UNIT 11 INTERNATIONAL PROJECT APPRAISAL

Structure

11.0 OBJECTIVES

After studying this unit you should be able to :

- explain the nature of international projects
- differentiate between international and domestic projects
- explain and illustrate various techniques of projects appraisal
- explain and illustrate the concept of project appraisal under conditions of certainty and uncertainty
- discuss real option value in project appraisal
- describe portfolio approach to project appraisal
- discuss a comprehensive case study on international project appraisal.

11.1 INTRODUCTION

Projects signify commitment and allocation of large sums benefits which will accrue over a long period of time in future. Projects thus involve long term expenditure; the amount of expenditure being generally large. An important characteristic of projects as distinct from day-to-day working capital type expenditure is that it is irreversible. Once committed, it is difficult to liquidate without substantial loss. An obvious implication of it is that the cost of error of judgement in case of projects is very high. It is for this reason that capital investment decisions need to be carefully thought through and appraised before committing funds. Committing funds abroad will definitely pose additional issues. How to appraise an international projects? This is the main question being attempted in this unit. But to be able to answer this question, we need to, first take up the questions viz., How do international projects differ from domestic projects? What are the basic techniques of Project Appraisal? Could the techniques of Project Appraisal be same for the domestic as well as international projects? If not, why and how not? What is robust frame work of analysis for international projects appraisal? How would you deal with distinct issues in international investment analysis viz., parents vs. project cash flows, parent vs. project discount rates, parent vs. project country currency, inflation, political risk, etc.?

For an international investor, world could be one market offering a universe of projects. So, should an international investor appraise a project as 'stand alone' or as a constituent of a

portfolio? What are the implications of and issues in portfolio approach to international project appraisal? How to resolve them?

In this unit you will learn about nature of international projects, difference between international projects and domestic projects, different techniques of projects appriasal, project appraisal under certainity and uncertainity, real option value and portfolio approach to project appraisal. We shall also take up a comprehensive case example to illustrate our discussion.

11.2 INTERNATIONAL PROJECTS

As we noted under introduction, projects essentially signify commitment of capital expenditure to build up productive capacities. This commitment of capital expenditure to build up productive capacities when an entrepreneur or a promoter undertakes in his or her own country it is called a domestic project; whereas when he or she goes to put the money beyond the borders of his/her country it is called an international or more often foreign project. The forms of these international projects could be diverse. Setting up a paper mill by an Indian in Thailand is much an international project, as acquisition of a running or sick paper mill by him there. The former is an example of green-field project while the latter may be an expansion or diversification through acquisition and turn around. One thing however, common in these projects is that the investor acquires physical assets in the form of plant and equipment in other countries. Literature classifies such investment as foreign direct investment (FDI). We may note, however that foreign operations of a business may take various forms viz., exports, sales and distribution affiliates, licensing arrangements and management contracts. But when we shall talk about international projects in this unit we don't refer to any of these. We instead mean FDI or production affiliates.

11.3 PROJECT APPRAISAL : MEANING AND SCOPE

Project appraisal basically involves answering the question : whether or not to put the money in the project? At a common sense level it means comparing return on investment with the cost of the funds. Only if the return is higher than the cost of funds, it would make sense to put the money in a project. This presumes, of course, that the purpose and rationale for undertaking a project is to generate a surplus. A literature survey on the motivation factors for undertaking FDI may highlight diverse strategic, behavioural and economic factors viz. follow the leader, bandwagon effect, market seekers, follow the customers, raw material seekers, efficiency seekers, cutting cost, that is, taking advantage of lower labour or input cost in other countries, pre-emption of competition, international diversification. However, to the extent that maximisation of shareholders wealth is a consensus objective of business, in financial terms, project appraisal means assessing the possibilities of generating a financial return higher than the cost of funds. This is so because the only way to maximise shareholders' wealth is to maximise risk adjusted rate of return that is the spread between return and cost of funds, suitably modified for business risks. The above approach to project appraisal is popularly termed as financial appraisal of the projects.

In the literature, we also come across some other approaches to project appraisal viz. economic appraisal or social appraisal. We may note here that whether it is financial appraisal or economic appraisal or social appraisal of a project, these all approaches essentially involve comparing benefits and cost of a project and seek generation of surplus. The difference is only of nature of cash flows considered. Under the financial appraisal, market-price-based cash flows accruing to the project are considered. Under the economic appraisal, economic prices or shadow prices based cash flows accruing to the project are considered. Under the social appraisal, economic prices based cash flows accruing to project and its social and environmental context are considered. In our discussion of international project appraisal in this unit, we will limit ourselves to financial appraisal of international project. We may also note here that financial appraisal of projects is indeed proceeded by a few other appraisals viz., market appraisal and technological appraisal. Market appraisal seeks to assess market demand for output of the project. This indeed forms the basis for revenue and cash inflow forecasts used in

financial appraisal. Technological appraisal involves assessment of the requirements of the construction, commissioning, operation and maintenance and abandonment phases of the project. This kind of exercise provides the basis for cost and cash outflow estimates used in financial appraisal. As we shall see under techniques of project appraisal, cash inflows and cash outflows and the estimated economic life of the project constitute the two most significant pieces of information in the entire process of project appraisal.

11.4 TECHNIQUES OF PROJECT APPRAISAL

Over the years, businesses have evolved various techniques of project appraisal. Non-DCF and DCF are the two broad groups. DCF means Discounted Cash Flow. The main difference between non-DCF and DCF techniques is that while non-DCF techniques use undiscounted or unadjusted for time value of money cash flow data, the DCF techniques use discounted or adjusted for time value of money cash flows.. The time value of money is a very critical concept in project appraisal. Time value of money means a rupee today is worth more than a rupee tomorrow. Or, you may say a rupee tomorrow is worth less than a rupee today. This is true as long as there is inflation in the economy. Inflation causes loss of purchasing power of currencies. Accordingly, under inflationary conditions, and which are surely common to all economics of the world, a rupee today is worth more than a rupee tomorrow; or a rupee tomorrow is worth less than a rupee today. Given a choice to you to have either rupees one hundred today or five year down the line, you will jump to have rupees one hundred today. You might even like to accept a little less than rupees one hundred today compared to rupees one hundred in five years from now. You know due to inflation the purchasing power of rupees one hundred five years from now will definitely be less than what it is today. Also you know, you may reinvest and enhance your wealth over five years, to exceed rupees one hundred to be received five years down the line. This concept of time value of money is very relevant to project appraisal, as the benefits from the project are available at different points of time in future. For instance, if you set up a tractor manufacturing factory, the construction and commissioning costs may be incurred over two year period, whereas operation and maintenance cost will be incurred over a long period of time in future. As well as, cash revenue will be realised over a long period in future. It is, therefore, necessary to provide for time value of money in the process of project appraisal.

11.4.1 Non-DCF Techniques

Payback period and Accounting Rate of Return are the two techniques of project appraisal belonging to the non-DCF group. Under the payback period, an effort is made to determine the period it will take to recover the initial investment in the project. To take a simple illustration, a project is likely to experience the cash flows as follows :

Period	**0**	**1**	**2**	**3**	**4**	**5**
Cash Flows (Rs. Crore)	**-1000**	**200**	**300**	**500**	**200**	**100**

The cash flow data signify that there will be an initial investment or cash outflow of Rs. one thousand crore, shown as minus 1000, and there will be net cash inflows (i.e., Difference between cash outflows on account of operation and maintenance expenses and cash inflow on account of revenue realisation, over the estimated economic life of 5 years of the project) shown as positive Rs. 200, 300, 500, 200 and 100 Crore. In how much period is the initial investment of Rs. 1000 crore recovered from the project?

A quick mental work will give you the answer as 3 years. Rs. 200 crore, Rs. 300 crore, Rs. 500 crore, to be realised in the first three years of the project life will equal initial investment of Rs. 1000 crore. Thus, 3 years is the pay back period of this project. In case only a portion of the net cash inflow in a year is sufficient to recoup the initial investment, the payback period gets adjusted. The assumption normally followed for the same is uniform net cash inflow in that year. Assume for a moment that the net cash inflow figure for the third year in our illustration above would have been Rs. 600 crore instead of Rs. 500 crore. The pay back period for this project would be less than 3 years. It will be 2 years and 10 months. To recoup Rs. 500 from Rs. 600 crore flowing in at a uniform rate over 12 months in the 3rd year, will take only 10 months.

Check Your Progress A

Compute payback period for the above illustration assuming other things remaining the same,

i) 1st year net cost inflow is Rs. 300 crore instead of Rs. 200 crore.

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ii) 2nd year net cash inflow is Rs. 400 crore instead of Rs. 300 crore.

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For project appraisal and selection, based on payback period, the decision rule is shorter the payback period, the better the project. The limitations of this approach are, however, obvious. First and foremost, it ignores time value of money. Two, it ignores cash flows beyond the payback period. To overcome the first limitation, some managers work out payback period based on discounted cash flows. But the second limitation continues. Also it is felt that if discounting of cash flows is to be applied, why not use discounted cash flow techniques itself. Why go half way only? Ease and convenience may be the answer here. But, as mentioned above, when the cost of error of judgement in project appraisal is so high, ease of convenience of approach should not be the basis of choice of technique for project appraisal.

Accounting Rate of Return (AROR), the other technique in the family of non-DCF methods, tries to overcome the second limitation as mentioned above, of payback period but suffers from ignoring the time value of money. You may once again take a look at the cash flow data used in our illustration above. Based on the given data, the accounting rate of return of this project is 6%.

$$\text{AROR (for 5 years)} = \frac{\text{Total net cash inflow} - \text{initial investment}}{\text{initial investment}}$$

$$= \frac{1300 - 1000}{1000} = \frac{300}{1000} = 30\%$$

$$\text{AROR (average per annum)} = \frac{30\%}{5 \text{ Years}} = 6\%$$

Some managers, assuming that the initial investment will depreciate to zero over the economic life of the project, in the above formula, in the denominator, replace initial investment by half of that. That means, in our example,

$$\text{AROR (for 5 years)} = \frac{300}{500} = 60\%$$

$$\text{AROR (average per annum)} = \frac{60\%}{5} = 12\%$$

You will readily appreciate that whether 6% or 12%, AROR suffers from a serious limitation ignoring time value of money. Let us now go to discuss DCF techniques which overcome this limitation and provide for time value of money.

11.4.2 DCF Techniques

Net Present Value (NPV) and the Internal Rate of Return (IRR) are the two popular DCF methods of project appraisal. Let us briefly explain and illustrate these two methods.

Net Present Value

Under the NPV method of project appraisal, project cash flows are discounted at the firm's weighted average cost of capital, or the projects' required rate of return, to determine net present value. Symbolically,

$$NPV = -I_0 + \sum_{t=1}^{n} \frac{NCFt}{(1+r)^t}$$

Where

NPV = Net Present Value

I_0 = Initial outlay (or project cost)

NCFt = Net cash flow over period $t_1 - t_n$ i.e., the economic life of the project or say the period over which the project is expected to remain economical or profit generating.

r = weighted average cost of capital or required rate of return (weighted average cost of capital is the weighted average of the cost sources of funds namely debt and equity where proportion in which different sources of funds are employed or targeted to be employed are used as weights. Required rate of return is adjusted WACC for project riskiness).

Let us run this formula of NPV on the facts of our illustration and compute NPV for the same project. For the purposes of NPV calculation, let us assume that WACC or the required rate of return is 18% p.a. (what is WACC? How is it calculated? How does it differ from the required rate of return? For answer to these questions, you may refer the unit 12). for ready reference, the facts of the illustration were as follows :

Period	**0**	**1**	**2**	**3**	**4**	**5**
Net Cash flow	**-1000**	**200**	**300**	**500**	**200**	**100**

Now, in order to work out the net present value of this project we shall take the following steps :

Step I : Calculate and sum up discounted value or present value of the future stream of net cash flows over the economic life of the project, that is 5 years in this case. To workout present value or discounted value, you will solve.

$$PV = \sum_{t=1}^{n} \frac{NCFt}{(1+r)^t}$$

PV = Present value

r = Rate of discount

t = Period

We will thus solve for

$$\frac{200}{(1+.18)^1} + \frac{300}{(1+.18)^2} + \frac{500}{(1.18)^3} + \frac{200}{(1+18)^4} + \frac{100}{(1.18)^5}$$

Computer programme 'Excel' can be used to find NPV. In the absence of this, there are present value tables, as given at the end of this block (See Appendix A), which may be used. In order to workout NPV with the help of present value tables, you will as a first step workout present value factors. A present value factor means the present value of a rupee received at the end of the period. Now assuming the discount rate of 18% p.a. the present value of a rupee received at the end of 1st year, 2nd year, and so on upto 5th year are :

Period	PVF
1st year	.847
2nd year	.718
3rd year	.609
4th year	.516
5th year	.437

Now multiply these present value factors by corresponding net cash flows for these periods and then add them up to get present value of the cash flows being generated by a project.

In our example, it will be

Year	PVF@ 18%	x	NCF (Rs. Cr.)	=	PV of NCF (Rs. Cr.)
1st	.847		200		169.4
2nd	.718		300		215.4
3rd	.609		500		304.5
4th	.516		200		103.2
5th	.437		100		43.7
			TOTAL	=	836.2

Step 2 : Compare PV of this project with initial investment to find out NPV.

The NPV of this project is negative Rs. 163.8 crore. Recall :

$$NPV = -Io + \sum_{t=1}^{n} \frac{NCFt}{(1+r)^t}$$

$$= -1000+836.2 = \text{Rs. } 163.8$$

For project appraisal and selection, based on NPV, the decision rule is, select project with positive NPV, and between two or more projects, select one with the highest NPV. This project, based on the analysis of the facts as given, should therefore not be accepted for investment.

Check Your Progress B

Write out PVFs for 1-5 years @ 9% per annum.

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Internal Rate of Return

Quite similar in logic to NPV is internal rate of return (IRR) method. Under this method, we are required to compute the internal or implicit rate of return from the net cash flows of the project and compare it with the cost of capital i.e. WACC or the required rate of return. Only if the IRR is higher than the WACC or the required rate of return, the project will be accepted for investment, not otherwise. Let us briefly discuss and illustrate IRR.

Internal rate of return means the rate of discount at which the present value of the future stream of net cash flows over the economic life of the project is equal to the initial

outlay. Symbolically, IRR means

$$Io = \sum_{t=1}^{n} \frac{NCFt}{(1+r)^t}$$

The symbols used above mean the same as explained for NPV formula . So, if we want to find out the IRR for our illustrative project, as discussed above, what we have to solve for is:

$$1000 = \frac{200}{(1+r)^1} + \frac{300}{(1+r)^2} + \frac{500}{(1+r)^3} + \frac{200}{(1+r)^4} + \frac{100}{(1+r)^5}$$

What it means is that we have to find out the value of r. And that would be the IRR of the project. As it can be readily appreciated, finding IRR is an iterative process. This process with the help of computer and 'Excel' programme can be very easily accomplished. In the absence of computer, we may again use present value tables as given at the end of this block (and used above for computing NPV) to workout IRR. To achieve this we may try with r, chosen at random. Suppose we choose r = 18%. Will it equate the present value of the future stream of net cash flows of the project equal to the 1000 crore? As can be seen from NPV calculations given on page 28 at 18% the present value of the net cash flows of the project is equal to Rs. 836.2 crores and not Rs. 1000 crore. Thus, 18% is not the IRR of this project. That means we have to make another try. But before we make another try with another r, it is important to decide whether the next r will be higher or lower than 18%. Here you may take guidance from the inverse relationship between r and present value (PV) in the IRR formula. This means, if r is higher, PV will be low and vice versa. Now that we wish to lift PV from Rs. 836.2 crore to Rs. 1000 crore we should try a lower r than 18%. Suppose we try 15%. The present value of the future stream of net cash flows of this project will be equal to Rs. 893.9 crore. This is again not equal to Rs. 1000 crore. And, therefore, 15% is not the IRR of this project.

Year	PVF @ 15%	x	NCF (Rs.Cr.)	=	PV (Rs.Cr.)
1st	.870		200		174.0
2nd	.756		300		226.8
3rd	.658		500		329.0
4th	.572		200		113.4
5th	.497		100		49.7
				TOTAL =	893.9

Let us now try 10%

Year	PVF @ 10%	x	NCF (Rs.Cr.)	=	PV (Rs.Cr.)
1st	.909		200		181.8
2nd	.826		300		247.8
3rd	.751		500		375.5
4th	.683		200		136.6
5th	.621		100		62.1
				TOTAL =	903.8

Is 10% the IRR of this project? The answer is big No. Let us now try 5%

Year	PVF @ 5%	x	NCF (Rs.Cr.)	=	PV (Rs.Cr.)
1st	.952		200		190.4
2nd	.907		300		272.1
3rd	.864		500		432.0
4th	.823		200		164.6
5th	.784		100		78.4
				TOTAL	= 1137.5

Is 5% the IRR of this project? The answer is again no. But there is certainly no need to try any other rate. By now we know that the IRR will be somewhere between 10% and 5%, as Rs. 1000 crore is between Rs. 903.8 crore, the PV @ 10%, and Rs. 1137.5 crore, the PV @ 5%. To arrive at the IRR we may use the following formula :

$$IRR = L + \frac{NPV_L}{NPV_L + NPV_H} \quad (H\text{-}L), \text{ where}$$

NPV_L = Net Present Value at the higher rate i.e. PV @ 5% – Io

NPV_H = Net Present Value at the higher rate i.e., PV @ 10% - Io

H = Higher rate tried

L = Lower rate tried

Thus,

$$IRR = 5 + \frac{(1137.5 - 1000)}{(1137.5 - 1000) + (903.8 - 1000)} (10\text{-}5)$$

$$= 5 + \frac{137.5}{137.5 + 96.2^*} (5)$$

= 7.94% approx.

* This is ignoring +, – sign.

Thus, the IRR of this project is approximately 7.94%

Check Your Progress C

It is said that IRR is the rate of discount at which NPV is zero. Do you agree? Give reasons.

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Choice between NPV and IRR

Though the logic behind NPV and IRR is same, that is, providing for time value of money, IRR is generally preferred by managers over NPV for its apparent appeal of an objective measure of rate of return in percentage terms. However, technically speaking NPV is better than IRR as it assumes uniform reinvestment rate equal to the rate of

discount for competing projects, whereas IRR assumes different reinvestment rates equal to individual IRR of competing projects.

11.4.3 Project Appraisal under Risk and Uncertainty

In our discussion above we have ignored one thing that is the risk and uncertainty affecting project appraisal. Risk and uncertainty signify variability of outcome(s) from the most expected outcome(s). From our discussion of NPV/IRR by now, it is clear that there are three pieces of information which are basic to the entire computation; these are, namely. Initial outlay (Io), net cash flows i.e., the difference between the cash inflows and outflows over the economic life of the project and the discount rate or the cost of capital. In all our illustrations, we have worked with deterministic figures, about each of three sets of data. The projects are certainly not deterministic. They are heuristic, probabilistic, risky and uncertain. Any project appraisal should therefore take into account the elements of risk and uncertainty. Probability analysis and sensitivity analysis are the two most common approaches to deal with risk and uncertainty in project appraisal. Probability analysis involves attaching probabilities to estimates of cash inflow and outflow over the economic life of the project to refine estimates about the net cash flows. Sensitivity analysis basically involves 'what if' analysis to foresee outcomes under different possible scenarios. Ad hoc enhancement of discount rates or required rate of return for different types of projects viz., modernisation or renovation, expansion, related diversification and unrelated diversification, in that order, is also quite common practice. The choice of approach to deal with risk and uncertainty in project appraisal ultimately depends upon the value at risk and the system sophistication achieved.

11.5 ISSUES IN INTERNATIONAL PROJECT APPRAISAL

Appraisal of international projects involve quite a few more complexities than domestic projects. The variables that are unique to international project appraisal are as follows :

a. Cash flows from foreign projects may be subject to various restrictions that are imposed by the host country.

b. Initial investment in the host country may benefit from a partial or total release of blocked funds.

c. Cash flows from foreign projects must be converted into the currency of the parent firm.

d. Cash flows generated from foreign projects may replace revenue producing exports to the host country.

e. Profits generated from projects undertaken in other countries are subject to two taxing jurisdiction: the host country and the parent country.

f. Profitability of foreign projects may be enhanced from concessionary financing arrangements and other benefits provided by the host country.

g. Foreign investment may contribute to the corporate overall strategy of growth and gaining foothold in markets to prompt competitors.

h. Foreign investment may produce diversification benefits to shareholders of the parent firm.

i. Terminal value is more difficult to estimate than in the case of domestic projects. Such value to the parent company may differ from the valuation put on the facilities by potential buyers in the host country or from third countries.

It may be mentioned that NPV technique of project appraisal is as much applicable in cash of international project appraisal as it is in case of domestic project appraisal. However, in view of the unique complexities as indicated above, Adjusted Present Value (APV) technique is found more suitable for appraising international projects.

11.6 ADJUSTED PRESENT VALUE TECHNIQUE

The Adjusted Present Value is essentially a method which allows different components of the project's cash flow to be discounted separately, thus providing the needed flexibility to allow the various variables and other features of the project to impact the outcome. This approach also makes possible the use of different discount rates for different segments of the total cash flow, depending on the degree of certainty of the eventual materialisation of each segment. Moreover, the APV framework enables the capital budgeting analyst to test the profitability of the foreign project prior to accounting for all the complexities. If the project is acceptable, no further evaluation based on accounting for other cash flows will be necessary. If it fails to meet the acceptance criteria, then an additional segment is added, and the evaluation process is repeated. For example, the analysis may be conducted on the basis of the contractual cash flows which are remittable to the parent company under existing foreign exchange regulations of the host country. If the project does not pass the hurdle rate, another cash flow component, such as the cash flow that the company can unblock through the transfer pricing mechanism, will be added to ascertain whether or not it helps to pass the hurdle rate. More components such as cash flow from tax savings, concessionary loans, subsidies can be added further. This approach is illustrated later by a case study. Let us now examine the components of the APV technique.

1. Initial Investment

Initial investment consists of the cost of the project (assume denominated in Indian rupees INR) representing cash, equipment, and other assets contributed by the parent company (assume Indian company) plus local loans (if any) for working capital purposes. The latter part is to be converted into INR at the spot exchange rate. In the event that the foreign project will release blocked funds the parent owns in the host country, the face value of the blocked funds which are activated by the project (if it is assumed that such funds have a zero opportunity cost) will be treated as a reduction in initial investment. Thus component may be expressed as follows :

$$-[I_{o(INR)}+(I_{o(local)}\times S_{o(H/L)} - UF \times S_{o(H/L)}]$$

Where
- $I_{o(INR)}$ = initial investment of parent company in INR
- $I_{0(local)}$ = initial local investment expressed in local currency
- $S_{o(H/L)}$ = spot exchange rate at period zero (year of initial investment) expressed in home currency per unit of local currency
- UF = unblocked funds expressed in local currency

2. Projects' Remittable Cash Flows

Project's cash flows has many components. The major component is the cash flows generated by sales in the host country, adjusted downward by the lost income on sales previously realized on exports made by the parents to the host country market. It also includes cash flows generated by sales from the new project to third country markets, also reduced by profits on lost exports to these markets (if any). In addition, remittable cash flow includes royalties and fees agreed upon by the parent and the affiliate for the use of patents and services, respectively, provided by the parent. Contractual payments to the parent also include interest on loans advanced to the affiliate by the parent. It should be emphasized that this component of the APV formula includes only those cash flows which are legally remittable to the parent. It may be expressed as follows :

$$\sum_{t=1}^{n}\left[\frac{(NCF_t^*)\,(S_t^*\,(H/L) - L_t)\,[I - T]}{(1 + r_1)^t}\right] + \frac{(NCF_{t2})S_t^*\,(H/L)}{(1 + r_2)^t}$$

$$+\left[\frac{(NCF_{t3}^{*})\,(S_t^{*}\,(H/O)-L_{t3})}{(1+r_1)^t}\right][1-T]$$

Where NCF_t^* = net cash flows generated by expected sales in the host country in time period t.

S_t^* (H/L) = expected exchange rate in period t (home currency per one unit of local currency).

L_t = lost profits on exports to host country in time period t expressed in home currency.

T = applicable tax rate in host country or home country, whichever is higher.

NCF_{t2}^* = expected cash flows from royalties and fees and other contractually remittable transfers in time period t.

NCF_{t3}^* = net cash flows generated by expected sales in third country markets in time period t.

S_t^* (H/O) = expected exchange rate in time period t – home country currency in terms of one unit of third country currency.

L_{t3} = lost profits on exports to third countries in time period t expressed in home currency units.

r_1 = discount rate applicable to project's cash flows from sales in host and third country markets. This rate reflects discount rates applied to projects of similar risk in host country or home country.

r_2 = discount rate applicable to transfer of contractual payments. r_2 is lower than r_1, because both the materialization and transfer of such flows are subject to less uncertainty than the cash flows generated by sales.

t = life expectancy of the project, i.e., number of years over which cash flows are expected to materialize.

3. Contribution of Subsidies and Concessions to Project

Most of the subsidies, concessions and other benefits granted by the host country will automatically impact cash flows. These may include provision of free land for the site of the project (to be treated as a reduction in the initial outlay), tax holidays, lower tariffs on imports, and lower utility rates. As such, there is no need to assign a separate term of the APV formula to incorporate these benefits in the evaluation process.

A concessionary arrangement that would require a separate treatment in the APV format is when the project can obtain a loan at a low interest rate from a local financial institution. Such a loan, which is usually provided to meet all or part of the working capital requirements of the foreign project, represents a one-time contribution to the APV of the project. This contribution is measured by the difference in home currency terms between the face value of the loan and the amount of repayments, discounted to the present at the probably home country borrowing rate that would have been incurred had the concessionary loan not been available. This may be expressed as follows :

$$So(H/L)\left[CL-\sum_{t=1}^{n}\frac{LR_t}{(1+r_2)^t}\right]$$

where : CL = face value of concessionary loan in local currency.

LR_t = loan repayments on concessionary loan in local currency.

r_3 = applicable discount rate; an appropriate rate is the borrowing rate in the home country.

4. Tax Savings and Other Transfers to Parent

This component of cash flow in the APV formula is somewhat conjectural and is not normally added unless the project proves unacceptable on the basis of remittable cash flows and the contribution of subsidies and other concessions.

International business firms, through the transfer pricing mechanism, are often able to move funds from high-tax location to low-tax locations, as well as to defer tax payments by transferring funds to tax havens. Tax savings realised from these operations contribute to the viability of the project by lowering the effective tax rate for the determination of net cash flows.

The transfer pricing mechanism also enables these firms to effect transfers over and above the legally remittable cash flows. It can also serve as a tool for overcoming to some extent future obstruction of transfers of legally remittable contractual cash flows. Potential contribution of tax savings and extra remittable income should be discounted at a substantially higher rate than contractually remittable income, in recognition of the higher degree of risk involved. This term may be expressed as follows :

$$\sum_{t=1}^{n} \frac{(S_t^* (H/L) (TS\&AT_t)}{(1 + r_4)^t}$$

where : $(TS\&AT_t)$ = tax savings and additional expected transfers in period t.

r_4 = appropriate discount rate for such transfers.

Terminal Value

Estimation of terminal value is perhaps the most difficult part of the international project appraisal process, unless there exists a prior arrangement with the host country's government or local private investors. In some cases, the host government stipulates that the projects will revert to it after a stated number of years for a nominal sum. If such is the case, or where the management of the parent company deems the terminal value to be insignificant, no adjustment is needed in the appraisal process.

In practice, International business firms view foreign affiliates as a continuing venture just like their operating facilities at home. Nevertheless, accounting for the terminal value may prove to be as crucial a step in financial appraisal of foreign projects as in the appraisal of domestic projects. The problem lies in arriving at a reasonable estimate of the terminal value, based on the most realistic assumptions possible. The range of possible values may be very wide, depending on whether the estimate is based on the project's potential value if retained as a going concern or if liquidated and sold to local investors.

The importance of estimating a realistic terminal value is especially crucial when the appraisal process is based on a relatively short project life span and in capital-intensive undertakings. International business firms have used several techniques to arrive at an acceptable estimate for the terminal value. One approach is to assume that net cash flows generated at the terminal year are to continue at the same level for a stated number of years. The terminal value will thus be the present value of this annuity at the terminal year discounted at an appropriate rate, probably reflecting local interest rates. Alternatively, a break-even terminal value may be computed. This value is defined as the value which would result in an APV of zero; that is, the project is just barely acceptable. Thus calculated, the terminal value is examined by the management to ascertain whether the projected market values are likely to attain or exceed that figure. In any event, if the project can achieve a positive APV without allowance for the terminal value, this adjustment would not be necessary.

The estimated terminal value is the last component in the APV formula and will be discounted at r_1, the same rate applied to discounting cash flows generated by sales in the host country, thus :

$$\frac{S_t^*(H/L)(TV_t^*)}{(1+r_1)^t}$$

where

TV* denotes the expected terminal value.

The various component in the APV formula are now aggregated as follows :

APV = $-\{Io(INR) + Io(local) \times So(H/L) - UF \times So(H/L)\}$

i.e. initial outlay reduced by the value of unblocked funds, +

$$\sum_{t=1}^{n} \left\{ \frac{((NCF_t)(S_t^*[H/L] - L_t))(1-T)}{(1+r_1)^t} \right\} + \frac{(NCF_{t2})\,S_t^*(H/L)}{(1+r_2)^t}$$

$$+ \left\{ \frac{((NCF_{t3})(S_t^*[H/O] - L_{t3}))}{(1+r_1)^t} \right\}(1-T)$$

i.e. present value of project's remittable cash flows, +

$$So^*[H/L]\left[CL - \sum_{t=1}^{n} \frac{LR_t}{(1+r_3)^t}\right]$$

i.e. present value of subsidies and concessions, +

$$\sum_{t=1}^{n} \frac{S_t^*[H/L](TS\,\&\,AT_t)}{(1+r_4)^t}$$

i.e. present value of tax savings and additional transfers achieved by the transfer pricing mechanism, +

$$\frac{S_t^*[H/L][TV_t^*]}{(1+r_1)^t}$$

i.e. present value of cash flow from estimated terminal value.

The last two components, namely, present value of tax savings and additional transfers achieved by the transfer pricing mechanism, and present value of cash flow from estimated terminal value, are added in the calculations, if the project being evaluated fails to meet the acceptability criteria on the basis of the first three components, namely initial investment reduced by the value of unblocked funds, present value of project's remittable cash flows, and present value of subsidies and concessions. Under these circumstances, the project is reappraised, with the so-called two-or multiple-stage approach by adding the additional components sequentially.

We thus see that APV is quite suitable for international project appraisal. It takes into account distinguishing characteristics and complexities of international projects. You may note that major difference between APV and NPV is that while NPV uses one single rate of discount, APV uses more than one rates of discount. In view of the differences in the nature of different components of cash flows (in terms of uncertainty or riskiness) in international projects, it is certainly more appropriate to use more than one rates of discount, as is the case of APV.

11.7 BEYOND APV : REAL OPTION VALUE

While APV has become quite well known technique of international project appraisal, it does not take into account value of elements of 'option' embedded into each project. Option in financial literature means a right but not an obligation. You might have heard about stock options, currency options, interest rate options. These are different types of financial options. All these options give their holder a right but not an obligation to buy or sell a specified asset at a specified price on or before a specified date. Without elaborating further on financial options, let us note that the elements of option (i.e., right but not an obligation) embedded in projects are called real options. These are called real options because unlike financial options which derive their value for some 'underlying' asset, real options draw their value from real projects. To readily appreciate real option value, think for a moment that an MNC is considering to set up a 500 megawatt electricity generation plant on Build-Operate-Transfer (BOT) basis. It has an option to set up the plant immediately or after two years. Also after on-schedule commissioning this project, it would be eligible to set up another 250 megawatt plant.

We hope you are able to see two options embedded into the 500 megawatt project. The international business firms can start the project immediately or after two years. The implication of this is that while appraising 500 megawatt project by APV approach, we should account for, among other things, the value of this option. Similarly, the other option the firm has got is to set up another 250 megawatt project. The value of this option should also be incorporated into the APV analysis. For this, international business firm would require some option valuation model. There are various option valuation models available in the market. Black-Scholes is one such formula. We need not go into the option valuation at this stage. Suffice it say that the conventional APV analysis needs to be supplemented with real valuation to appraise international projects.

11.8 PORTFOLIO APPROACH

Before we conclude this unit, let us discuss portfolio approach to international project appraisal. Portfolio approach to investment dates back to Nobel Laureate Harry Markowitz work in early 50s. In his seminal work, Harry Markowitz had concluded that investment risk can be reduced for a given level of return, or investment return can be improved for a given level of risk, by efficient diversification of investment portfolio. Efficient diversification essentially involved mixing, in terms of their returns, negatively correlated or lowly possibly correlated assets. Empirical research both from bond market and stock markets, in the later years, provided ample evidence to the validity of his conclusions and became popular as portfolio approach to investment. Investing in international projects is like any other investment decision. The only difference between investing in bonds and stock and international projects is that while bonds and stocks are financial assets, international projects are real assets. You would recall from our discussion of motives for foreign direct investment in Unit 10 that achievement of diversification benefits provides a strong motive for FDI. Diversification by country not only provides the international business firm with a natural hedge against the foreign exchange and political risks, but also reduces the variability of the overall cash flow, thus contributing to the increased valuation of the firm as a whole. There is little doubt that diversification through direct investment in foreign markets reduces the systematic risk facing the firm, since economic cycles are likely to be in different phases. The beneficial impact of international diversification on the portfolio's risk arises from the diversity of economic and financial conditions in different countries, and the fact that business cycle phases in different countries are often not synchronized.

Another evidence to the portfolio approach to investment can be seen from the fact that many investors try to achieve the benefits of international diversification by investing in the shares of a diversified international business firms. By buying the shares of a multinational, it is believed that investors can overcome imperfections and barriers in the national securities market and share in the profits realized by these firms through capitalising on imperfections in the product and factors markets. We may thus conclude

our discussion by stating that international business firms in appraising international projects generally view them as portfolio of projects and not stand – alone projects. In other words, they do consider diversification benefits in choosing international projects.

11.9 CASE STUDY : INTERNATIONAL NEW TECHNOLOGIES (INT) LTD.

In order to illustrate the application of the APV technique to evaluate an international project, lets take up a case study of International New Technologies (INT) Ltd. The illustration will proceed on a step by step basis, highlighting the various components of the APV formula in the order in which they were discussed in this unit. These components will then be pulled together to measure the APV of the project, in an attempt to reach an overall assessment. While most of the data are imaginary and contrived so as to simulate conditions facing international business firms in real-life situations, a number of simplifying assumptions will be used.

Company and the Project

International New Technologies (INT) Ltd. is a manufacturer of small office systems suited for small enterprises. The company and its research and manufacturing facilities are based in Noida, U.P. Exports accounted in 2000 for about 35 per cent of its sales. Total sales have grown rapidly since the company was established in 1984, reaching INR (Indian Rupees) 130 million in 2000.

The company's major domestic market is concentrated mainly in North and West India. Most of its exports in recent years have been to Yugoslavia and a few countries in the Eastern Europe. An affiliate of INT in Spain, organized as a joint venture with local investors, produces several of the company's product lines under a licensing agreement for the Spanish and Portuguese markets.

INT Ltd's, performance both in the domestic and exports markets was adversely affected in 1999-2000 by increasing competitiveness in the mini-computer and office systems industry, a reflection in part of over-production and saturation of markets which plagued the high-technology industry as a whole during this period. Although INT Ltd's markets in Eastern Europe Countries are well established, some inroads in its share of the market in these countries were made by a British competitor.

Realizing that it must make a defensive move to protect its lucrative export markets, INT Ltd. has been seriously looking into the possibility of setting up a wholly owned affiliate located in Yugoslavia. The facility will manufacture, distribute, and service the full line of INT's products in Yugoslavia and the Eastern Europe markets. The staff of the Capital Budgeting Division has just completed the compilation of the necessary cost and market projection data for the evaluation of the project.

The facility, to be located in a suburb of Zagreb, Yugoslavia, and to be called INT (Yugoslavia), will be a wholly owned subsidiary of International New Technologies Ltd. The land on which the facility is to be erected is state land which will be assigned to the project rent-free for a period of 10 years. The Yugoslavian Government, to induce INT to locate the project in in their country, has also offered the project a 10-year exemption from customs duties on parts and components imported from the parent company, as well as a preferential 20 per cent income tax rate on net profits plus 10 per cent withholding tax on dividends transferred to INT (Ltd.).

In addition, the draft agreement with the Ministry of National Economy of Yugoslavia contains the following provisions :

1) Seventy-five percent of profits less tax withholding, and all royalties and service fees are freely transferable to INT (Ltd.).

2) Payments for parts and components imported from INT (Ltd.) are also freely transferable.

3) Proceeds of all exports and royalties for sales outside Yugoslavia are to be remitted to INT (Yugoslavia), and are subject to the same transfer provisions governing profits on sales made in Yugoslavia.

4) A concessionary loan not exceeding Yum 500,000,000 (500 million Yugoslavian Dinars) is to be made available to INT (Yugoslavia) carrying an interest rate of 8 percent per annum. This loan, together with accrued interest, is to be paid back in five equal annual instalments.

5) The facility will be sold to a joint venture of public and private Yugoslavian investors 11 years after the project becomes operational. The sale price will be five times the net profit realized by INT Yugoslavian from its domestic operations during the tenth year. The terminal value is transferable to the parent company.

Initial Investment

Initial investment in the project consists of cash and equipment contributed by the parent company according to the schedule in Table-11.1

Working capital requirements of the project are to be met from the proceeds of the concessionary loan, as well as other local loans if necessary.

INT (Ltd.) was offered YUM 100 million in blocked accounts in local banks by the Universal Canning Co., an Indian firm which discontinued operation of its plant in Yugoslavia. The blocked amount was to be exchanged into INR at the rate of INR 100 = YUM 200.

Table 11.1 : Initial Investment

	2001	2002
Local construction cost (millions of YUM)	210.4	73.3
Local purchase of equipment (millions of YUM)	12.5	80.0
Equipment shipped by INT (Ltd.) (million of INR)	0.5	2.5

Cash Flow from Operations

Sales in Yugoslavia. The projected sales, operating expenses, and net profits from operations in Yugoslavia for five years beginning in 2003 are shown in Table 11.2

Equipment bought locally and that shipped by INT Ltd. as part of the initial investment, valued at cost based on the exchange rate which prevailed at the time of the initial investment, is to be depreciated by the straight-line method to a zero salvage value.

Table 11.2 : Projected Sales, Operating Expenses, and Net Income

A. SALES IN YUGOSLAVIA	(MILLIONS YUM)				
	2003	2004	2005	2006	2007
Sales	510.3	550.8	610.5	640.0	675.5
Cost of goods sold and operating expenses (excluding depreciation)	130.0	145.3	151.8	158.3	160.2
Depreciation	100.0	100.0	100.0	100.0	100.0
Gross operating income	280.3	305.5	358.7	381.7	415.3
Selling, general, and administrative expenses	41.0	45.1	51.1	54.0	57.6
Interest on concessionary loan	40.0	32.0	24.0	16.0	8.0

Royalties and service loan to INT (Ltd.)	45.0	47.5	50.5	52.0	53.8
Net income from local sales	153.8	180.9	233.1	259.7	295.9
B. SALES IN MIDDLE EUROPEAN MARKETS (MILLIONS INR)					
Sales	1.25	1.47	1.75	1.95	2.19
Cost of goods sold and allocated expenses*	0.52	0.61	0.72	0.82	0.92
Net income from exports before royalties	0.73	0.86	1.03	1.13	1.27
Royalty to INT (Ltd.) 10% of sales	0.13	0.15	0.18	0.20	0.22
Net income from exports	0.60	0.71	0.85	0.93	1.05

* *Exports' share of operating general, administrative expenses, with the exception of depreciation. Depreciation is charged against production for sales in Yugoslavia only.*

The agreement between INT (Ltd.) and INT (Yugoslavia) stipulates that the affiliate is to compensate the parent for the use of patents and for the technical assistance to be provided by the parent's staff in the form of a royalty equivalent to 5 per cent of sales in Yugoslavia (10 per cent for exports) plus YUM 20 million annually. These amounts are to be transferred to the parent company, together with the dividends allowable under the agreement with the Ministry of National Economy of Yugoslavia.

Sales in Eastern European Markets. Sales in Eastern European markets, are denominated in INR. According to the agreement with the Yugoslav Ministry of National Economy, proceeds of these sales are remittable to INT (Ltd.), and are to be lumped with sales in Yugoslavia for accounting and tax purposes. These sales are shown in part B of Table 11.2.

Remittable Cash Flows and Exchange Rate Forecast. Remittable cash flows to INT (Ltd.) include royalties, service fees, and dividends transferrable to the parent.

Calculation of INT (Yugoslavia) profit would require a forecast of the YUM/INR exchange rate for the year 2003-2007 period, since sales to Eastern European markets are denominated in INR. These same rates should also be used in converting YUM cash flows into INR in accordance with the APV formula.

While the project was still in the planning stage, a special committee from the staff of the Financial and Foreign Exchange Division of INT Ltd. developed two sets of forecasts of the YUM/INR exchange rate. These forecasts were based on the spot rate of YUM 135 = INR 100 which prevailed on June 30, 2000.

The first forecast was based on purchasing power parity with the assumption of an annual inflation rate differential of 10 per cent between the two countries (5 per cent for India and 15 per cent for Yugoslavia). The second forecast was based on a number of international financial projection models and studies prepared by multinational banks and international financial institutions. The YUM/INR rates according to these two forecasts are shown in Table 11.3

The rates derived from international forecasting models are based on a scenario having the INR weaken vis-a-vis currencies of trading partners of India in the early years of the period and then appreciate steadily thereafter. Using these two sets of forecasts, the management of INT (Ltd.) developed its own set of figures for the purpose of appraising the project under consideration.

Remittable cash flows to the parent company are calculated in Table-11.4. They consist of transferable dividends (75 per cent of INT (Yugoslavia) after-tax profit less withholding tax), royalties (5 per cent of sales in Yugoslavia and 10 percent of export sales), and a flat YUM 20 million service fee per year.

Table 11.3

YUM/INR RATE		FORECAST BASED ON PPP*	FORECAST BASED ON INTERNATIONAL FORECASTING MODELS	MANAGEMENT'S OWN FORECAST RATE
Spot rate 30-6	2000	135.00	135.00	135.00
Average rate for	2001	153.13	125.00	145.00
	2002	166.45	120.00	145.00
	2003	180.93	145.00	155.00
	2004	196.67	155.00	160.00
	2005	213.78	175.00	175.00
	2006	232.28	185.00	185.00
	2007	252.60	200.00	205.00

* *According to PPP formula, the YUM should depreciate vis-a-vis the INR by 8.7 per cent per annum.*

$$\text{Expected change in Exchange rate} = \frac{\text{inflation rate in India} - \text{inflation rate in Yugoslavia}}{1 + \text{inflation rate in Yugoslavia}} \times 100$$

$$= \frac{5\text{-}15}{1.15} \times 100 = 8.7\%$$

Table 11.4 : Calculation of Remittable Cash Flows to INT Ltd. (Million, YUM)

	2003	2004	2005	2006	2007
Net income from sales :					
In Yugoslavia from Table-11.2)	**153.8**	**180.9**	**233.1**	**259.7**	**295.9**
In Eastern European markets (million, INR) (Table-11.2)	0.60	0.71	0.85	0.93	1.05
Exchange rate YUM per INR from Table 11.3	155	160	175	185	205
(Million, YUM)	**93.0**	**113.6**	**148.8**	**172.1**	**215.3**
Total net income	**246.8**	**294.5**	**381.9**	**431.8**	**511.2**
Income tax at 20%	49.4	58.9	76.4	86.4	102.2
Net income after tax	197.4	235.6	305.5	345.4	409.0
Transferable dividends (75% of net after tax income)	148.1	176.7	229.1	259.1	306.8
Less : tax withholding (10% of transferable dividends)	14.8	17.7	22.9	25.9	30.7
Dividends less withholding	133.3	159.0	206.2	233.2	276.1
Royalties on sales in Yugoslavia (5% of sales)	25.5	27.5	30.5	32.0	33.8
Royalties on sales in East Europe (10% of sales)	19.4	23.6	30.6	36.1	44.9
Service fees	20.0	20.0	20.0	20.0	20.0
Total remittable cash flows	198.2	230.1	287.3	321.3	374.8

Lost Sales on Exports. INT Ltd. initial decision to consider the possibility of setting up an affiliate in Yugoslavia is predicated on its assessment of market developments during the 2000s. The project is envisioned as a defensive move to preclude loss of export markets in Yugoslavia and Eastern European markets due to imminent increase in tariffs on office computers and systems by these countries, as well as stiffening competition. Based on its intelligence sources, INT Ltd's management is confident that at least one competitor is considering plans to establish manufacturing subsidiaries in the area.

INT Ltd. marketing staff estimate that the company stands to lose 50 per cent of its net profits on exports in the year 2001, 75 per cent in 2002, and to loose the market entirely thereafter. No adjustment for lost exports is needed since INT (Yugoslavia) will start operations in 2003.

Calculation of NPV of Remittable Cash Flows. INT Ltd. policy for appraisal of all mini computer and office system projects (domestic and foreign) assumes a life cycle of five years, and employs a discount rate of 16 per cent. Its capital budgeting policy with respect to foreign investment is based on reflecting the exchange and political risks primarily in cash flows rather than in adjusting the discount rate for the higher perceived risks. This policy also tacitly acknowledges the diversification and flexibility benefits which accrue from foreign projects. Such benefits are considered adequate to offset other risks which are inherent in foreign investment.

The net present value of remittable cash flows from INT Yugoslavia taking into account foregone profits from replaced exports are presented in Table 11.5.

Table 11.5 : PV of Net Profits Generated by INT Yugoslavia[1] (Million, YUM)

	2003	2004	2005	2006	2007
Total remittable cash flows from Table 11.4	198.2	230.1	287.3	321.3	374.3
Estimated profits on the sale of Parts and components to INT (Yugoslavia)	65.0	70.0	75.0	80.0	85.0
Income tax paid in Yugoslavia[2] (Table 11.4)	49.4	58.9	76.4	86.4	102.0
Withholding tax on dividends[2] Transferred (Table 11.4)	14.8	17.7	22.9	25.9	30.7
Taxable Income generated from INT (Yugoslavia)	327.4	376.7	461.6	513.6	592.7
Exchange rate forecast (YUM per INR)	155	160	175	185	205
			(Million, INR)		
Taxable income generated from INT (Yugoslavia)	2.11	2.35	2.64	2.77	2.88
Indian corporate income tax (40%)	0.84	0.94	1.06	1.11	1.16
Less credit for taxes paid in Yugoslavia	(0.41)	(0.48)	(0.57)	(0.61)	(0.65)
Net income generated from INT Yugoslavia	1.68	1.89	2.15	2.21	2.38
PV factor at 16%[3]	.6407	.5523	.4761	.4104	.3528
PV of net income generated from INT (Yugoslavia)	1.08	1.05	1.02	0.91	0.84

Total PV of net income generated from INT (Yugoslavia) = 4.90 million, INR

[1]Includes remittable cash flows and estimated profits on the sale of parts and components to INT (Yugoslavia) excluding depreciation charges, which are not transferable.

[2]Income tax paid in Yugoslavia on net income of INT Yugoslavia plus withholding tax on dividends transferred to the parent company are "grossed up" before India corporate income tax liability is calculated.

[3]PV in 2000, the year of appraisal.

Contribution of Concessionary Loan To The Project

The loan arrangement negotiated with the Yugoslavian Ministry of National Economy allows INT Yugoslavia to borrow up to YUM 500 million at 8 per cent to finance the working capital requirements of the project. If such a concessionary loan had not been made available, INT (Yugoslavia) would have had to borrow from local private commercial banks at 18 per cent.

The contribution of the concessionary arrangement to the project is measured by the face value of its loan minus the present value of repayments (consisting of interest and principal) discounted to the present at 18 per cent. (Table 11.6)

Table-11.6 : INT (Yugoslavia) Repayment of Concessionary Loan from Yugoslavian Banks. (Million, YUM)

YEAR	LOAN OUT STANDING	INTEREST APPLIED	APPLIED TO PRINCIPAL	TOTAL PAYMENT	PRESENT VALUE OF PAYMENT
2003	500.0	40.0	100.0	140.0	100.72
2004	400.0	32.0	100.0	132.0	80.49
2005	300.0	24.0	100.0	124.0	63.92
2006	200.0	16.0	100.0	116.0	50.66
2007	100.0	8.0	100.0	108.0	40.0
					336 Approx

Contribution of loan to project = 500 – 336 = 164/135 = $1.21 million INR .

[1]Discounted at 18 per cent, the rate at which INT (Yugoslavia) would have borrowed working capital funds from local Banks had the concessionary loan not been made available to the Year 2000.

Overall Evaluation

We will now proceed to evaluate INT (Yugoslavia) from the viewpoint of the parent firm on the basis of the first three Component of the APV formula, as of the end of 2000. APV is calculated as follows :

APV (millions of INR) = – adjusted present value of investment in project
+ present value of remittable cash flows
+ present value of concessionary loan

$$= -\left[\frac{2.04}{1.16} + \frac{3.56}{(1.16)^2}\right] + 4.90 + 1.21$$

$$= -4.39 + 6.11 = 1.72$$

The project has a positive APV of INR 1.72 million and thus passes the acceptability criterion easily. The fourth and fifth components namely present value of additional transfers and tax savings achievable by the transfer pricing mechanism and present value of cash flow from estimated terminal value need not be introduced in the computation as the project has been found acceptable even without such contribution.

11.10 LET US SUM UP

Projects essentially signify large amounts of expenditure to build capital assets or productive capacities. Project appraisal means deciding to invest or not. It basically involves comparing expected return from project with cost of its funding. If the expected return is higher than the cost of funding, we may go it; otherwise not. Project appraisal requires various appraisals, namely, technical, market, environmental, financial, economic and social. Financial appraisal is a key appraisal. There are broadly two techniques of financial appraisal; non-DCF and DCF. DCF stands for discounted cash flow. Payback period and Accounting Rate of Return are non-DCF techniques. Net Present Value (NPV) and Internal Rate of Return (IRR) are DCF techniques. DCF techniques are better than non-DCF as these techniques are based on time value of money concept. Time value of money means a rupee today is worth more than a rupee tomorrow. This is so because of inflation. Owing to inflation, the purchasing power of rupee declines over time. Hence, in terms of purchasing power, a rupee toay is more than a rupee tomorrow. Since cash flows from any project become available over a long period of time, time value of money must be taken into account while appraising projects. Between the NPV and IRR, NPV is a better method, but NPV has a limitation that it employs single rate of discount, irrespective of the nature and riskiness of project cash flows. Adjusted Present Value technique overcomes this limitation of NPV.

In the case of international projects appraisal, APV is most suitable as it uses different discount rates to compute present value of different components of project cash flows. It is suggested that to get a better picture of the financial viability of a project, real option value should also be taken into account. Further, portfolio approach to project appraisal is definitely better than stand-alone analysis approach. All in all, international project appraisal poses additional challenges that can be fairly dealt with APV approach.

11.11 KEY WORDS

Discounted Cash Flow : Analysis involving time value of many principle using an appropriate discount rate.

Internal Rate of Return : The rate of discount that equates the present value of project cash flow with initial investment, the NPV thus at this rate of discount is zero.

Adjusted present value : A method which uses different discount rates to complete present value of different components of project cash flows.

Real option value : The economic value of option (s) embedded in a capital project.

Portfolio Approach : Analysing risk/return of basket/group of projects rather than of each project individually and separately.

Time Value of Money : The purchasing power of units of money is different at different points of time.

11.12 ANSWERS TO CHECK YOUR PROGRESS

A i) 2 years 9.6 months

ii) 2 years 9.6 months

11.13 TERMINAL QUESTIONS/EXERCISE

1 "Projects are not day to day expenses of business". Discuss

2 List out important differences between domestic and international projects.

3 Explain the various non-DCF and DCF techniques of project appraisal. Which of the technique is best and why?

4 "Financial appraisal is said the key most appraisal of any project". Explain and bring out its relationship with other appraisals namely technical, market, environmental economical & social.

5 How does APV differ from other techniques of financial appraisal of projects? Why is it more suitable for international project appraisal?

6 Write brief notes on the following :

a) Real option value

b) Portfolio approach to project appraisal.