. Net Invest in new H	11,55,556	-	-	-	-	-
B. In. in Rev.	-	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
C. Saving in op cost	-	1,50,000	1,50,000	1,50,000	1,50,000	1,50,000
D. Dep on New H	-	532333	355555	270377	158025	152250
E. Dep on old H	-	191,148	98715	6544	43876	29264
F. Inc. Dep	-	305785	256790	171193	114129	79086
G. In. Tax Profit	-	(35785)	93,210	178872	235871	223914
H. In. Tax @ 50%	-	(17893)	46605	89464	117936	126755
I. In. IAT	-	(17592)	46605	89463	117935	126757
J. Net Cash Value	-	-	-	-	-	152,172
K. I.E.	(11,55,556)	-	-	-	-	-
L. op. CF	-	3,67,593	3,03,395	2,60,596	2,32,064	2,13,943
M. Terminal CF	-	-	-	-	-	1,52,172
N. NCF	-	3,67,593	3,03,395	2,60,596	2,32,064	3,68,215

Now we will move to the next part, because this is the cash out flow in the 0 year, so we have nothing, we are not doing anything here because no inflows are coming in the 0 period, so it means nothing here only we are going shell out additional 11,55,556. Now, what is going to be the effect of this change in the machine? B is the increase in revenue, increase in the revenue, how much increase in the revenue we are going to have?

Increase in the revenue we are going to have here is 2,00,000 rupees, it is given to us 2,00,000 rupees it is increase in the revenue is 2,00,000 rupees net increase in the revenue is 2,00,000 rupees every year for the 5 years period of time, that is why we are going to have the better machine, so it is 2,00,000 rupees, that is increase in the revenue.

Third important component is the savings in the operating cost, saving in operating cost. How much saving in the operating cost is going to be there? We are going to save some amount called as 150,000 rupees, 150,000 rupees we are going to save, it is 150,000 rupees we are going to save, this are the for the period of 5 years.

Next thing is now depreciation, we will have now talk about the cost part. Depreciation on new hammer, depreciation on the new hammer and again the depreciation rate on this hammer is going to be how much that depreciation rate on the new hammer is going to be at the rate of that is going to be at the rate of say 33 and 1 by 3 percent again as it was on the previous hammer the same depreciation rate, so if you calculate the depreciation on the new hammer, what is the depreciation on the new hammer?

The first figure comes you here is 5,33,333, then is the next year is 3,55,555, then is 2,37,000 depreciation we are calculating on the new hammer as per the WDV method and applying the rate of 33 and 1 by 3 percent and then the rate is 1,58,025 and last depreciation is how much 105350. So, this is the depreciation on the new hammer. Similarly, if the old hammer would have been not replaced by the new hammer then it also would have given us some inflow in terms of the depreciation.

So, now we have to calculate the depreciation on old hammer, because we have to calculate the incremental depreciation only. So, the depreciation on the old hammer is how much? 148,148 again then it is 98,765, then it is 65,844, then it is 43,896 and then it is 29,264 this is on the old hammer the depreciation. So, both the depreciation figures we have calculated. And finally what is the incremental depreciation? Incremental depreciation is how much?

Incremental depreciation here it is, that is this minus this D minus E, so incremental depreciation is going to be 3,85,185 then it is 2,56,790 then 1,71,193 then it is 14, if you subtract the other 1 from the other then it comes as 114,129 and then it is 79,086 this is the incremental depreciation or this is the differential depreciation you can call it as, this is incremental depreciation we have to calculate.

So, incremental depreciation we have calculated which is the figure of importance for us, this is incremental depreciation we have calculated that is the depreciation on the new hammer and minus the depreciation of the old hammer and the incremental figures we have arrived at, we have worked out here. Now, G is incremental taxable profit, incremental taxable profit, how much is going to be the incremental taxable profit now we have to calculate.

Because we have to find out here that is the savings are 3,00,000, this 2,00,000 plus 1,50,000, 3,50,000, so out of this we are going to subtract some amount some amount. So, this amount is going to be how much? 35,000, 35,185 is going to be the say taxable profit, but this is not the profit actually this is the loss, because the total amount which we were going to have, the saving upon that is increase in the revenue is 2,00,000 rupees saving in the cost is 1,50,000 rupees.

And when you talk about the incremental depreciation, so incremental depreciation as a cost because already know depreciation is a cost which is 3,85,185 so this is the difference that is the, the difference is coming up 35,185, this is a loss. We have calculated here this is loss. And then the incremental profit in the next case is going to be how much? The incremental

profit in the next case is which is a incremental taxable profit. We have to write here incremental taxable profit here. And for calculating this incremental taxable profit in the first case it is 35,185 which is a loss not a profit.

In the second case it is 93,210 and in the next case it is 1,78,807 and then is the taxable incremental taxable profit 1,78,807 and then is 235, 2,35,871 and then it is a 2,73,914. So, this is the taxable profit or in the first year there is a taxable loss, means there is no profit at all and the loss is to the tune of 35,185. And in the next year there is a profit 93,210 and then it is next year it is 1,78,807, then it is 2,35,871 and then it is a 2,73,914.

Now, we have to calculate the incremental tax. So, it is the incremental tax we have to calculate. So, for calculating the incremental tax. Now, what is your tax rate given here? The tax rate given here is the 50 percent, so we have to take this incremental tax we have to calculate, so if you calculate at the rate of 50 percent, what is the rate given here? That is the 50 percent.

So, we have calculated the incremental taxable profit which is 35,185, which is the loss in the first year, no profit, but in the other 2, 4 years 2, 3 and 4 years there is a 4 and 5 year, there is a profit. And now the incremental tax at the rate of 50 percent, incremental tax at the rate of 50 percent we have to take here, so because the tax rate given to us is 50 percent. And if you take, calculate the tax on this rate, at the rate of 50 percent, so it means what is the total incremental taxable profit or loss, so and if we apply this, so this works out as how much? 17,593.

And in the other years we have to take as the 46,605 and the one more is 89,403 and then it is incremental means this incremental tax we have to take here as 17,593 in case of the first year which is the loss, but the tax savings will be this much amount and then in the second year there is going to be the tax at the rate of the 46,605. And in the net year it is going to be how much? 89,404, 403 or 404 we take it as a 403 and or we take it as a 404 and then later on we will take it as the 403. So, this is going because it is 50 percent, so 89,404.

And next case it is going to be 1,17,936 is the incremental tax and then it is lastly 1,36,957, this is incremental tax. So, now lastly we have to calculate here is that is the incremental profit after tax, incremental profit after tax, so if you calculate the incremental profit after tax, how much it comes up as, it comes up as 17,592, so it is again the loss that is the say after

this if you take into account this is a loss, 17,592 is the loss, in the next case it is going to be how much? 46,605 is going to be the profit after tax incremental profit after tax.

And then it is going to be the again same figure 89,403 is the incremental profit after tax. And then in the next case it is going to be again same figure 1,17,936 and or 35 we will have to make because there is difference of 1 rupee, so will be have to make it 35 here, this is 35 and last amount is going to be incremental profit after tax is again same amount 1,36,957. So, this is incremental profit after tax we have calculated.

Now, we will calculate the net salvage value, net salvage value. How much is the net salvage value? We have to calculate the net salvage which is coming up in the last year, 5 years. And this is going to be how much? That is the value left after the depreciation. And depreciation we have to charge for a period of 5 years at the rate of 33 and 1 by 3 percent. So, the salvage value is going to be the market value which the asset is going to fetch after selling it of in the market after 5 years.

So, this is going to be this much and next thing is the net initial outflow initial investment or outflow you can say is how much, this is 11,55,556, is the initial investment we have done. And finally on the bases of this you can calculate the operating cash flow, operating cash flow, so we calculate the operating cash flow it will be the we will be taking account the operating part of the form and in this case operating cash flow we are going calculate, so we have calculated he initial investment of 11,55,556.

And the operating cash flowing is going to be how much? It is going to be in this case 3,67,593, and in the next case it is going to be 3,03,395, in the next case it is going to be 2,60,596, next case it is going to be 2,32,000, 2,32,064, so this is the 1 and 2,32,064, 064. And next thing is 2,13,043 is going to be the operating cash flow. And now the terminal value, terminal cash flow, what is going to be the terminal cash?

Nothing here, nothing here, nothing here, nothing here, nothing here and we are going to get the same amount that is 1,52,172 as the terminal cash flow is going to be this and after all this calculation we are going to find out the last figure and the final figure which is called as the net cash flow. We are going to find out the last figure that is the net cash flow and this ultimate objective of doing this all analysis.

So, net cash flow is going to be a the sum total of all the calculations we have done here that terminal cash flow, we have to add up into the operating cash flow and then we will be able to find out the net cash flow. So, in this case net cash flow is going to be how much? Net cash flow is going to be in this case 3,67,593, in this case it is going to be the same figure no change 3,03,395 and in this case it is going to be 2,60,596 and in this case it is going to 2,32,064, in this case only we are going to make this plus this plus.

So, if you make this plus this plus it works out as 3,68,215 is going to be the final amount is the cash flow net cash flow in the year that is called as a year 5. So, in this case if we look at the total cash flows, the cash out flow which we have worked out is a net cash flow that is 11,55,556 and in the say over the subsequent 5 years, when we have calculated the cash inflows, we have been able to find out that is the cash flows here, in the first year though there was a loss, but that loss has been say finally as given as because of the depreciation amount.

And what was a depreciation amount? That was the say incremental depreciation when we calculated it was 3,85,185 and from this when we subtracted the loss figure after say setting a setting aside the text part because that benefit we will be taking up in the next year, from the profit of the next year the loss of the previous can be adjusted, so that benefit we will be taking. So, in this whole case after miss the whole analysis at the end of the first year we had the positive cash flow and that cash flow was 3,67,593. And in the subsequent years you have the positive cash flows anyway.

And in the last year the cash flow which we have worked out is in that the cash operating cash flow we have added up the your terminal cash flow also which is basically the book value. It was given to us that after say buying the machine and using it for a period of 5 years; we have bought it for 16,00,000 rupees and used it for a period of 5 years. So, the book value, whatever the book value will be at the end of the fifth year, that will be realizable, that will be the market value also, that will be realizable from the market.

So, we have found at that this is the book value of the machine of the new hammer purchase for 16,00,000 rupees that was 1,52,172. So, at the end of the fifth year one cash flow will be operating cash flow and second will be the terminal value. So, 2 cash flows will be available with us. So, finally if you try to find out how much is the sum total value of this cash flows so it is 3 3 6 and 2 8 and then it is to 10 13.

So, I think the non-discounted figures are going to be more than the say the cash outflow, net cash outflow has taken place that is 11,55,556. But if you discount this figures for the given discount rate or the cost of capital, I am still hopeful that the decision should not be negative, there may be some sum negative NPV, but simply just say taking the decision on the bases of marginal negative and PV, if this machine is going to give us other say multiparous advantages maybe as the buy products.

So, which cannot be countrified normally you can call it as they are the qualitative benefits. So, as I discuss in the previous problem here also I would emphasize upon, that after calculating the cash flows the next thing is calculating the net present value. So, this value will remain the same, but these values we have discount and after discounting we have to calculate NPV. So, whatever the NPV comes normally the rule of thumb says NPV has to be at least 0. So, there cash out flow is equal to cash present value of the cash inflow.

So, normally that is the rule of thumb. So, if that rule of thumb is applied by the company in this case, so maybe the decision goes against the replacement of the old asset with the new. But if some other multiparous advantages are also kept in mind, then the management of the company may decide that ok still we are going for the replacement of the machine because it is going to give us so many other say qualitative benefits also, improve the product quality, customer satisfaction.

And anyway the saving are going to be there and increase in the revenue is also going to be there. So, this decision has to be taken in totality, but at this point of time our job was because we are learning about estimation of the say cash flow in case of the capital budgeting decisions. So, we have done that and we have learnt sufficiently I think after doing 4 - 5 problems of the different types, that how to estimate the cash flows both out flow and inflow which will be more relevant useful for the any kind of capital budgeting decisions.

So, with this discussion with this discussion I would stop here and I will complete discussions on the say estimation of the cash flows. So, next time we will talk about the new topic, new say part of the discussion with regard to this financial management and the next topic which I will start talking in the next class onwards is that is the say management of risk in the capital budgeting decisions or in the capital budgeting say projects, you call it as management or you call it as the assessment of the risk in the capital budgeting decisions that I will start in the next class or from the next class onwards till then thank you very much.