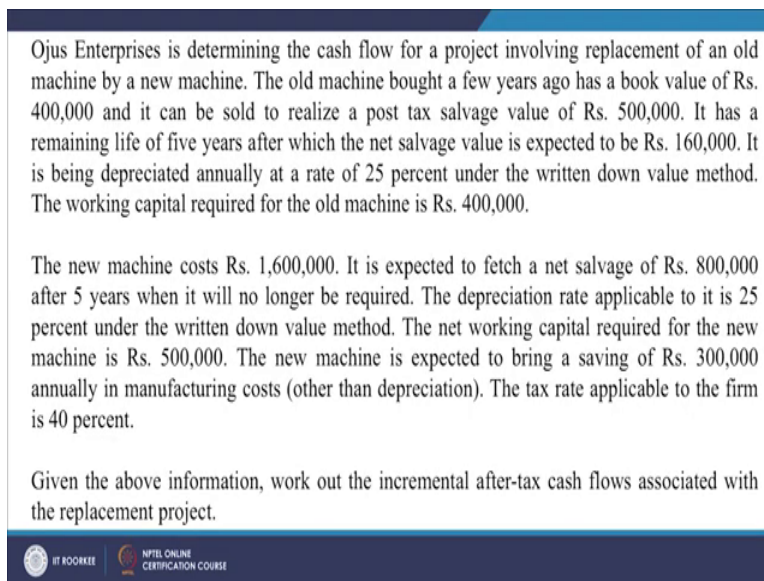**Financial Management for Managers**
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Lecture 36
Estimation of Project Cash Flows
Part VIII

Welcome all. So, after just initiating the discussion on that cash flow estimation about the replacement projects. Now, we will learn practically how we calculate or how we estimate the cash flows for the replacement proposals. And here is one more problem, the third problem with regard to the estimation of the cash flows. So, first we will read the problem carefully understand it, what is the information given here and then we will see but important things happened taken into account for calculating or for estimating the cash flows in case of the replacement project.

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Ojus Enterprises is determining the cash flow for a project involving replacement of an old machine by a new machine. The old machine bought a few years ago has a book value of Rs. 400,000 and it can be sold to realize a post tax salvage value of Rs. 500,000. It has a remaining life of five years after which the net salvage value is expected to be Rs. 160,000. It is being depreciated annually at a rate of 25 percent under the written down value method. The working capital required for the old machine is Rs. 400,000.

The new machine costs Rs. 1,600,000. It is expected to fetch a net salvage of Rs. 800,000 after 5 years when it will no longer be required. The depreciation rate applicable to it is 25 percent under the written down value method. The net working capital required for the new machine is Rs. 500,000. The new machine is expected to bring a saving of Rs. 300,000 annually in manufacturing costs (other than depreciation). The tax rate applicable to the firm is 40 percent.

Given the above information, work out the incremental after-tax cash flows associated with the replacement project.

So, for example, this information given here is say Ojus enterprises is determining the cash flow for a project involving the replacement of an old machine by a new machine, replacement of the old machine by the new machine. So, in this case, the old machine bought a few years ago has a book value of 400 thousands or the 4 lakhs rupees, 4 lakhs. And it can be sold to realize a post a text salvage value of the 500 thousands or the 5 lakh rupees.

It has a remaining life of five years after which its net salvage value is expected to be 160 thousand rupees, 160,000 rupees. It is being depreciated annually at a rate of 25 percent under the written down value method. The depreciation is 25 percent the written down value

method is going to be followed and the rate of depreciation will be 25 percent. The working capital required for the old machine was rupees or is rupees 400 thousand rupees.

It means the book value of the old machine is four lakh rupees and the working capital required for the old machine is four lakh rupees. The new machine which is going to be now added as a replacement of the old machine, the new machine costs 16 lakh rupees, 1.6 million rupees 1600 thousand rupees, this is going to be the cost of the new machine. It is expected to fetch a net salvage value of the 800 thousands after 5 years when it will no longer be required means the machine will be purchased today as a replacement of the old machine will sell out 16 lakh rupees, 1.65 million rupees will use that machine for a certain number of years.

And after that, it will be sold as a maybe a secondhand machine in the market or maybe as a salvage value for the form or whatever it is at the 50 percent of the purchase price and that is at 8 lakh rupees after 5 years, it is given here after 5 years. So, means there is a possibility of the use of the machine for the next 5 years. After 5 years we can dispose of the machine at half of the price of the purchase value and that is that 8 lakh rupees.

The depreciation rate applicable to it is 25 percent under the same written down value method, because in India it is compulsory that the say that depreciation for the income tax purpose has to be calculated under the WDV method, not under the SLM method. The networking capital required for the new machine is rupees 5 lakhs. The networking capital required for the new machine is rupees 5 lakhs. The new machine is expected to bring a saving of 3 lakhs annually in the manufacturing costs, this is the major point.

Why we are going to replace the old machine with the new machine because it is more efficient is more effective is going to say bring us or causes the savings worth rupees 3 lakhs annually as compared to the old machine in the manufacturing cost other than depreciation. The tax rate applicable to the firm is 40 percent. The tax rate applicable to the firm is 40 percent. So, in this means what is required to be done now? Given the above information given the above information, we have to know say estimate the cash flows.

But here the cash flow which you will call it as in case of the replacement projects the cash flow estimation or whatever the cash flows we estimate are called as a incremental cash flows, are called as the after tax incremental cash flows which are associated with the replacement project, which are associated with the replacement project. So, means why we

are going to change the machine because some cash flow is going to be available with the old machine also, but we are going to have the better cash flows, higher cash flows.

So, it means net result is that we are going to have the incremental cash flows. So, that is it one more correction here we have to do that in case of the replacement projects we do not means evaluate it as a standalone, alone proposal or maybe addition to the existing project or adjusting series of the products. It is the same project, same manufacturing process everything only what we are going to do here is we are replacing the old machine with the new machine.

So it means when the old machine is there, some cash flow is coming at that time also. But in case of the new machine, additional incremental cash flow is going to be there. So, that if you calculate the after tax cash flow that is going to be more as compared to the cash flows coming from the old machine. So, the net result here is we have to work out the incremental net cash flow and that is after tax. So, for now calculating or working out or estimating of the cash flows for the replacement projects, it is done here already it has been done.

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So, we can save the time also. Now, one problem first one was like this, second we did our self and then now that this third one in case of the replacement projects is given to us here. So, we can just look at it that how the cash flows have been worked out or in case of the replacement projects, how the cash flows are worked out. So, again we are taking the same thing here we have taken the years on this side and then the this is on the years on this side or you can call it as a particulars also.

This side is a particular this side is a years and now we are taking the same number of years, the functional ears are fine 1, 2, 3, 4, 5 and the current period is called as the 0 period. And in the 0 period, we will estimate largely the cash outflows and then in the subsequent 5 years, we will factor for the cash inflows and then the net cash flow will be worked out at the end of this entire process. So, in the 0 period, in the 0 year in the current period, what is going to be the say will have to first of all calculate the investment outlay, this is the first requirement.

Number one is the investment outlay, which we are going to work out here and this is this is this is something like you call it as the first thing is the cost of the new machine. What is the cost of the new machine? It is given to us that is 16 lakh rupees, since we are giving rupees in thousands, so it means it is 1600 thousands or 60 lakh rupees or 1.6 million rupees. Number two is now the salvage value of the old asset because they are when this is old asset is Going out, you are going to have some salvage value of the old asset and that is 500 rupees.

So, this figure is positive it will come and 16 will go right increase in the networking capital will be 100, because networking capital required in the old machine was 400 million rupees in this it is required as a 500 million rupees which means, the networking capital is going to increase. So, when the networking capital is going to increase because of say the new machine. So, it means that increase is going to be how much by 100 million rupees.

So, total investment if you work out 16 plus 1, 17 minus 5 is going to be the 1200 thousands. 12 lakh rupees actually the net investment is required total net investment required for this replacement project is 12 lakh rupees or the 1200 thousand rupees not 16 lakh rupees or 70 lakh rupees because some cash inflow will be available from the sale of the old machine or liquidation of the old machine.

Now, we go to the point number two, point number two here is that is operating say estimation of the operating inflows and now, because we have to work out the operating cash flow. So, we have to now take here into account the operating cash inflow and cash outflow. So, on account of revenue, the inflow will be there and on account or different expenses cash outflow will be there. So, we will have to work out the net cash operating cash flow.

So, for calculating the net operating cash flow, it may be outflow also, it is not all the times inflow, because if the revenue is less than the cost is more so, it will turn out as a negative cash flow. So, I am calling it test that cash flow not the cash flow. So, what is the operating

cash inflow from the project? Operating cash flow from the, from the project is going to be say here now, we will not talk about the revenue, we will talk about the savings, extra saving.

So, it is clearly given in the proposal if you look at the information given in this PPT. It is clearly given the new machine is expected to bring a salvage value of 3 lakh rupees annually and this is more important. This is the source of revenue because it was also giving you revenue, old also had the cost, new machine is also giving the revenue and new machine also has the cost. So, what is the net difference? In terms of savings, what is the net difference that is important for us?

And here if you look at this, so, savings is how much? Saving is we are taking here after tax savings in manufacturing costs after tax saving, it is clearly given here that is the new machine is expected to bring a savings of 3 lakh rupees annually in the manufacturing costs other than depreciation. So, what is the after tax savings because total savings on that we have to pay the tax also. So, there is a tax rate, tax rate here is the 40 percent.
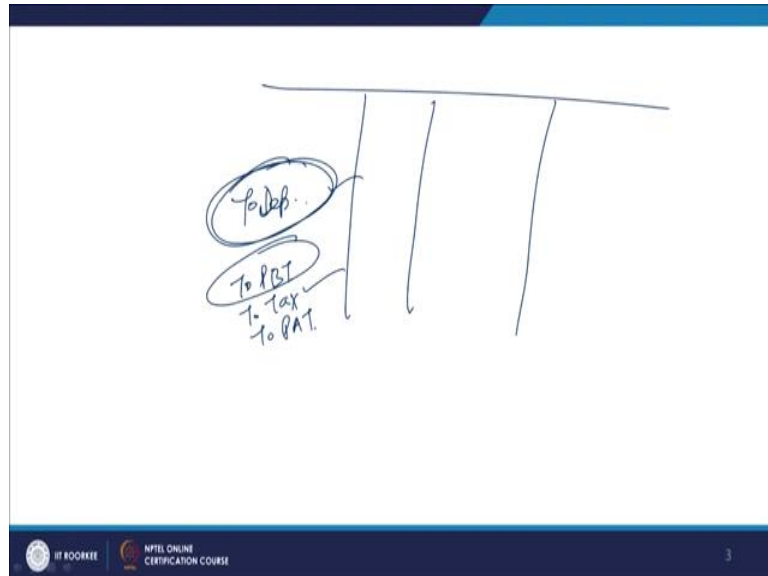
So, what is a total? 3 lakh rupees, we are going to say and minus 40 percent, so, it means finally we are going to have with us is the 180, 180, 180 here 180 here. So, this is the after tax savings in the manufacturing costs, source of first source of revenue and then extra cost we are going to have the depreciation of the new machine. So, what was the rate of depreciation given? Rate of depreciation was given here as 25 percent and what is the cost of the machine? 60 lakh rupees, so 25 percent of 60 lakh is 400,000, 300,000 because it is a written down value method.

225 then it is 168.8 and then it is126.6, this is the on the new machine. But there will be the depreciation on the old machine also. Sorry just for the depreciation on the old machine. What is the depositional old machine? If 25 percent is the rate again and then the method is also the WDV, so it means that old machine was costing to us was how much? 200 thousands and 25 percent of that is 100. So, similarly that appreciation for the old machine you have to work out.

Now how much is the incremental depreciation? Everything is incremental in terms of the revenue also, in terms of the costs because the appreciation we were paying earlier also depreciation we are charging no also. So, how much is incremented appreciation? So, this figure is important for us, this is the important figure for us, so it is called as incremental

depreciation and if you take this incremental depreciation that is 300, 225, 168.7 million 126.6 millions and 95 million rupees.

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Tax savings on the incremental depreciation because when you show this depreciation in the profit and loss account, how we call it as a tax saving because when you show it in the profit and loss account we are talking about as that this is your profit and loss account and you write here as a one cost is two depreciation. And finally, then be a calculator to PBT - Profit Before Tax, then we talk about the two tax and then we talk about the two profit after tax this is the process.

So, when you are showing this as a cost, it means profit before tax will come down by the depreciation amount and when the PBT is lesser, so certainly the tax dew on the profit before tax will also be lesser. So, but basically it is a non-cash expense, it is not a cash expense. So, that is a very important point because it is different from the normal expenses. So, here it you that is why we are calling it as tax savings on the incremental depreciation will be this much 100, 20, 90 because tax rate is 40 percent. Tax rate is 40 percent, so 90, 67.5, 50.6 and 38.

And then lastly, net operating cash flow, it is written here in flow, but always you say that net operating cash flow because it can be negative also, if that revenue is negative, and the cost is more, or the revenue is lesser the cost is more than the inflow will become negative or the cash flow will become negative not inflow, cash flow will become negative. So, in this case what is the situation that, this is a tax savings and finally, net operating cash flow is how much? 300,000 because, it is the total amount which is available with this 5 the column number 5 plus 9.

So, five is this is the after tax saving in the manufacturing cost is 180 and the 9 is going to the tax saving. So, this these two will become has a 180 plus 120 will be 300. So, this will be known as a net operating cash inflow. So, if you look at this process of calculating or estimating the cash flows and if you look at the previous process in case of the new projects or expansion projects, if you look at the cash flow analysis, totally different. In this case, source of revenue is only the differential savings, in the manufacturing costs.

And then only we are calculating the differential amount in terms of the outflow also, in terms of the inflow also, in terms of the sales also, in terms of the cost also. What is the differential amount? So, the process is a little different as compared to the process we followed for the previous things. Now, tax savings and then finally, the net operating cash flow we have calculated here.

Third important point here is now to calculate the terminal cash flow, to calculate that terminal cash flow because ultimately we have to calculate this fourth item which is called as a NCF, net cash flow. For calculating the net cash flow NCF, you have now to calculate the terminal cash flows. Terminal cash flows are net terminal value of the new machine is how much? 8 lakh rupees we have already seen information is given that it is say 50 percent will be realizable on the sale of the new machine after 5 years because we are going to use machine for 5 years, maybe the life of the project is 5 years.

And let terminal value of the old machine is it is given to us 160,000 rupees, it was purchased for 4 lakh rupees and terminal value is going to be the 160,000 rupees. And next source of the say terminal value will be recovery of the incremental networking capital, recovery of the incremental networking capital. So, how much networking capital we are going to invest more here? Earlier case was 400 million. Now it is 500 million. So, it is the extra amount of the 100 million which we are going to recover the backend full.

So, finally, terminal cash flow is how much? This has been calculated as 11 minus 12, 11 minus 12 means the cash flow from the new machine value from the new machine, but if it was not there and only old machine was there, then we could have got 160 that case also. So, incremental terminal value is how much that is 800 minus 160 plus the working capital part 100. So, the total amount here we are getting the terminal cash flows is total terminal cash inflow is 740, 740.

And finally, here if you look at then we have calculated the NCF net cash flow, which is a sum total of the column number 4, 10 and 14. So, column number 4 is this much, because we are only not talking about the inflows, we are talking about the outflows also while calculating the NCF net cash flow. So, in this case, we are talking about this also. So, 1200 is the outflow because not 16 but 12 and inflows we have calculated here.

So, we have taken that 4 plus 10 plus 14, 4 is this 10 is this and 14 is this. So in the 14, 14 is important because we have to take into account the terminal value also in calculating the net cash flow. So, it means here the in the first year the main source of that net cash flow is the operating cash flow. Second year also operating cash flow, third year also operating cash flow, fourth year also operating cash flow and fifth year is sum total of the operating cash flow and the terminal value.

Operating cash flow and the terminal value is going to be the net cash flow in that year 5, which is 958. Out of this 740 we are going to get as the terminal cash flows and the operating is how much? 218, so this plus this figure, this comes out as 218 plus 740 this becomes 958, this becomes 958. So, this is how the cash flows for the replacement projects are worked out and this process is entirely different from the process which we followed in the earlier cases.

In the first case, we saw that the proposal is the standalone proposal, or it is a new investment proposal, everything is constant, your cash outflow is constant, cash inflows over the foreseeable period are constant. And then we calculated the net cash flow we estimated the

net cash flow. In the second problem, we saw that it is a addition of the one more product into the existing 16 products.

And in that case, when you are adding, so, there are some problems of like bad debt losses, the problems of opportunity cost, and we learned there and then the important consideration there was that we assumed that cash inflows are not going to have a straight line. They are going to have a zigzag line of kind of the structure. We have the one amount in the first year then it is going up, remaining stable or again going up then coming down, coming down.

So it means this kind of the cash flows are going to be there, cash inflows are going to be there, because of the changing value of the sales and the revenue. So, we adjusted those problems there in the second. Third one was a totally different, which was with regard to the estimation of the cash flows for the replacement projects. So, in the replacement of projects, always bear in your mind, we have to calculate the incremental figures, differential figures.

And in that case, we are going to take both advantages and disadvantages of replacing the old machine with the new machine replacing the old asset with the new assets, if you are taking about the advantages increase in the say savings in the say manufacturing costs or maybe changing the working capital requirement or change in the sales value. All fine, these positives are there, but if this machine is not replaced, and when you remove this machine, some negatives also we have to means keep in mind bear in mind.

So, that is a very important question. So, both advantages and disadvantages of replacement of the old machine with the new machine have to be kept in mind. And then finally, we have to calculate the cash flows, which is basically based upon the incremental analysis or the differential calculations. So, that major differences there in case of the traditional projects or the maybe the difference between the standalone projects cash flow estimation or addition into the existing range of the products and in case of the replacement of the old asset with the new asset. So, this is the entire process available here.

So, I will do one or two more problems also in the next classes. But in the meantime, one more concept is here to be to be known here, which is very important, and that concept is of the inflation and before that or more concept here is the is about the biases in cash flow estimations. So let us know about these two important concepts, biases and then the impact upon the impact of the inflation on the cash flow estimation.

After talking about these important (())(22:14) of the cash flow estimation, I will do one or two more problems here, so that you are thorough with the entire process of estimation of the cash flows for the capital investment projects. Now, we talk about here the biases in the cash flow estimation, whatever the cash flow estimation process, we saw here, we learned here in the real life, we commit some mistakes.

And when you commit the mistakes in estimation of the cash flows, because mind it project has not come into the picture at the time of estimation of the cash flows, it has not come into picture. It is not really there on the surface, it is only estimation, is only the DPFR, preparation of that DPFR and whatever the value of sales and demand we have analyzed or found out in the DPFR after the market and demand analysis, and the technical analysis on the basis of that we are only estimating.

And when we are only estimating for something which has to be done in future which has to be done in future in that case, mistakes are bound to happen, biases are bound to exist there,. So, what are what kind of the biases could be there, what kind of the mistakes could be there, these are divided broadly into two parts, overstatement of the cash flows, understatement of the cash flows.

Sometime we become very optimistic, very positive and we say that cash flows are going to happen as per our expectations. Sometimes we become very pessimistic and we commit some sense some mistakes that the estimated or expected cash flows give us the lesser than the said that the real values or the say the optimistic or you can call it as the optimum figures, what could we the reasons?
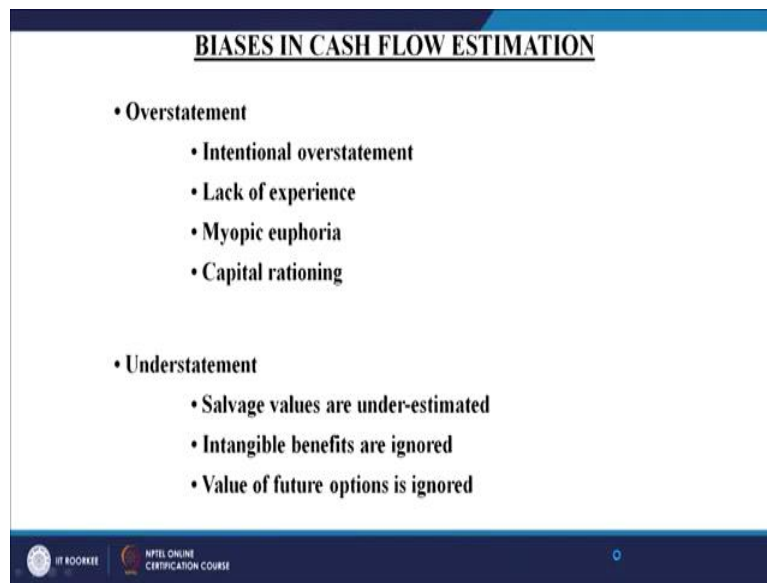
First thing is overstatement, why? Intentional overstatement sometime because we want to get project approved from every source. Especially in case of the startups, in case of the new projects or when the firm is coming up for the first time into existence. So, what we do to impress upon the venture capitalists, private equity providers, angel investors or maybe some time for boring the fund from the financial institutions, we exaggerate the say cash flows. So, intentionally we do it because by hook or by crook, we want to get it approved.

Lack of experience. Who is the person who is estimating the cash flows? Who is a person who has gone for the market and demand analysis and technical analysis? What is their experience in the field? If they are not experienced people, so what is going to do? What is going to happen? That because of the lack of experience we are sometime going to put yourself into the problem of the overstatement. And it is always bad. So, lack of experience can be the second reason.

Myopic euphoria – Myopic euphoria is basically a term of psychology, which you can call it as in other way around is the polarization effect. Because there is a team of the people, when the people who estimate the cash flows, they are a team of the people, it is not only one person. So, if the one person the team says that no, the sales in the next 5 years will be this much and our cash flow will be this much.

So sometime other members of the team also subscribe to that statement, that idea and this means a team gets a polarized, they start moving in the same direction, they start thinking in

the same direction. So it is not the opinion of the whole team, originally, originally, this opinion of the one member of the team, but later on, everybody agreed to that somehow. And they means agree to what access say out of the 5 or 6 members team and everybody said that yes, the cash flows will be this much or we agree with that figure, which is coming out or all the figures coming out for a period of next 5 years.

So, this is called as the myopic effect or the say polarization effect. And last one is a capital rationing, because, everywhere if you for example, if it is the say addition of the new project by the existing firm, that it may be possible that the capital for the new project in the new project has to come from the existing firm. So, sometime there must be a team of the people who want by anyhow means get this project approved by the top management of the firm, because capital is limited with the firm also because finance is always scarce resource.

So, what they do is they overstate the cash flows. They impress upon the top management of the firm that if we take up this project, then certainly we are going to have the better output or the better cash flows. In many cases when you even have to go to the venture capitalists, private equity providers or the venture capitalists, even to the financial institutions, we know that venture capitalists also has the limited resources and they always select the best projects, which are going to give the higher cash flows or cash inflows.

So, they always as a rated to influence upon the venture capitalists that our project is very good and from the limited stock of your capital, ration capital, you give us the desired amount of the capital and you fund this proposal. So, these are 4 important say component or maybe you call it as the reasons where we can overstate the cash flows and they are basically because of the biases towards the project or maybe because of the estimation in the say or you can call it as error in the estimation of the cash flows.

Similarly, if there is an overstatement, there is a possibility of the understatement also. And in case of the understatement, why the understated? Number one, salvage values are underestimated. Now in the previous case we have seen that the salvage value of the machine which is purchased for 16 lakh rupees and used for say 5 years will be sold for half of the price 8 lakh rupees.

Or the first machine which was purchased for the 4 lakh rupees salvage value will be 160 lakh rupees, it may be possible that the machine may be sold for the higher price. Because when you are charging the depreciation on any fixed asset, you are simply talking about the

technical value of that asset. So, depreciable values different value actual reduction in the value of any asset is a different value.

So, sometime the salvage value which we have estimated can be much less as compared to actually that asset can fetch from the market at the time of its placement or the termination of the project. So, one reason could be the understatement of the cash flows. Then second is intangible benefits are ignored. Now, for example, when you are coming up with the project, there could be the say intangible benefits also, there could be the intangible benefits also that say for example, there is the increase in the goodwill.

If you do a good kind of business or maybe the appreciable kind of the business, so sometime then we are supplying a good quality product in the market at a very reasonable price or at a very competitive price. So, it creates a goodwill in the market and when it creates a goodwill in the market, so, more than the expected number of the people start buying the product and that we have not estimated. So, it means your sales increase.

So, intangible benefits what happens that though it is a tangible benefit but coming out because of the intangible effect of the word bill. So, sometime be forget to estimated and their causes and statement. Last point is value of future options is ignored, value of future options is ignored. For example, now I give you the example here how this factor causes understatement. What is the written here? The value of the future options is ignored.

So what is that future option? For example, some company or some say group of investors, they propose to construct a hotel, they want to establish a new hotel, construct a hotel. And they have two plans, that initially we will construct the hotel which is for the residential purpose. But later on will add a very good quality restaurant also to the hotel. But currently when we are estimating the revenue and that addition of the restaurant is immediately after one year or two years now, we are not waiting going to wait for very long period of time.

Currently, it may be possible that the people who are going to construct the hotel they are say not very experienced in the restaurant business, so they want to gain some experience. And then they want to see also that let us see how many people come and stay in our hotel. What is the occupancy rate over the number of 1 or 2 years? And then we can see that if we add up the restaurant also in this hotel, can we increase the occupancy rate or can we increase the revenue of it?

So, tomorrow what happens that we had estimated the cash flows of the hotel as a standalone facility but later on after one or two years, when we added the restaurant also in the hotel, so it means people who were earlier not staying in the hotel because there is no food facility available in this hotel. But later when you added the restaurant also, so what may happen, people who are not staying in the hotel, they may also have to stay in the same hotel.

So the occupancy rate, which was estimated to be 70 percent, at the time of the estimation of the cash flows that will go up to 90 percent. So what will be there? We have ignored the value of the future options. What was the value of the feature option? The feature option is adding the restaurant in the hotel. So, when people get the same means the food facility also in that in the same hotel, so, they prefer to stay in a hotel where the restaurant is also there, the room service is also there.

And in that case, it doesn't give you the additional revenue because of the additional service you are giving that is of the food and restaurant, but the occupancy rate of the hotel also increases because that limitation which was causing the lesser number of people occupying the rooms in the hotel that has been removed. And now, more occupancy, more number of the people, more footfalls are there and more people are coming and staying in the hotel.

So, all these options we have to bear in mind. So because of these, some factors listed out here can cause overstatement of the cash flows or understatement of the cash flows. There could be other reasons also which are not listed out here. So, we have to be very careful, more rational, more say not optimistic but optimum in say estimating the cash flows. So, that whatever we are going to estimate that is more realistic that is more acceptable value adding and more reliable.

So, this is all till now, what we could discuss about the estimation of the cash flows. First we learned about conceptually how to estimate the cash flows, then we did 2-3 problems in the different situations that how to estimate the cash flows if this thing is there or that thing is there or the replacement proposal, replacement project is there. And then we are now means we are through with these biases, which could cause the errors in the cash flow estimation maybe in terms of the overstatement or in terms of the understatement.

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TWO WAYS OF MAKING ADJUSTMENT FOR INFLATION

1. First, express all cash flows as real cash flows and discount them with a cost of capital that is adjusted to a real rate by abstracting away the inflation premium.

2. Second, express all cash flows in nominal terms and discount them at the nominal cost of capital.

So, one more concept is there that is the effect of the inflation on the cash flow estimation that is how to adjust for the inflation while estimating the cash flows. This particular component and some more problems, one or two more problems on the estimation of the cash flows. I will discuss with you in the next couple of classes. After that, we will close the discussion on the estimation of the cash flows and move to the next topic. Till then thank you very much.