Financial Management for Managers
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Lecture 42
Risk Analysis in Capital Budgeting - Part III

Welcome on. So, now, we will learn about the techniques of risk analysis and first technique we are going to discuss in this class is the sensitivity analysis, that how sensitive the project is or the investment proposal is towards the see different variables. And when we change one variable out of the different variables, maybe the investment is one variable, which is a cash out cash outflow.

And then if we change the sales as one variable or we changed the variable costs as another variable or we changed up Fixed Cost as another variable, so how it is going to impact the NPV of the project. So, we have created the situation here assume that this some company, who they want to miss add up this new facility here, maybe you assume that it is a flour mill and say, Raja flour mill, we can assume that they want to start up a new flour mill, they want to establish a new flour mill, and they are evaluating the investment proposal carefully.

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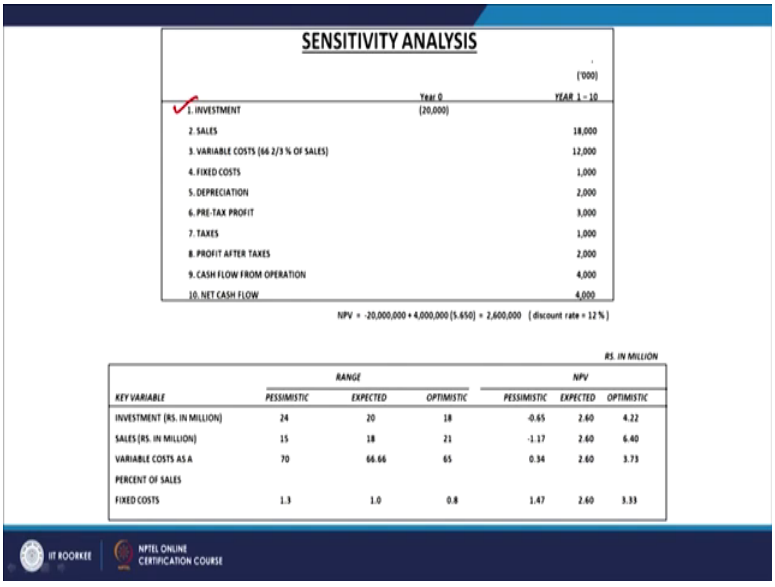

And they have estimated that how much investment is required in this new business and how means the other factors are going to be there. So it means, we can see this total information given here and if you (lok) talk about in this case, the investment requirement of the form is how much this information or these figures are in thousands. So it means it is the 20,000 thousand, it means how much, it is 2 crores, the investment of the 20 million is required.

So, this is the investment estimate, which has been estimated on the basis of the detailed project feasibility report, largely based upon the technical analysis (include) included in that report. So, technical analysis is that the requirement of the land, building, plant and machinery, total investment requirement we have anticipated is that for establishing the flour mill you need to spend minimum 20 million rupees or 2 crore rupees.

So, this is the investment which has been estimated here. And then we have the similarly, the other variables say, out of this total say, analysis we have found out and the first thing is the revenue that is because of the sales. How much sales are going to be there and what is going to be the annual revenue? And the time period taken here is the 10 years. So, for all the 10 years, we are going to take the same figures, they are not going to change, means to this is a limitation of the say this kind of analysis But still not doing anything is always better to do something.

So, we have anticipated keeping the things simpler that sales are expected to be say how much, 1 lakh and 80,000, sorry 1 crore and 80 lakhs, 1 crore and 80 lakhs and this every year this this much of the sales are required. So, it means total sales are 18,000 and with these the figures are in thousand.

Similarly, the say variable cost, if you talk about variable cost is two third of the sales and if we talk about the variable cost this is going to be your 1.2 crores and similarly, the fixed cost, fixed cost is expected to be it is say 1 million rupees and then the depreciation we are going to say follow here as the say which one that is a straight line method, fix instalment method.

And we have calculated the depreciation here which is a you can call it as how much 20 lakhs of the depreciation is going to be there, 2 millions of the depreciation is going to be there, because 20 millions you are going to be the say total investment we are going to make. So, it means the depreciation is going to be 10 percent and the salvage value expected out of it is 0. So, total plant and machinery is going to be depreciated at the end of the 10 years.

Pre-tax profits if you see we have calculated here are say 30 lakhs and the similarly your taxes we have calculated here are 1 million that is one third is the tax, tax rate is 33 and 1 by 3 percent is a tax rate. So, we have calculated these taxes here and after that profit after tax calculated is 20 million, 20 lakhs or 2 millions and cash flow from operations is where we are taking only two things. One we are taking depreciation and second we are taking the profit after tax. So, cash flow from operations is the 40 lakhs.

So, 4 million is the profit cash flow from the operations because the profit is 2 millions and the depreciation is 2 millions. So, the cash from the operations is cash flow from the operations is 4 millions or the 40 lakhs and finally, the net cash flow is the same amount, there is no other change, this note terminal cash flow or something like that, because salvage value expected from this investment is 0. So, and depreciation is rate is 10 percent.

So, we are going to depreciate this investment over a period of 10 years and at the end of the ten years period of time entire the structure will have the 0 salvage value. So, we are calculating the depreciation here as per the SLM method. So, if you look at all these estimates, if you look at all these figures, then you can say that, say your sales are 1 crore 80 lakhs, your variable cost is 1 crore 20 lakhs, there your fixed cost is say 1 million, your depreciation is 2 million, your pre-tax profit is 3 millions.

And because similarly, we are going to calculate this, variable cost we have calculated here is some amount and from this say sales minus variable cost is how much, 18 minus 12 is 6, and from the say this 6 we are going to subtract furthermore 6, fixed cost is the 1 million and then the depreciation is 2 million. So, your profit before the taxes half that is 50 percent that is 3 millions and taxes are 1 million. So, it means profit after tax is 2 millions, 20 lakhs and cash flow from operations in total adding up the depreciation into the profit after tax is 4 millions and net cash flow is the same amount.

So, it means when you are going to get this net cash flow means this is without any kind of the sensitivity analysis. This is basically the cash flow estimation, this is basically the cash flow estimation. And after that, when we have say discounted these cash flows, when we have discounted these cash flow. So, we have discounted these cash flows, we have calculated the NPV. So, it is done here.

NPV of the project has been calculated that the total investment is how much this is the 20 millions of the investment is going to be made, 2 crores of the investment is going to be made. And out of this the say the total cash flow available is how much it is available as the 40 lakhs of the four millions, but this is in annuity, this will be available, this cash flow will be available for a period of next 10 years. This is in the annuity. So we have multiplied it by the factor.

So how we have calculated this value. Let us do it, we can do it, we can calculate the NPV of the project. By say discounting the cash flows, since the cash flows are going to remain same,

so you can treat them as the annuity cash flows, cash inflows, because 4 millions are going to be available, 40 lakhs are going to be available all the 10 years. So, we can calculate the NPV of the project.

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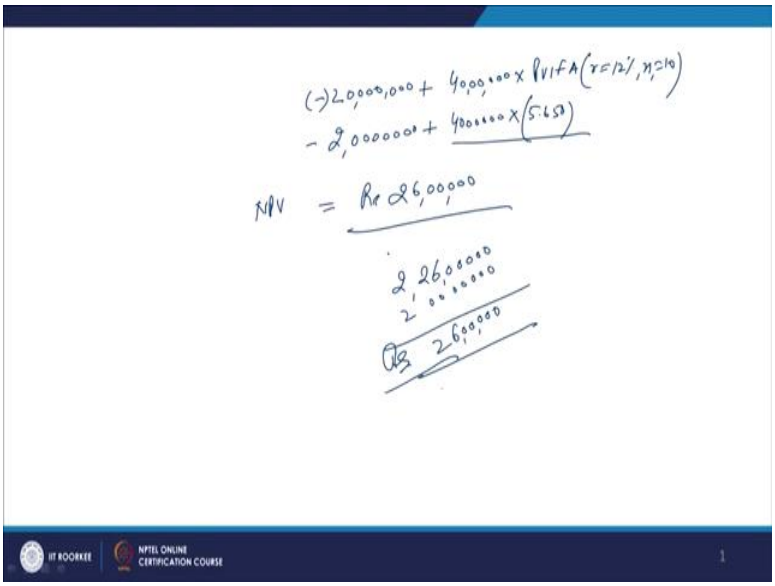

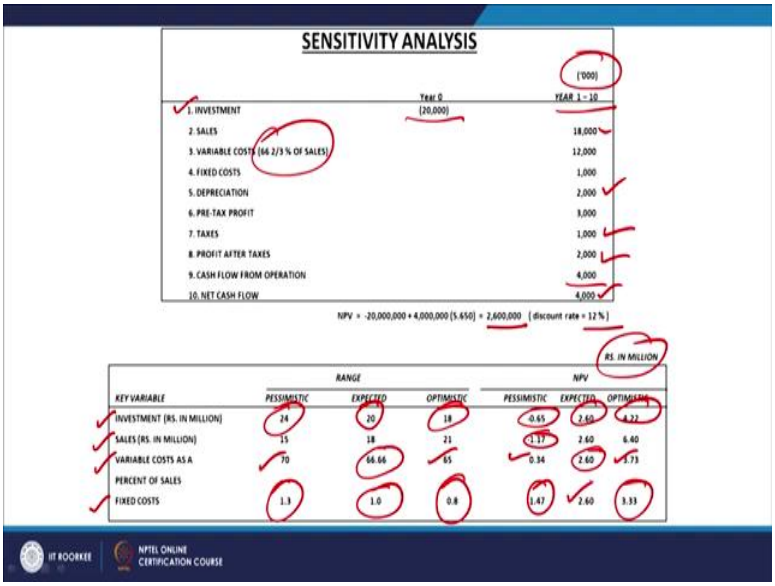

So, it will be something like this, it is how, it is you can say that is the investment we are going to make is 20 millions or 2 crores. So, this investment is here we are making this is the in minus, then plus how much is 40 lakhs, we are going to make this 40 lakhs. So, 20 millions or 2 crores you can say, 2 crores is the investment and every year you are going to get the 40 lakhs or 4 millions of the cash inflow and that to for the next period, next 10 years period of time.

So, you can treat it as annuity. So, you have to discount it with some factor which is known as PBIFA, you have the different table and table values or different process for discounting the cash flows which are in annuity and are we have expected taken here is the cost of capital we have taken here is that is 12 percent and taken here is 10 years that is already given to us and taken here is 10 years.

So, it means, finally, the value which we are going to get here is this is 2 crores. So, in this case 2 crores value is going to be this much, mine 2 crores, 1 2 3 4 5 6 7, yeah 2 crores plus minus 2 crores plus 40 lakhs, 40 lakhs into the factor value when we have seen the table, the value of the, this factor is 5.650. The discount factor we have applied for the present value interest factor, we have applied it for the annuity and when you multiply it this and when you solve this entire process, you will get here that the NPV of the project, NPV of the project is rupees 26 lakhs.

NPV of the project is 26 lakhs. It means when you solve it, so we have found it out if you multiply, this you will find out some figure like you can call it as test 2 crores 26 lakhs. This is that I think outcome coming out if you multiply this by this factor, so this will come out as 2 crore 26 lakhs and we are already making the investment of how much, the total investment we are making here is that is of the 2 crores.

So, it means finally your NPV of the project is 26 lakhs we have calculated here, this is the NPV of the project and since NPV of the project is 20 lakhs which is a positive NPV. It means the final outcome of this analysis on the basis of the cash inflow and outflow sees that he has the project can be taken up and we can go ahead with the proposal. So, this is the result of the most likely estimates that yes, if everything goes well, then our say anticipated things will happen like that and we are going to have a positive NPV of this amount of 26 lakhs.

So, it means it is a positive proposition, is a good proposition, is a good investment proposal and our cost of capital we are applying here is 12 percent. But now, as I told you that we have to apply the sensitivity analysis, we have to go for the risk analysis. So, this risk analysis done in the lower table, where we have say created the three scenarios, but these three scenarios are not say based upon say changing or bearing the multiple variables in one go, only one variable at one point we have changed and then we have seen the impact upon the NPV.

So here you, for example, you take the first variable is the investment we are taking. Here we have taken the first variable is a investment, most expected or the most likely scenario is this, where we have anticipated that 20 millions of the this is the rupees in millions we are taking, so it means that in the most likely scenario, in the most expected scenario 20 millions of investment is required to be made in this project. And if 20 millions of the investment we make, if there is no change in the investment if then NPV of the project will be expected is 2.6 million.

But when you change it, you only bearing only one variable at a time, if you change the investment and move towards the pessimistic side set and not expect that only 20 millions will be required to be invested, we can say 24 millions will be required to be invested. So when (to) investment goes up by say 4 millions, so you can say, finally the NPV, other factors are remaining the same, we are not changing, so NPV of the project becomes negative that is by 0.65 million.

The NPV of the project is negative and the NPV of the project works out this like this. And in the optimistic scenario, we are saying that we are not required to shell out 20 million rupees rather it will be sufficient to invest 18 million rupees and if the investment goes down other factors remaining the same, your sales are same, your variable cost is same, your fixed cost is same, your depreciation is same. So, it means because depreciation will come down anyway.

Because it will be 10 percent so it will come down because the investment has come down to 18 million. So, it will come down to not, it was 2 million to 1.8 million. So, it will come down accordingly. And finally, the NPV of the project will be in the optimistic scenario will be 4.22 million, so it will not be 2.60 million, but it will be 4.22 million, it will go up, because your sales are remaining same, your variable cost is remaining same, your fixed cost other than depreciation is remaining same.

So, it means your NPV will have the positive impact. Second thing you can change the sales. If you change the sales keeping the other factors the same, then this is going to be the NPV. Because most likely scenario was 1.8 crores, 18 millions of the sales were expected to be made. But if the sales come down to 1.5 crores or the 15 millions, then the NPV will also become negative by this amount and if the sales go to 21 million, then the NPV of the project will become say 6.40 keeping the other factors same.

Similarly, we talk about the variable cost, if you change the variable cost, because variable cost as a percentage of sales, because we have taken the variable costs as a percentage of sales here and that works out as 66 and 2 by 3 percent. So variable cost we have taken here it is the most likely in the most likely scenario, it will be 66 and 2 by 3, but it goes up to 70. What will happen? This will happen. If it comes down to 65 this will happen, in the normal circumstances, the NPV of the project will be same in the most likely scenario.

Fourth variable we have changed is that is the fixed cost, fixed cost normally is expected to be other than depreciation, is expected to be 1 million rupees, but if it becomes 1.3 million rupees, what will happen, this will happen, your NPV will be positive but will come down from the 2.6 million to 1.47 million and if it goes down from the 1 million to 0.8 million, 80 percent of the most likely scenario, so what will happen?

This NPV will become this that is 3.33 right and in the most likely scenario, this is in any way going to be there. So, this all analysis is done to apply the technique of sensitivity analysis and sensitivity analysis be call it because how sensitive this investment proposal is towards different variables that if one variable is changed at a time and other variables remain the same, how this proposal will be looking like and what impact upon the NPV will be seen.

So, we are say trying to find out the sensitivity level of the NPV of the project because or say towards the, say the variables towards the variables of the project and variables are investment, variables are sales, variable is your variable cost, your fixed cost, your depreciation all these variables. So, how sensitive your NPV or NPV of the project is towards the different variables making the total project.

So, this analysis has been done like this. And I would tell you here I would like to share with you that this is the most widely used analysis in the practice for every investment proposal. Normally, we do the other kind of analysis also because one analysis is not complete is not sufficient in all the cases we do other analysis also, but sensitivity analysis is always done. And along with the sensitivity analysis, we can do the scenario analysis or we can calculate the breakeven point or we can do any other kind of analysis.

But sensitivity analysis is always done, why we do it, because of certain say positives associated with this method. What are the positives associated with this method? That say, we want to find out by applying the sensitivity analysis that how sensitive the NPV of the project is towards the different variables. So, it means how robust or how vulnerable other way

around you can say sensitivity is seen as in terms of the robustness or the vulnerability of the different variables and how they are going to affect the NPV of the project.

This is the one important thing and sensitivity analysis makes it possible so we use this method. Second important positive of this method is that we can say that if they are going to be some factors, which are going to create a problem, means, for example, sales are not going to be as anticipated. For example, if your variable cost is not going to be as anticipated, because we have seen the risk factor also, we have seen the negative part of the project also, then how to contain it.

So, out of the different variables, out of the different variables applying one by one and seeing the sensitivity of the change in the say NPV because of the change in one variable, we are able to find out which variable is going to be the most vulnerable with regard to the performance of the project. And if that is known in advance, we can take the corrective actions, we can take corrective actions.

If more than one variables are there, then certainly we can take corrective action against all but at least if the one is found, then we can contain the say the risk involved in that and the corrective action can be taken. And third important the part of this this particular method is, it is very simple to apply and very say easy to implement this method as far as the risk assessment of the project is concerned.

There are some negatives also associated in this and when you talk about some negative parts, the first negative part of this sensitivity analysis is that we can say that, say, for example, we are talking about the sales are not going to be anticipated, but they are not going to be as anticipated but less than that. So, we are saying that in this case, for example, we have seen that sales are not going to be your 18 millions, but 15 millions. Now, what is the basis of this change in the sales?

Or how likely it is going to be there, certainly be there and going to affect the performance of the project? How likely? So, that likeliness is not answered by this technique, the technique only says that if sales go down, if sales go down, but will happen, but how likely it is sales will go down and how likely it is sales will go up that is not answered by this technique. So, this is one more important limitation of this particular method.

Another limitation is that we change only one variable at a time, whereas more than one variable must be or may be affecting the performance of the project. So, for that we have the solution in terms of the scenario analysis, but sensitivity analysis you can see, you cannot say straight way rule out that this is not at all a good technique or acceptable technique, it has many positives, it has many say associated benefits with it.

And third important limitation is that this is a treated as a very subjective analysis. Some experts rejected that this analysis is very subjective analysis because all these changes we are say making for creating different scenarios. Whether it is a pessimistic scenario or the optimistic scenario, we are only expecting that this will happen or that will happen. But that is only based upon the human estimates, though people are expert who make all these estimates make all these changes, they are good consultants, they are good experts, they have good long standing experience in the market.

But still the element of subjectivity is more in this method. So, because of these some limitations, people criticize it. But you can still say this criticism is more theoretical and practically, the method is very-very useful and hardly there is any investment proposal where the risk analysis has to be done and the sensitivity this analysis is not done is the first and the foremost. As I told you in the capital budgeting proposals, evaluating the capital budgeting proposals, payback period method we cannot afford to ignore.

Maybe we can go for discounted criteria also but even the non-discounted criteria and in the non-discounted criteria you cannot afford to ignore the payback period method. Payback period method is always applied by you can call it as knowingly or unknowingly always the payback period method is important and we make use of that, maximum improvement we can do is that we can use the discounted payback period method or we can discount those cash flows expected but yes that without that method, no capital investment proposal proceeds ahead.

Same is the case here that in the sensitivity analysis also it has some inherent limitations, but hardly there is an investment proposal where the risk analysis is done without the say applying this technique of the sensitivity analysis. So, this is a first and the most useful technique and we always use this technique. Then we go to the second technique and second technique is the scenario analysis.

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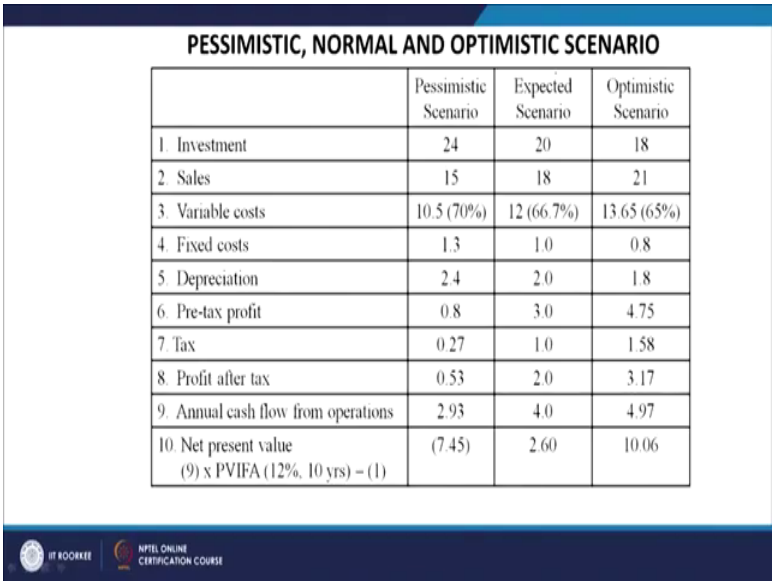

	Pessimistic Scenario	Expected Scenario	Optimistic Scenario
1. Investment	24	20	18
2. Sales	15	18	21
3. Variable costs	10.5 (70%)	12 (66.7%)	13.65 (65%)
4. Fixed costs	1.3	1.0	0.8
5. Depreciation	2.4	2.0	1.8
6. Pre-tax profit	0.8	3.0	4.75
7. Tax	0.27	1.0	1.58
8. Profit after tax	0.53	2.0	3.17
9. Annual cash flow from operations	2.93	4.0	4.97
10. Net present value (9) x PVIFA (12%, 10 yrs) – (1)	(7.45)	2.60	10.06

As I told you the scenario analysis, and in the scenario analysis when we apply the scenario analysis, we create these different scenarios. This is the expected scenario we have already created and this is NPV we have already found out. And this is called as now the pessimistic scenario, which is created here, this is called as optimistic scenario created here. And in this scenario we look at that, say all the variables are changed.

So, if we are talking about the investment is not 20, investment we are expecting is 24, sales are not 18, sales are expected to come down to 1.5 crores or maybe the 15 millions. Similarly, variable costs we are not expecting to be 66.67 percent but 70 percent of the sales, fixed costs we are expecting to go up by say, how much 0.3 million, it is not say 1 million, but 1.3 million, depreciation will automatically change because when the investment changes, depreciation will also change.

So, it means we are changing all the variables as compared to these most likely scenario, we are changing all the variables here and we are seeing that the NPV has now become seriously negative, highly negative, because we have increased or changed all the variables. Similarly, for creating the optimistic scenario, we have lowered down the investment, we have increased the sales, we have lower down the even variable costs also from 67 or 67 percent to 65 percent.

Fixed cost is we are saying that it will be 80 percent of the most likely scenario and depreciation is we are anticipating here is that naturally when the fixed investment will come

down so depreciation will also come down and finally, means the changing all these 4 important variables, largely 4 variable, depreciation is outcome of the investment, so your NPV is getting positively affected and it is increasing from the 2.60 million to 10.06 million.

Or you can call it as it is going to be 1 crore and 6 lakh rupees. So, very, you can say serious growth in the or very effective, significant growth in the NPV of the project. So we can create these different kinds of scenarios. The only difference is in the NPV in the sensitivity analysis, we change only one variable at a time keeping all other variables the same. For example, you will change investment, but sales will remain the same, variable costs will remain the same.

Your your fixed costs will remain the same. And then we will see the impact upon NPV or sometime we can change the sales, but the investment will remain the same, your variable costs will remain the same fixed costs will remain the same. So we change only one variable in the sensitivity analysis. Whereas in the scenario analysis, we change more than 1 variable and then we see the impact of the entire process on the NPV of the proposed project.

And then we try to find out that which scenario is expected to be there in the market, if expected, is there then it is a win-win situation, optimistic is there far more a better situation, but even if pessimistic scenario is there, then are we able to sustain in sustain in the market? Should we still go ahead with the project or should we abandon the project? And here now, as I told you in the limitations of the sensitivity analysis, only problem which is here is that how likely it is?

These two, how likely they are going to happen? How likely it is the pessimistic scenario will emerge? How likely it is the optimistic scenario is will emerge? So that likelihood finding out or assigning the probability of emergence of any kind of the scenarios is a million dollar question which is a very complex job that is why people call it as is subjective analysis. But subjective analysis is done by the subject experts, by the people who are in the market for the ears and who understands the market scenario very well.

So, if they suggest something to be done, I think we have to accept that and we have to say create different scenarios and then try to find out that even in the pessimistic scenario if the project is going to be viable, then there is no point rejecting the proposal. But under the pessimistic scenario, the difference between NPV of the expected scenario and the pessimistic scenario is a seriously high that we have to think twice.

For example, in this case, NPV of this most likely scenario is 2.60 positive NPV, but here the negative NPV and almost you can say it is approximately 3 times of the NPV which was expected to be there in the expected scenario. So, now in this case, we have to be means carefully look at it, whether we should go for establishing this flour mill or not. Because if expected things happen, fine. It is acceptable. 26 lakhs of the NPV is expected over a period of 10 years.

But if pessimistic things happen then means the existing firm who is going to have the another say unit of manufacturing the flour, wheat flour or any kind of the flour is means going to affect the health of the existing firm also or the sponsorer also. So, it means the difference is too high between the most expected and the pessimistic. So, we have to be very careful and we have to be means a very means reasonably taking care of all the factors so that later on people have not to worry about that had to be means trusted the pessimistic scenario, we would not have ended up say making this kind of the situation or severe losses to the firm.

So, this is the, these are the two techniques sensitivity analysis and that scenario analysis. Next one is the third one is the again a very important technique and we call it as this technique, we call it as the breakeven analysis. So, breakeven analysis we will learn as a technique of analysis of the capital budgeting proposals in three forms? We can calculate three breakeven points, we can calculate three breakeven points and under three breakeven points we try to find out that whether we are able to reach at the no profit, no loss situation at the earliest or not.

Because we all understand, what is breakeven point? Breakeven point is that point or that situation of the firm, where the total say cost of the say of the firm, all kind of the costs are equal to the total revenue and we are in this state of the 0 profitability. There is no loss, no profit, the situation is no loss, no profit, the benefits of coming out of the project are equal to the cost and we are we just breaking even that our cost is equal to the benefits or vice versa.

And there is no profit till this point, but objective of every business or every promoter of every business is that should that they should try or their business should reach at the breakeven point at the earliest. So that after crossing the breakeven point, after that whatever the sales, they make production and sales, they make, the firm will start earning the profits. So, we do the breakeven analysis also, because after breakeven analysis, there are the green pastures available.

So we will, we want to reach up to those green pastures. So, breakeven analysis helps us to understand how quickly the firm is going to reach at the breakeven point where the total cost of production is going to be equal to the total sales and we are going quickly we are going to reach out of the state of the no profit, no loss. So as I told you, we are going to have the 3breakeven points.

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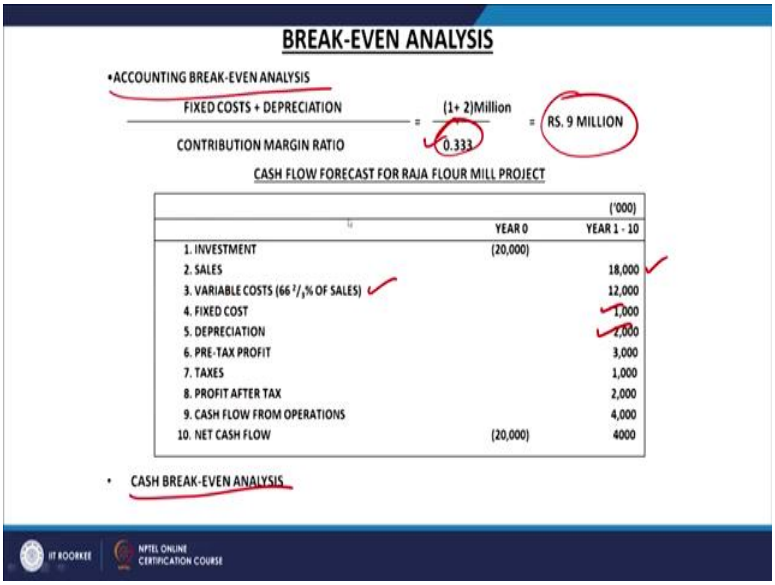

So, first breakeven point we are going to learn about is the accounting breakeven point accounting, breakeven analysis, or accounting breakeven point. Second breakeven point is the cash breakeven point We are going to learn about is the cash breakeven point that is the cash breakeven point is the second one that is we are going to learn about or we are going to calculate the cash breakeven point and third one will be the breakeven point, which is called as financial breakeven point.

Third one is the financial breakeven point. So, we are going to calculate these three breakevens. We are going to learn about that when we in the accounting, for example, if you have already studied the accounting, then you must have heard about the breakeven analysis or maybe the marginal costing if you have already studied, you must have heard about the breakeven analysis, but that analysis you have heard about till date must be the accounting breakeven analysis.

So, how we calculate the accounting breakeven point? Accounting breakeven point is basically we take these 2 this is a formula, we divide the fixed cost by the contribution margin ratio, we divide the fixed cost by the contribution margin ratio, fixed costs when we

take for calculating the accounting breakeven point is, so we take the fixed cost plus depreciation, fixed cost plus depreciation so 2 fixed costs.

So, total fixed cost we take into account and divided by the contribution margin ratio. Contribution how we calculate? Selling price minus variable costs or sales minus variable cost is the contribution. So, in this case we have calculated the accounting breakeven point which has been worked out as 9 million rupees. How it has been calculated? For example, the details are given here.

Say, for example, the cash flow forecast of Raja Flour mill project which we discussed in the previous case, in case of the sensitivity analysis and scenario analysis, we are taking that example forward. So, we are again taking it means like that the most likely scenario and we are treating here investment is 20 millions, sales are 1.8 crores or 18 millions, then variable cost is 12 millions, fixed cost is 1 million, depreciation is 2 million and then similarly the other things have been worked out.

So, we have first calculated the contribution and here we are saying that our variable cost is 66 and 2 by 3 percent or maybe you can say it is 66 and say 67 percent. So, in that case, if you calculate the contribution margin ratio, you can say that is the contribution margin is sales minus variable cost is the contribution and contribution here it is show is 0.333 or 33.33 percent. And in the numerator we have taken that fixed cost and depreciation, fixed cost given to us here is the 1 million and it is 2 million.

So, we have added up the, this becomes 3 million, so 3 million divided by this contribution margin ratio of 0.333, then it is equal to the 9 million rupees then it is equal to the 9 million rupees, so it means your breakeven sales are 9 millions. How much sales we are totally making here? The total sales expected here are say 18 millions of the sales, every year we are going to make the sales of 18 millions, but after making the sales of 9 millions will be at the breakeven point and after that, whatever the sales the remaining 50 percent of the sales be make that will be giving us the profitability.

So, this is the concept of the accounting breakeven point. So that means may, say so that it can help us that if you are satisfied with this 9 million, then fine, go ahead, but if you say that reaching up to 9 million will be taking a longer time. So, we will have to look for the improvement. How can you look for the improvement? Either you improve the contribution

margin ratio that you reduce the variable cost. It can be done because variable cost is always variable, it can be controlled or you can control the fixed cost other than depreciation.

So anyway, you have to means control the cost or you can improve the revenue also. You can increase the selling price or you can increase the sales volume and then you have to increase the total sales amount. So, either you reduce the cost or you increase the sales, so that you can further improve upon the accounting breakeven point, but from the present calculations, the accounting breakeven point workout here is 9 million rupees.

So, up till 9 million rupees, we will not be earning any profits, but after that remaining sales 50 percent of sales, yes, will be giving us the profit. Then is the concept of the your cash breakeven point. When you talk about the cash breakeven point, in the cash breakeven point what we do? In the cash breakeven point we take, we calculate it something like this that we do not take the depreciation into account.

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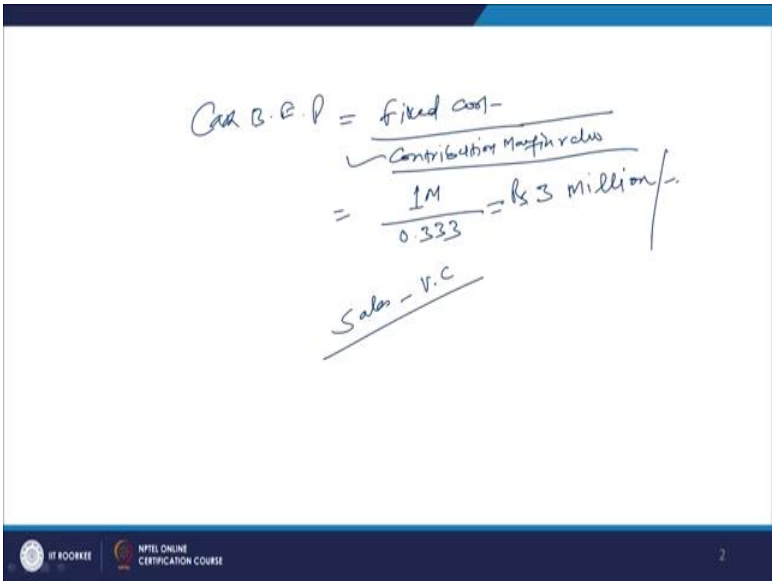

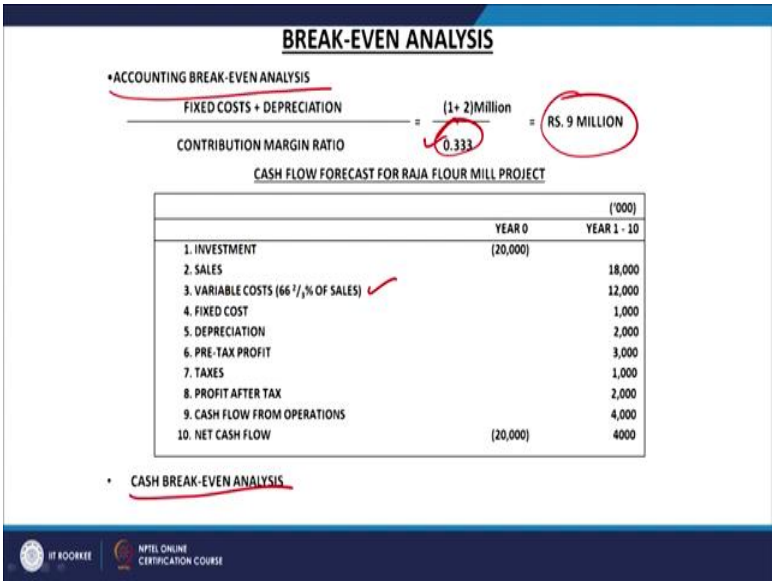

We do not take the depreciation into account we take only, the formula becomes the cash breakeven point, cash breakeven point, it becomes like fixed cost divided by the contribution margin contribution margin ratio, this becomes like contribution margin ratio. So, in this case if we calculate the cash breakeven point from this, so how we can calculate this cash breakeven point, we have not to include now the depreciate this depreciation So, what is the fixed cost? If we look at the fixed cost, only the fixed cost fixed cost is the 1 million rupees.

So, it is going to be one divided by 1 million divided by the ratio contribution margin ratio and this is going to be how much? Point 0.333 and if you calculate this, then it comes up as equal to 3 million rupees. It works out as rupees 3 millions, so if you want to calculate the cash breakeven point and you want to recover only the fixed cost which is other than the depreciation, which is only one third of the total fixed cost because two thirds is the depreciation, one third is the fixed cost.

So, if you want to calculate the cash breakeven point, you can say that recovering the, because in this contribution margin, variable cost is already recovered, variable cost is already recovered. So, how you calculate the contribution? Sales minus variable cost. So, we have already calculated this ratio and in this contribution margin, variable cost has already been taken care of, and then to arrive at the profit. Now, from this contribution, but you have to subtract you have to subtract the fixed cost.

So, contribution minus fixed cost becomes the profit. But here because, to arrive at the profit, you have to first meet the fixed cost. So, breakeven point can be calculated like accounting breakeven point is the fixed cost plus depreciation divided by the contribution margin ratio

and in case of the, case of the cash breakeven point only the one millions of the fixed cost, only fixed cost of 1 million has to be, means the fixed cost which we are going to pay in cash.

For example, the your administrative expenses are there, general expenses are there, employee salaries expenses are there, all those expenses which are paid in cash for recovering those fixed expenses, you require only 3 millions of the sales and for requiring the fixed investment part also which is in terms of the depreciation they calculate, if you have to recover that also, then you need to make the 9 millions worth of the sales to arrive at the breakeven point because depreciation amount is quite high.

But if you simply want to recover the cash, fixed expenses or fixed expenses incurred in cash, then only the sales worth rupees 3 million are required. After 3 million rupees of the sales, all costs stand recovered and after that whatever the sales, production and sales will we make that will start giving as the profits. So, this is the concept of the accounting breakeven point and the cash breakeven point which sometimes we use as a technique of the say risk analysis in the capital budgeting proposals.

Third breakeven point that is the financial breakeven point is basically the one which helps us to find out that at what level of sales, at what level of sales, the NPV of the project will be 0, because there we want to find out. The financial breakeven point requires that at what level of production and seeds NPV of the project will be 0, means at 0 level of NPV the project is expected to be at the financial breakeven point. So at what level of the sales, the NPV of the project will be 0. That point is called as a financial breakeven point.

So, how to calculate that financial breakeven point where means that amount of the sales with the NPV will be 0 that we will discuss in the next class. We will learn about the financial breakeven point in the next class. For the moment, I will stop it here after discussing the techniques like sensitivity analysis, scenario analysis, and two types of the breakeven analysis that is the accounting breakeven analysis and cash breakeven analysis and remaining discussion about the financial breakeven analysis and other techniques of the say risk analysis in the capital budgeting proposals. I will discuss with you in the next class.

Till then thank you very much.