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**Lecture - 24**
**International Capital Budgeting**

Let us discuss about international capital budgeting. As you read in corporate finance capital budgeting how to take decision about long term investment, which cash flows are spread over a long period and initial investment will be huge in nature. So, initially you are spending lots of money and the returns are coming over the periods, without evaluating the project, you cannot go for a long term investment or in the form of capital budgeting.

Hence, generally in corporate finance, project finance a part is project finance or capital budgeting you discussed about different methodology. So, as to articulate the evaluation procedures of different forms of capital budgeting. When we discussed about domestic capital budgeting, the fluctuation of exchange rate is not the part of that. Similarly, the international risk in the form of political risk, in the form of benefits also like subsidies, royalty payments, you are in the form of differential taxation, these are not applicable in case of domestic capital budgeting.

When you mention the word capital budgeting, we should understand that you are, you we are evaluating project, which involve huge investment in 3, 4 years and which returns are spread over a long period of time. So, when returns are spread long, long period of time or many years it has own risk and when the returns are in in the form of foreign exchange in it will have another risk also.

So, we have to evaluate this risk of international project finance in the in the capital budgeting decision process. Let us define what is capital budgeting, what are the difficulties are there in international capital budgeting, which are the methodologies available for international capital budgeting, then we will be discussing about a the foreign exchange problem in international capital budgeting, and we will be evaluating the entire process of evaluation with a practical example.

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**Capital Budgeting**
- Capital budgeting evaluates the investment decisions related to assets.
- The "capital" in capital budgeting refers to the investment of resources in assets, while the budgeting refers to the analysis and assessment of cash inflows and outflows related to the proposed capital investment over a specified period of time.
- Objectives of capital budgeting are
  - Determine whether or not a proposed capital investment will be a profitable one over the specified time period
  - To select among investment alternatives.
  - Capital budgeting at the international level addresses the issues related to exchange rate fluctuations, capital market segmentation, international financing arrangement, international taxation, country risk or political risk etc.

Let us move to define what is capital budgeting. When I mentioned international capital budgeting first we have to go to the, discuss about domestic capital budgeting, then we will define what is international capital budgeting. As we know capital budgeting evaluates the investment decision related to assets. Here assets mean, a machinery a technology, a long term investment proposal, which create some kind of physical asset some kind of, some kind of capital which provide return to us.

The term capital in capital budgeting refers, refer to the investment of resources in assets while the budgeting refers to the analysis and an assessment of capital cash flow and outflow related to proposed capital investment over a specified period of time. When we mentions capital in capital budgeting is a long term assets, a long term investment and budgeting means the cash inflow and cash outflow. Cash inflow, cash outflow is the initial plan investment and cash outflow or the cash or the cash returns, returns are available over a period of time.

So, capital budgeting or capital investment a two aspect, one aspect is the a how we what are the initial investment and second aspect that the cash inflow which are coming in the long run. The objective of the capital budgeting if you analyse you determine or because we have a number of proposal because a country generally or a company generally have less capital, but they have alternative investment proposal.

The capital budgeting try to evaluate the alternative investment proposal and try to find which proposal is good for the company. So, capital budgeting is the nothing but selection of alternative investment proposal, the proposal which increase the value of the company, the proposal which gives good return for the company, the proposal which provide or improve the stake holders money. The capital budgeting primarily the evaluation, evaluation process of alternative investment proposal.

Here, capital is referred to a long term assets and budgeting is the assessment of cash flow and cash outflow. When you when you internationalize this capital budgeting, same meaning will we get. In the international level we have investment proposal and international level the cash flow, cash inflow or outflow will be there. You have to evaluate the cash inflow, cash outflow and alternative investment proposal which are spread over different country.

However, in international capital budgeting there are some issues are there, the issues related to exchange rate fluctuations, issues related to capital market segmentation, capital market integration, issue related to arrangement of investment, issue related to international taxation, issue related to country taxation, issue related to subsidy, royalty payment, political risk, many other things are there in international level of discussion or capital budgeting side.

So, we have to address all these issue and try to find which are the alternative investment proposal best for a company, if the company face a number of proposal and they want to select one proposal for investment side. The international capital budgeting though it is the process is same, but the implication is very difficult. The implications of taxation, implication of international financing, implication of capital market integration, implication of country risk these are the some kind of issues generally effect in international capital budgeting process.

**Capital Budgeting: Net Present Value Approach**

- The investment decisions of a firm are generally known as the capital budgeting, or capital expenditure decisions.
- Investment Decisions: Expansion, Acquisition, modernisation and replacement
- Investments lead to Exchange of current funds for future benefits.
- The funds are invested in long-term assets so as to create cash inflows over a long period.
- The future benefits will occur to the firm over a series of years.

**NPTEL**

So, when we discuss about capital budgeting we should also understand which are the methods are available or process are available for evaluation of alternative process of capital budget, capital budgeting. Generally, at present for many company, they are using the net present value methods. A net present value methods is nothing but the initial investment are present, present form and the return from the initial investments are future oriented.

You have to bring the future cash flow to its present value in the form by, in the, by discounting it with the proper discounting factor and compare the present value of initial investment and the present value of future cash flow and try to find what are, which are, what is the net present value. The net present value is positive. Generally are, generally you go for the investment, if negative we may not go for the investment.

Here, we are comparing the present value of present investment with the future cash flow bringing the future cash flow to its present value through a discounting factor. Net present value methods generally all companies are using sorry evaluating the alternative investment proposal for capital budgeting side. Invest, that investment decisions of a forms are generally known as capital budgeting or capital expenditure decision, investment decision, expansion may be because there are many kind of investment decisions are there. It may be expansion, it may be acquisition of new resources, it may

be modernization, it may be in the form of what is called investment or replacement of old machinery.

So, investment decision not always related to a new investment proposal, it may be a old investment proposal, old machineries are there you want to replace it, it may happen the existing machinery you are expanding it, it may happen acquisition of new machinery, it may happen that you want to modernise the existing facility. So, investment proposals are different kinds. So, we have different, for different investment proposal generally one method or generally we call it net present value has applicable.

There are many other methods are there like the internal rate of return. It may be what is called the payback period, discounted payback period, simple payback period, real options methodology, there also other methodologies are useful for evaluation of capital budgeting side. But in our, in our present example we will be discussing about the net present value methods because that may, this methods are applicable almost all investment proposal. Here, you have to understand that in case of net present value approach the funds are invested in the long run, long term asset so as to create cash flow over a long period because initial investment, initial investment will be very huge, but we are getting the returns from the investment in the long period, over a periods of time.

The future benefit will occur to the firm over a series of year, number of years will be there and a bullet payment type of returns will come from the investment proposal and this investment proposal, huge investment initial period and cash flow or return from the proposal, investment proposal a long period. So, they spread over 10 15 years of cash flow, you have to bring it to present value and compare with the present investment and the net part the present investment and the present value of future cash flow both are, there is a net surplus available then you will go for the investment, that net surplus amount generally called net present value.

## Capital Budgeting: Net Present Value Approach

- Three steps are involved in the evaluation of an investment proposal:
  - Estimation of cash flows
  - Estimation of the required rate of return (the opportunity cost of capital)
  - Application of a decision rule for making the choice

- Any investment should increase shareholders value. It should recognise the fact that bigger cash flows are preferable to smaller ones and early cash flows are preferable to later ones.

The net present value what you suppose to do in net present value. You have to estimate the cash flow, future cash flow you have to estimate. Then the future cash flow need to be discounted because these are future cash flow you have to bring it to present, present value, so that this future cash flow need to be discounted and you have to find a what is a proper discounting rate. Then application of decision rule if the NPV is positive or NPV is negative or NPV is 0, what to decision we have to take from there, the decision methodology you have to use here.

So, any investment, any investment should increase the shareholder value, the our bottom line is here, our objective of net present value method is that any kind of future expansion, future modernisation or future replacement of old machinery or any kind of new investment should increase the shareholders value, the owners value you have to increase it. It should recognise the fact that bigger the cash flow, we have to prefer the investment proposal.

So, the cash flow should be bigger in nature, the cash flow should immediately come. If the same cash flows are coming from two proposal, from two proposal same cash flows are coming, but one proposal is give cash flow in a lesser time period, then the another proposal then you have to accept the first one. So, here the NPV should be more and it should increase the shareholders value, then we suppose to get back our initial

investment very easily, it should be profitable project, then you are going for the calculation estimation of the NPV method.

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## Project Selection : NPV Criterion

- Cash flows of the investment project should be forecasted based on realistic assumptions.
- Appropriate discount rate should be identified to discount the forecasted cash flows. The appropriate discount rate is the project's opportunity cost of capital.
- The project should be accepted if Net Present Value is positive (i.e., NPV > 0).
- Net present value should be found out by subtracting present value of cash outflows from present value of cash inflows.

$$NPV = \left[ \frac{C_1}{(1+k)} + \frac{C_2}{(1+k)^2} + \frac{C_3}{(1+k)^3} + \dots + \frac{C_n}{(1+k)^n} \right] - C_0$$

$$NPV = \sum_{i=1}^{n} \frac{C_i}{(1+k)^i} - C_0$$

The, what are the criteria's are available for NPV side? Here, we have to estimate the cash flow that means you have to forecast the cash flow, then you have to future cash flow need to be discounted to bring it to present value, then here you have to discount, you have to estimate or you have to give, decide about that discounting factor. So, which discounting factor you have to use, it is our judgemental decision.

So, discounting factor also effect the NPV method. So, then if the discounted cash flow more than the present, present outflow of, outflow of investment, then you have to accept the proposal, that NPV will project it you have to accept the proposal, if it is less then you have to reject the proposal. So, what are the difficulties are there, difficulty of forecasting the future cash flow, difficulties here selecting the discounting rate. So, these two on these two entire NPV method based upon.

So, what is the NPV formula here? If you see the formula NPV here, here C here you have to understand the NPV here C 1 C 2 C 3 these are the cash flow and these are coming different time period, we are using here NPV here, we are using NPV here C 1 by 1 plus k to the power 1 C 2 by 1 plus k to the power 2 like this it will go C n 1 plus k to the power n minus C naught. C naught is the initial cash outflow, C naught you have to understand what are the things we have written here C naught, C naught is the planned investment. How much you are investing at 0 time period, planned investment at 0 time period what is the investment, what is the out, outflow of cash and here C 1 C 2 like C 1 C n these are the cash flow, cash flow occurring, occurring at C first year, second year, third year up to n year and k is here discount factor, the discount factor, discount factor k is here discount factor, you are discounting the future cash flow to bring it to the present value and comparing the with the present value. If discounted cash flow this is the D C F discounted cash flow, this is the initial cash flow.

If there is surplus available then our NPV will be NPV will be 1 i 1 to n C i by 1 plus k to the power i minus C naught, if it is positive.

## Project Selection : NPV Criterion

- With positive NPV we accept the project, other than reject.
- Higher NPV consider for mutually exclusive projects.
- NPV is most acceptable investment rule for the following reasons:
  - Time value of money is recognised by discount rate
  - Measure of true profitability
  - Shareholders' value maximised

- However, Present value of any cash flows such as subsidies, external financing etc., would be factored using special discount rates.

If it is positive they give a more than 0, your asset to NPV will be positive and you are accepting the proposal. So, what are the NPV here? NPV should be positive, NPV can be negative, NPV can be 0, these three situation may arise and here each situation you have to take a decision. This situation definitely we have to accept the proposal, this situation we have definitely you have to reject the proposal and this situation and NPV is 0, we are we are indifferent, we do not know what is supposed to do.

So, really this kind of situation will arrive either, we have positive or negative situation and you have to take a decision on that. Then question whether NPV is good or bad. NPV, NPV criterion is good or bad you have to understand that. So, here with positive NPV we are accepting the proposal, negative NPV we are rejecting the proposal and higher the NPV that proposal is good for us. There is suppose you have a two number of mutually exclusive project means we have a one investment you have to choose, but mutually many projects are there which are mutually exclusive. So, we have to choose all NPV, all project gives positive NPV to us then how to take a decision the project which give highest NPV, we should select the project.

So, but NPV what kind of things then NPV takes into account? NPV is good because it take into account time value of money, why we are discounting the future cash flow bringing it to present value. So, we are comparing everything at present so it takes care of present time value of money then second most important thing is that it measures a

true profitability. Why it is true profitability, how much you are investing, how much you are getting? If it is positive we are we are accepting, the profitability take cares, take cares here, then third most important thing is shareholders value maximize because here the end of the day after every all expenditure what is coming to us that is the value of the shareholders or the promoters money.

So, shareholders value also take into account, but NPV many things in NPV do not take into account. These are called taxation, subsidy, royalty payment many other things are there we never take into account and a more important thing the NPV here you have to find a discount rate. The discount rate is very difficult to find because discount rate depends upon, depends upon what is the opportunity cost available in the economy because we are choosing proposal A against proposal B then what is the opportunity cost? We do not know the opportunity cost.

Opportunity cost nothing but I do not want, I do not want to invest, I will keep the money in in the bank deposit, if I am getting a good return then I have to, why I should go for the project, project by investing in project I am accepting risk, I may get, I may not get return. So, by a risk free interest rate is the opportunity cost for me however if the project cash flows are spread over many years, more than 5 year, 7 year, 10 years we do not know the opportunity cost may not remain constant. We are accepting that opportunity cost remain constant, opportunity cost never remain constant because there is change in the value of money, the interest rate is changing, inflation also changing. So, opportunity cost may not remain constant over a long period of time, you have to go for a variable opportunity cost, you have to include a variable opportunity cost, you have to you have to redesign the NPV again.

So, it is the generally NPV long time period if a project is the life span of the project is more than 10 15 years, you cannot continue with the proceed with one NPV, one discounting factor you have to use multiple discounting factor in period of time. We have to go for a scenario analysis because each scenario will change the discount rate and try to find a scenario type of NPV.

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## Exchange rate Risk & Capital Cost

- Project evaluation cash flows are perspective in nature and in case of international project cash flows are in foreign currency which values go on fluctuating and hence misalignments take place while evaluating international project.
- **Method: A**
- Estimate future cash flows in foreign currency.
- Convert to the home currency at the predicted exchange rate using PPP, IRP *etc.* for the predictions.
- Calculate *NPV* using the home currency cost of capital.

Similarly, these are the domestic side, we have not include the foreign exchange here. So far whatever you discussed, a discussion on NPV in domestic market, a domestic level we have not include the foreign exchange or international market or international capital budgeting side. Let us move to the exchange rate side and capital cost. So, when you, I have, we have discussed earlier that a company can have international project because a domestic company like a US company make an invest in other than US like in India, in China, in some other country.

Similarly, Indian company can also invest in Bangladesh, Bhutan, US any other country. So, here domestic market is not involved, the market is here foreign market. We are not receiving the cash flow in domestic currency, we are receiving cash flow in foreign currency. You are, suppose there is a taxations are available, you have to pay tax where the project locate. Similarly, when they bring the money to India, you have to pay tax in India also.

Similarly, you may get a subsidy in in a project where subsidy may be available by the company, by the country where the project is located. Here when you bring the money return to country, the domestic currency country may give us a since you are bringing foreign exchange you may get some royalty. So, many things are involved in case in case of internationalisation of capital budgeting. So, the NPV using home currency cost

capital may not be available to us, you have to go, you have to analyze the cost of capital or the initial investment or the discount factor in a international aspect.

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## Exchange rate Risk & Capital Cost

### World Financial Markets are integrated

- Foreign currency denominated future cash flows need to be discounted with a risk-free foreign currency discount rate and multiply it by home currency current spot rate to bring it to present value of home currency.
- Home currency PV = {FCF / (1+$r_f$)}* Current Spot rate
- FCF = Foreign currency cash flow, $r_f$ = Foreign currency risk-free discount rate
- In place of each year foreign currency cash flow, we can use respective year forward rate and discount the cash flow with home currency risk-free discount rate.

So, when international, international systems are available here domestic market not going to help us in deciding the decision about international capital budgeting side. You have to understand that we are investing in foreign country and we are accepting the foreign currency risk also. We are investing in foreign country, we are accepting the foreign, foreign country risk also, the political risk, the market risk of the country you are accepting it. So similarly, we are accepting the rules regulation, the geographical rules regulation, countries rules regulation, countries taxation principle, subsidy principle, countries depreciation side, everything we are accepting where the project is located. So, all these factors you have to take into account while taking a decision on the internationalisation of the cost of the, in capital budgeting.
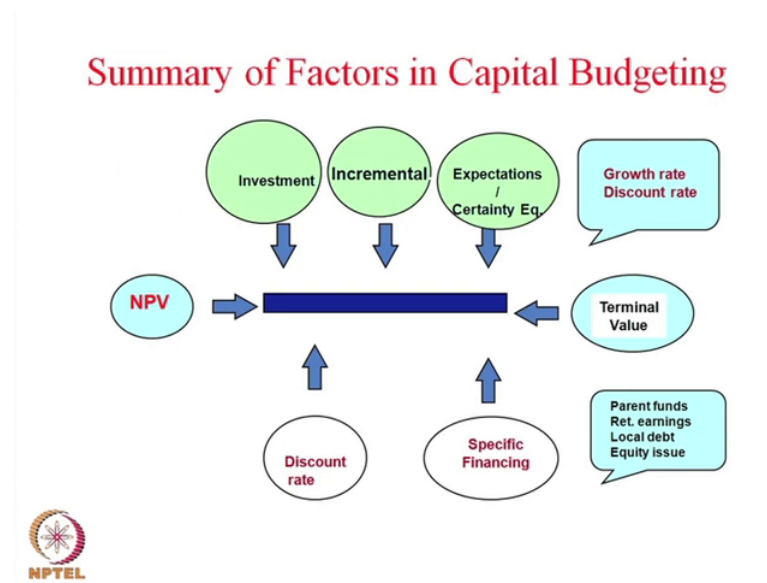
So, here you have to understand, that you have to understand that the two things are, in many things are involved in this process of internationalisation of capital budgeting. First NPV, you can see the graph here NPV is, NPV here NPV here the NPV is coming by a discounting factor. So, investment it may be incremental, it may be expectation of certain certainty may be investment, what are the capital your foreign exchange coming to us in the form of cash flow, there may, it may not be involve some kind of risk, it may not come in the form of what we are projecting because we are this we are forecasting the cash flow, while forecasting, forecasting error will be there.

So, that kind of expectation we are, we are putting here. So, expectation may not be realised so all kind of errors are there in in case of cash flow also. So, we are, we are forecasting the cash flow on the basis of some growth indicators. The growth indicator may not be valid in the long run. Similarly, whatever after the investment over we are we are supposed to get some terminal values, the terminal values may not be available to us.

Similarly, when you go for the sourcing the capital because our cost of, cost of capital we are borrowing money from the market and investing in new plan expenditure. So, the cost of capital may not remain constant, cost of capital may also change, or cost of borrowing also change. So, everything change in a international, international scenario while accepting a long term, long term investment, in long term investment or long term

investment proposal, we are investing initially is not going to solve our NPV, the domestic side of NPV.

The NPV of domestic market you have to internationalise by factoring all kind of risk and benefit in the international capital budgeting side. So, what are the system procedures available here.

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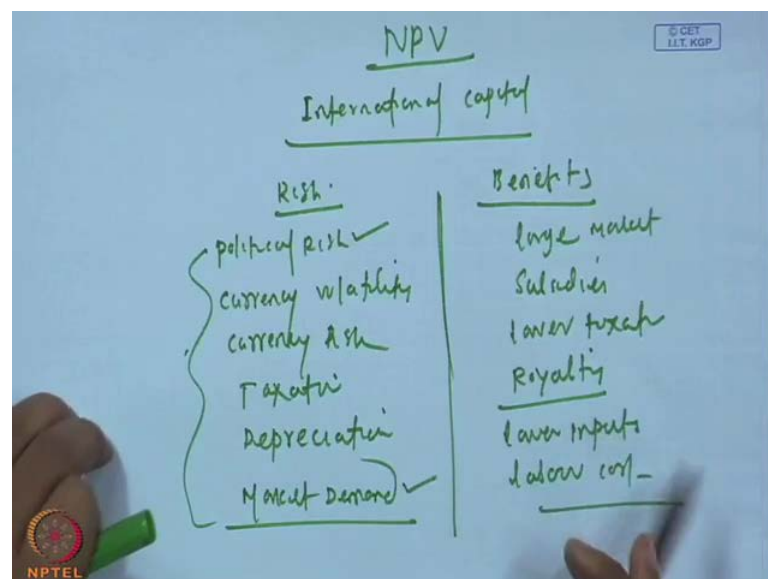


**Exchange rate Risk & Capital Cost**

**World Financial Markets are segmented**

- We can use expected spot rate for each year foreign currency cash flow and discount it by home currency discount rate which can adjust the exchange rate risk.

- In case of segmented market, political risk, exchange risk etc., are adjusted in the discount rate.

So, before going to that NPV criteria of international factor, internationalisation of capital budgeting you have to understand three more important factor.

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First is here first is here in international capital budgeting side international capital budgeting side what are the what are the risk are there and what are the benefits are there. You have to articulate the risk and benefit together. Risk is risk is here first is first and foremost risk is here capital, what is called, what is called the political risk, political, where you are investing, which country you are investing that country political risk we are accepting. Political risk means instability in the country, the instability affect the growth prospect, the growth affect the cash flow of the company, the cash because all these part are the part of our investment proposal. So, political risk you have to take into account saying we are accepting, we are receiving this, we are receiving that cash flow in foreign currency. So, currency volatility currency volatility we are accepting currency volatility we are accepting.

Similarly, we are also accepting what is called what is called the conversion of currency because our the company may be domestic company is investing in abroad. So, you have to convert the foreign currency into domestic currency. So, currency risk also we are accepting or absorbing. Then also we are absorbing what is called the country where your investment proposal is there, their country what is called taxation, taxation we are accepting, their country depreciation of capital expenditure that also we are accepting. We are accepting the country where the proposal, where the plant machinery will be there, production will be there that country entire market demand factor we are accepting market demand factor we are accepting.

So, again we are also accepting if you if you understand there if you if you understand there these are the risk of the risk of the international capital budgeting. Similarly, but what are the benefits we are getting. The benefits are we are getting a large market, we are investing in other country say large market, we are accepting a large market. It may happen the country may give us some kind of subsidy, the country may welcome foreign capital, will provide some kind of subsidy.

It may be happen that country many have a lower taxes when compared to our domestic market, lower taxation. It may happen the country also provide some kind of royalty in the form of bringing the investing further in the country or the taking away the benefit or taking away the profit out of the country. So, royalty payments maybe available, it may be also possibilities are there, the company also bringing some kind of technology,

technology export will be there, technology export side also we can get some kind of some kind of royalty payment.

It since we are accepting the market of the market of the country where our project will be located, their cost of labour, cost of inputs maybe lower, lower cost of input, lower input cost in the form of in the form of raw material, some other, in the form of labour cost, lower labour cost will be available to, these are the benefits available to us, these are the risk available to us in international capital budgeting. Everything you have to factor while just taking a decision about NPV. NPV is our criteria of evaluation.

So, while doing, while accepting this risk and benefit you have to recalculate or re estimate the NPV in international capital budgeting side. This is not so easy because many things are there, it is not possible for us to quantify, quantification side is very difficult like political risk how to quantify it. Similarly, risk of what is called market demand you have to forecast it. Similarly, what kind of, what kind of large market available to us we are accepting that how to quantify it.

These are the some expectations are there some quantification problems are there in capital budgeting, everything you cannot do, cannot factor while evaluating the long term investment proposal of international long term investment proposal. So, we have to go for some kind of, some kind of calculation, some kind of estimation process and by factoring which are the possible possibilities are there for quantification, some kind of value judgement which are not possible to quantify. So, both subjective and the objective methods are used in for capital budgeting side while evaluating international level of capital budgeting.

## Example

A U.S. MNC is considering a European opportunity. The European project has initial investment of Euro 750 Million. It provides 35% returns each year in its 7 years life span. The project would get a royalty payment of 10.5% of return each year which is non-taxable. With a tax rate of 35% and straight line depreciation evaluate the project acceptance. The project would be having operating cost 18% of return.

Inflation in US is 4% and that of Euro-zone is 2%. The current spot rate is Euro 1= US$1.28. Expected opportunity cost for the MNC in dollar term is 15%. Evaluate the project.

So, before going to the capital budgeting let us discuss one problem, that problems help us in analysing how the capital budgeting will be, capital budgeting criteria's are taken into consideration in international level. So, let us see the examples here. Here a when a US MNC multinational company is considering a European opportunity because a multinational company locate in US, there is a opportunity in European market, it is evaluating the opportunity of European market, the European project has initial investment of Euro 750 million.

So, the US company need to invest 750 million Euro in European country, it provides 35 percent return each year in its 7 years life time. The project, the proposal has a 7 years life time, each year the company is will be getting a cash flow of 35 percent in the form of return of initial investment, the proposal will be 7 years life time, the project would be, would get a royalty payment of 10.5 percent of return each year which is non taxable.

So, whatever the cash flow generate 10.5 percent will be a royalty payment, the company will be getting on 10.5 there will be no tax, on royalty there is no tax. Then with a tax rate of 35 percent and straight line depreciation, evaluate the project acceptance, the tax rate of the company corporate tax rate is 35 percent, as the country has a straight line depreciation. So, using this you have to evaluate the capital acceptance or rejection of capital budgeting, the investment proposal.

The project would have, would be having operating cost 18 percent of return, the operating cost of the project is 18 percent of return, every year there will be 18 percent of the, of return in the form of operating cost. Inflation in US is 4 percent and that of Euro zone is 2 percent because inflation take, inflation effect the currency conversion. So, there will be 4 percent in US, 2 percent in Euro zone. Since, US inflation is more US dollar will depreciate, Euro zone Euro zone inflation is less so as compared to Euro US dollar, US inflation is more. So, Euro US currency will depreciate. The country's spot rate is 1 Euro will be is 1.28 dollar. So, spot rate of the market 1 Euro is 1.28 dollar, expected opportunity cost for the MNC in dollar term is 15 percent, evaluate the project. So, the opportunity cost or the discount factor is 15 percent in dollar terms not in Euro term, dollar term you have to evaluate the project.

So, here it is a very big question. That question here, the project is in Euro zone and who is investing? A US company is investing. So, you have to evaluate everything the NPV in US dollar term. So, but we do not have returns, opportunity cost, return, depreciation, your what is taxation everything in Euro currency, but our NPV end of the day you have to evaluate in US dollar or there is a conversion rate. The conversion rate will be change because the time period is more than nearly 7 years. There is inflation in US is more, Euro zone inflation is less.

So, currency in US dollar may depreciate further. So, you have to evaluate all these thing and try to find international level of capital budgeting whether you have to accept the Euro zone proposal in dollar term or not. How to do it? You have to understand the step by step here.

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## Answer

- Each year Cash Flow : Investment * % of return
- Each year Operating cost: Cash Flow * % of operating cost
- Each year Royalty : Cash Flow * % of royalty
- Each year depreciation : Investment / Plan period ( 7 year)
- Net Cash flow : CF – Operating cost – Depreciation – Royalty
- Each year Tax : Net Cash Flow * Tax rate (35%)
- Net Profit : Net cash flow – Tax
- Total Cash Flow : Net profit + Depreciation+ Royalty

Conversion of Cash flow into US$ we have used the respective country inflation rate.

- $S_1(\$/€) = \{(1 + \pi_\$)/(1 + \pi_€)\}^2 * 1.28$

So, each year there is cash flow. The cash flow will be each year.

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Then how to evaluate the cash flow? The cash flow is each year 35 percent of the investment. We have a initial investment. Initial investment in Euro dollar, Euro currency. So, initial investment is Euro 750 million. Each year each year we are accepting, each year the proposal is the project lifetime is project lifetime is 7 years project life time is 7 years and each year each year the return is, each year return is 35 percent of initial investment initial investment.

Each year the return is 35 percent of the initial investment. So, every year we are getting 750 in into 35 percent of 750, every year there will be returns will come to us. Then each year the opportunity cost is available, the operating cost operating cost each year is 18 percent of initial investment, initial investment is that is 750 million Euro every year, 750 million of Euro. Then we have royalty payment, every year the company get a royalty payment. The royalty payment is non taxable. So, royalty payment is 10.5 percent of, 10.5 percent, 10.5 percent of return. Each year you are getting return of 35 percent of 750.

So, 10.5 percent of return of each year the royalty payment, then depreciation is straight line depreciation, as you read in corporate finance or accounting straight line depreciation means the over the life period of the project you have to get back the project investment money. So, here 7 years project, each 750 million, 750 million by 7 years, that will be every each year depreciation, 750 by 7 that will be each year depreciation. Then the net cash flow will be that net cash flow, then we have to estimate the net cash flow. Net cash flow is how much? Net cash flow is nothing but return minus return minus operating cost minus royalty payment minus depreciation, this is our return, this is net cash flow. On this tax will be there, tax rate is 35 percent. So, on this tax will be there, after this tax of tax on net cash flow, net cash flow, tax on net cash flow that is 35 percent.

We got 35 percent net cash flow. So, 35 percent there, after that we will get what is called what is called net profit, net profit will be.

Net profit will be net cash flow, net cash flow minus tax. After getting net profit you have to you have to calculate the actual cash flow, actual cash flow will be net profit plus royalty is company is enjoying, you have to add the royalty then depreciation will be there, there in the system, you have to add that depreciation. That will be your cash flow for the company, each year will come, after getting the cash flow this cash flow in Euro term.

You have to convert the cash flow into dollar term. So, we have a, we know that how to convert it, conversion will be conversion in dollar term will be S 1 what is called conversion rate S 1 will be 1 plus US inflation divided by 1 plus Euro inflation into the conversion rate. The conversion rate is 1. 1 Euro is 1.2 dollar. So, into conversion rate we will get the, to the power because 1 you are considering 1 to the power 1, it will be 2 it will be 2, like that you have to calculate the conversion rate here. This is inflation, inflation lead to depreciation of US currency because US inflation is more than Euro zone.

So, you have to do this so that after this we will get what is called cash flow in dollar term each country each year, after that you have to calculate D C F discounted cash flow, discounted cash flow will be cash flow in dollar divided by 1 plus discount factor is 15 percent. So, it will be 1 to 7 years, this will give you the discounted cash flow. The summation, this discounted cash flow you have to sum it up and minus the initial

investment. Initial investment is 750 Euro, 750 million Euro into 1 plus US inflation divided by 1 plus Euro inflation because this 750 need to be converted into need to be converted into Indian dollar term.

So, 750 million, so 750 million in what is you have to convert into Euro, convert into US dollar. So, Euro inflation into 1.28 that will be calculation, if it is positive then our NPV will be, NPV is positive you have to accept the project, if negative you have to reject the project. So, these are the step involved in calculation of this this problem. Let us move and calculate estimate the entire exercise in a excel sheet. I have done it here, you can see here.

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## Answer

| Initial Investment | 750 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | | | | | | | | | |
| | Return % | Cash Flow | Operating Cost | Royalty | Depreciation | Net Cash Flow | Tax | Net Profit | Total CF |
| 1 | 35% | 262.5 | 47.25 | 27.56 | 107.14 | 80.54 | 28.19 | 52.35 | 187.06 |
| 2 | 35% | 262.5 | 47.25 | 27.56 | 107.14 | 80.54 | 28.19 | 52.35 | 187.06 |
| 3 | 35% | 262.5 | 47.25 | 27.56 | 107.14 | 80.54 | 28.19 | 52.35 | 187.06 |
| 4 | 35% | 262.5 | 47.25 | 27.56 | 107.14 | 80.54 | 28.19 | 52.35 | 187.06 |
| 5 | 35% | 262.5 | 47.25 | 27.56 | 107.14 | 80.54 | 28.19 | 52.35 | 187.06 |
| 6 | 35% | 262.5 | 47.25 | 27.56 | 107.14 | 80.54 | 28.19 | 52.35 | 187.06 |
| 7 | 35% | 262.5 | 47.25 | 27.56 | 107.14 | 80.54 | 28.19 | 52.35 | 187.06 |

| Year | Mn Euro | Fx conversion | CF in US$ | DCF in US$ |
|---|---|---|---|---|
| 0 | -750.00 | 1.28 | -960.00 | -960.00 |
| 1 | 187.06 | 1.31 | 244.13 | 212.29 |
| 2 | 187.06 | 1.33 | 248.92 | 188.22 |
| 3 | 187.06 | 1.36 | 253.80 | 166.88 |
| 4 | 187.06 | 1.38 | 258.77 | 147.96 |
| 5 | 187.06 | 1.41 | 263.85 | 131.18 |
| 6 | 187.06 | 1.44 | 269.02 | 116.31 |
| 7 | 187.06 | 1.47 | 274.30 | 103.12 |
| | | | | 105.94 |

So, here I have, what I have done? Return, return is what 35 percent in every year. 35 percent of what? Everything in now in Euro term, our initial investment in 0 year investment in 750 million, this is 75 million every year each in initial year of 0 year. After 0 year, first year up to seventh year we will be accepting what is called 35 percent return of 750. So, you can see that here 35 percent of 750 every year, 35 percent, 35 percent every year till the end, till the seventh year.

So, what will be 35 percent of 750 is 262.5 million. Since 750 is million, so 262.5 million every year we are accepting a cash flow of 262.55 every year and this is then our operating cost. Operating cost is 18 percent of the cash flow. The cash flow of 262 18 percent of this, this is 47.25 every year the operating cost is coming to us. Then royalty

payment 10.5 percent of the 752 and your cash flow. The cash flow is 362 10 percent of every year, that every year 10 percent, the royalty payment is here. Every year 27.555556 every year royalty payment will be there. That I have mentioned here. Then after that, after that depreciation will be there. Depreciation I told you, the depreciation is seventh year you have to recover the 750 million, seventh year you have to recover the 750 million.

So, 750 million by 7 7 every year 107.14 hundred and 7.14 every year depreciation and net cash flow is nothing but cash flow 262 minus operating cost 47.25 minus royalty payment 27.56, minus depreciation that will be our net cash flow 80.54.

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What is, how we got it because first year, first year our cash flow is 262. 262.2 our operating cost, o p t cost is, operating cost is 47.25 47.25, royalty payment royalty R P m at, royalty payment is 27.56 and our depreciation is 107.14 107.14, these are expenditure these expenditure these expenditure these three are expenditure.

This will be minus from here. So, that will give you net cash flow. So, if you add all these three, minus from 262.2 262.25 we will get the 80.54 at the net cash flow. 80. net 54 is the net cash flow and on this 35 percent tax will be there, tax on this, 35 percent tax, 35 percent is a corporate tax so that will be 35 percent of 80.54 is 2. 28.19 and 28.19 is a tax, if you minus that tax from N C F we will get, what is called net profit.

The net profit is our net profit is 80.54 minus 28.19, this will be something around 52.35 will be the cash flow, net profit for each year. You can see that here every year we are receiving these 50, net profit of 52.35 because everything remain constant. So, every year you are receiving the net profit of 52.35. Then how we got the total cash flow? The net profit because here royalty payment, depreciation, these are the two component company is getting, there is no outflow, there is a, with, this will be there with the company.

So, you have to add in the net profit royalty 27.56 and depreciation 107.14 we will get 187.06 as the total cash flow in Euro every year. So, every year we are getting the Euro component of 187.06. So, that is a cash flow. Now, you come to the second table. Here in 0 year 750 750 Euro is outflow, 750 Euro is outflow minus sign and what you are getting? Every year you are getting 187. Here cash flow, every year this cash flow is coming over here 187.06 as the cash flow up to seventh year.

But FX conversion rate, I told you how to calculate conversion rate. Conversion rate S 1 is equal to 1 plus US inflation in 4 percent divided by Euro inflation 2 percent into 1.28 is the conversion, 1 Euro is 1.28 dollar. So, S 1 will be in dollar term. S 1 will be in dollar term, if you calculate you will get every year this is 0 year, this power will be 0. So, it will be 1.28. In first year 1. 1. 1 plus 4 percent divided by 1 plus 2 percent to the power 1 into 1.28, this will be how much? This will be 1.31.

Then third year, second year, like that you have to go i'th year it will be 1 1.4 1 plus 2 percent to the power i into 1 into 1.28 that will give you i change 1 2 3, we will get the conversion rate. The conversion rate I have calculated here you can see that conversion rate every year and if you multiply the conversion rate with the million Euro you will get cash flow in US dollar term, first year the 0 year there will be 960 cash outflow is there minus sign and every year you multiply 187.06 into 1.31 you will get this one, like that seventh year 187.06 multiply 1.47 you will get this 274.3, this is the cash flow in dollar, a million dollar will come and after getting the cash flow in million dollar you have to convert these into, these are future cash flow, you have to bring it to present value by discounting them with, discounting them with a discount factor of 15 percent that is opportunity cost of capital for the company.

So, you have to discount this is a 0 year, there is no discounting. First year the cash discounting factor, even a discounted first year what will be that? First cash flow 212 that 244.13 first year cash flow 1 plus 15 percent to the power 1, this will be, this will be coming how much 212. 12.129 like that, every year discount it and bring it to the present value and sum it up 960 will be minus sign will go out from that system, other thing will remain with the system, total NPV, that NPV NPV will be 100 and 105.94 million US dollar, million USs dollar, US dollar in million.

So, that is a positive NPV so you have to accept the project. Positive NPV of 105.94 we are accepting what is called the investment proposal of US MNC in European Euro zone area. So, here the calculation takes place like that. Here, we have not, we have adjusted the royalty payment and depreciation. We can also adjust some other example, you can adjust the subsidy, we can adjust less borrowing cost, we can adjust what is called less taxation, like that it may or you can also adjust the political risk in the form of extra discount rate. Suppose, the political risk is more in Euro zone you can extra 2 percent extra discount rate. In place of 15 percent you can use 17 percent because country specific country specific analysis are available and each country what is the risk of investment, that also available now a days to country risk calculation process, that can be a factor in discounting, as a discount factor in estimating the NPV.

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## References

- International Financial Management, 3nd Edition, by Eun and Resnick, Irwin, 2004.

- Multinational Financial Management by Jeff Madura, Thomson Publications

- Multinational Financial Management, by Alan C. Shapiro, Wiley India, 8th Edition.

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So, the references are here you can see. The references international financial management, you can, Eun and Resnick 2004 you can go through that, you can go through the multinational financial management by Jeff, Jeff and Madura, you can also go through multinational financial management by Alan Shapiro and see that how the international capital budgeting dealt with there, some questions I have put you, model question here, you can go through the model questions.

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## Model Questions

- Discuss the nature of international capital budgeting. What are the adjustments required to carry out for converting domestic capital budgeting to international capital budgeting.

- Inflation in US is 6.50% and that of Euro-zone is 3.75%. The current spot rate is Euro 1= US$1.26. Expected opportunity cost for the MNC in dollar term is 12%. Evaluate the project if the after tax cash flows are in the following pattern:
- Year                     0    1    2    3
- After Cash Flow (Euro)    -1550  450   675   825

Discuss the nature of international capital budgeting and what are the adjustment required to carry out for converting domestic capital budgeting into international capital budgeting? You see you have to mention here what is domestic capital budgeting, you have to mention here what is international capital budgeting and what are the adjustment of royalty, adjustment of taxation, adjustment of subsidy, adjustment of country risk, adjustment of political risk, adjustment of adjustment of differential taxation, adjustment of depreciation like adjustment of what is called your less labour input. So, all these adjustment you have to do in domestic capital budgeting side to convert into a international capital budgeting. The major adjustment here what is currency fluctuation side that also a part of the adjustment process.

Second question inflation in US is 6.5 and Euro zone is 3.75, the current spot rate is 1 Euro is 1.26 US dollar. Expected opportunity cost of in MNC in dollar term is 12 percent, evaluate the project if the after tax cash flow are given to us, here after tax cash

flow in 0 year, first year, second year, third year given to you and the Euro conversion rate is given to you. 1, 1 Euro is 1.26 that is spot rate and but inflation in US is 6.5, inflation in Euro zone is 3 3.75.

So, this differential inflation lead to depreciation of Euro dollar and there will be change in depreciation rate. So, how to do it? In first year, in cash flow it is 0 year, year put here and cash flow.

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Cash flow in Euro currency. So, 0 year there will be minus cash flow 11 1 1550 in first year, second year, third year. In first year is 450, second year is 675, third year is 825. These are the cash flow, but these are Euro cash flow, you have to convert this cash flow into US dollar cash flow, how to do it.

Since, the currency conversion rate 1 Euro. 1 Euro is available to 1.26 dollar. However, inflation rate is available to the conversion will be S 1 will be 1 plus US inflation is 6.5 percent divided by 1 plus Euro inflation is 3.75 percent to the power i, i is here to the power i into 1.26. Here, i will be 0 so you will get the conversion rate for this (( )) this multiply, multiply here minus 1 1550 into S 0, S 0 will come where i will be 0, this will be 1.26.

Similarly, S multiply here 450 into S S 1, multiply here 450 into S 2, multiply here in a 6 675 into S 2. Similarly, 825 into S 3 and you are changing i 1 2 3 4 and getting that S 1 S

2 S 3, this will give you Euro US dollar cash flow, after getting the Euro dollar cash flow you go for calculation of D C F. D C F will be this, this here remain same, D C F here discount factor discount factor is, we are given to your discount factor is 12 percent by MNC, but discounting these by 12 percent you will get the NPV. NPV here minus will be there or NPV will come over here. That will be the calculation process of this problem.

Thank you.