CHAPTER

12

International Capital Budgeting

Learning Objectives

After reaching a decision to invest abroad, the firm evaluates proposals/projects and selects one or more of them that ranks high from the viewpoint of adding to the corporate wealth. The process, known as international capital budgeting, is discussed in the present chapter. The purpose is:

- To acquaint the readers with different evaluation criteria.
- To show how cash flow relating to proposal/project is computed from the viewpoint of both parent and subsidiary.
- To discuss the cost of capital that acts as a cut-off rate.
- To explain adjusted present value approach that is an alternative approach to evaluation of projects.
- To discuss real options that demand a fresh look at the project appraisal.
- To discuss evaluation of an M&A proposal.
- To examine the relevance of non-financial factors in international capital budgeting.

The decision to invest abroad takes a concrete shape when a future project is evaluated in order to ascertain whether the implementation of the project is going to add to the value of the investing company. The evaluation of the long-term investment project is known as *capital budgeting*. The technique of capital budgeting is almost similar between a domestic company and an international company. The only difference is that some additional complexities appear in the case of international capital budgeting. These complexities influence the computation of the cash flow and the required rate of return. In the present chapter we discuss

the complexities that arise in international capital budgeting, but in the beginning, we look at the fundamentals of capital budgeting techniques. For a detailed idea of domestic capital budgeting process, reference may be made to any textbook on corporate finance.

EVALUATION CRITERIA

Non-discounting Methods

The methods for evaluating investment proposals are grouped as discounting and non-discounting methods. The non-discounting methods are simple. One such method involves the *average accounting rate of return* earned by the project. It represents the mean profit on account of investment prior to interest and tax payment. The mean profit is compared with the hurdle rate or required rate of return. A project is acceptable if the mean profit is higher than the hurdle rate. Despite being a simple method, it has some shortcomings, namely, it is based on the accounting income and not on the cash flow; it considers profit before tax, rather than post-tax profit. And finally, it ignores the time value.

PROBLEM 12.1

Find out the accounting rate of return based on the following data:

Year	Gross Profit	Depreciation	Net Profit	Investment
1	$ 2,000	5,332	–3,332	13,334
2	6,000	5,332	668	8,000
3	10,000	5,332	4,668	2,666
Average			668	8,000

Solution

Accounting rate of return = 668/8,000 = 8.35%

The other non-discounting method is known as the *pay-back period*, that is the number of years required to recover the initial investment. If the investment is not recovered within the pay-back period, the project should not be accepted. Thus this method stresses on early recovery of funds, but fails to consider the cash flow after the pay-back period and so does not consider profitability over the life of the project. It also fails to consider the time value of money. Nevertheless, non-discounting methods are widely used. Buckley (1996) finds that 10 to 20 per cent of large US multinationals are reported as using the accounting rate of return method as their primary evaluation technique, while 28 per cent are found to have opted for the pay-back period method.

PROBLEM 12.2

Considering target pay-back period as two years, the cash flow of two proposals is as follows:

		Proposal A	Proposal B
Initial investment ($)		–2,000	–2,000
Net cash benefits:	Year 1	1,200	1,200
	Year 2	800	400
	Year 3	–	300
	Year 4	–	300

Find which project can be accepted.

Solution

Proposal A will be accepted because initial investment is recovered within the target pay-back period despite the fact that Proposal B gives a greater return.

Discounting Methods

Discounting methods take normally three forms:

1. Net present value (NPV) method
2. Profitability index (PI) method
3. Internal rate of return (IRR) method

Net present value (NPV) rule

In this case, projects are accepted where the present value of net cash inflow during the life span of the project is greater than the initial investment. The difference adds to the corporate wealth. The equation is:

Net present value is the residue after deducting the initial investment from the present value of future cash flows relating to a project. Positive NPV means additions to the corporate wealth.

$$\text{NPV} = \sum_{t=1}^{n}\left[\frac{CF_t}{(1+k)^n}\right] - I_0 \qquad (12.1)$$

where

CF_t = expected after-tax cash flow from t_1 to t_n, including both the operating cash flow and the terminal cash flow,
I_0 = initial investment,
k = risk-adjusted discount rate, and
n = life span of the project.

PROBLEM 12.3

A project involves initial investment for $ 5,000,000. The net cash inflow during the first, second and the third year is expected respectively $ 3,000,000, $ 3,500,000 and $ 2,000,000. At the end of the third year, the scrap value is indicated at $ 1,000,000. The risk-adjusted discount rate is 10 per cent. Calculate NPV.

Solution

$$t_1 + t_2 + t_3 - I_0 = \frac{3,000,000}{1.10} + \frac{3,500,000}{(1.10)^2} + \frac{2,000,000 + 1,000,000}{(1.10)^3} - 5,000,000$$

$$= \$\ 2,873,778.$$

Project would be accepted because NPV is positive.

Profitability Index is the ratio between the present value of future cash flows and the initial investment.

Profitability index (PI)

This shows the relationship between net cash inflows and initial investment. It shows the relative gains and would be expressed as the following equation:

$$PI = \sum_{t=1}^{n} \left[\frac{(CF_t/(1+k)^n}{I_0} \right] \quad (12.2)$$

Basing on the above example, the profitability index (PI) is calculated as

$$PI = 7,873,778/5,000,000 = 1.57$$

The project may be accepted because PI is more than 1.

Internal rate of return is the discount rate equating the present value of future cash flows and the initial investment. For accepting a project, IRR > hurdle rate.

Internal rate of return (IRR) rule

IRR is that discount rate which must bring down the value of cash inflows (net) during the life of the project to equate the value of initial investment. Expressed as an equation,

$$\sum_{t=1}^{n} \left[\frac{CF_t}{(1+IRR)^n} \right] - I_0 = 0 \quad (12.3)$$

The project shall be acceptable if IRR is greater than the required rate of return.

Based on the above example, IRR is 40 per cent. Since the required rate of return is 10 per cent, the project would be accepted.

PROBLEM 12.4

A proposal involves $ 2,000,000. The annual cash flow is $ 1,000,000 for three years. Find out the IRR.

Solution

Since the initial investment divided by the annuity is 2/1, one has to find out 2 in the annuity table. The annuity factor closest to 2 for three years is 1.9520 at 25 per cent discount rate and 2.1065 at 20 per cent discount rate. The annual cash flow will be multiplied by these two annuity factors and then a difference of the product from the initial outlay is found out. It is as follows:

(a) At 20% discount rate: 1,000,000 × 2.1065 – 2,000,000 = 106.50

(b) At 25% discount rate: 1,000,000 × 1.9520 – 2,000,000 = –48.00

Since NPV is greater than 0 at 20 per cent discount rate, one needs a higher discount rate to equate NPV to initial investment.

$$IRR = 20 + (106.50/154.50) \times 5 = 23.45\%$$

Ranking of Proposals

If there are two or more mutually exclusive proposals, they need to be ranked in order of preference. Under the NPV rule, first preference is given to a proposal

with the highest NPV but judged by the IRR method and if initial outlay differs, the decision could be erroneous. In such cases, the incremental approach is considered. Suppose there are two proposals. Proposal A involves an initial investment of $ 2,000 with an annual net cash inflow of $ 610 for five years while proposal B having an initial outlay of $ 3,000, has a net cash inflow of $ 900 annually for five years. In the former IRR is 16 per cent, while it is 15.2 per cent in the latter and both the proposals will be accepted if the required rate of return is 10 per cent. If only one proposal has to be taken up, proposal A will be accepted on the basis of higher IRR. If incremental approach is taken into account, it is found that the incremental outlay is $ 1,000 and the incremental net cash inflow is $ 290 per annum for five years. The incremental IRR would be 13.8 per cent. In this case, proposal B would be accepted as it ranks first. The only condition is that IRR should be higher than the cost of capital.

Choice between Net Present Value and Internal Rate of Return

Sometimes the result of the two methods (NPV and IRR) differs because they rest on different assumptions concerning the reinvestment of funds released from the project. The NPV rule implies reinvestment at a rate equivalent to the required rate of return used as a discount rate, while the IRR rule assumes that the funds are reinvested at IRR. However, in such cases, the NPV rule is preferred in view of some limitations inherent in IRR. *Firstly*, where projects of different lives are considered, the IRR rule will possibly inflate desirability of a short-life project as IRR is a function of both the time involved and the size of capital investment. *Secondly*, IRR tends to be lower on projects with a longer gestation period, even when NPV remains larger. This is because IRR ranks high in those projects where several benefits accrue in early part of their economic life. *Thirdly*, while computing IRR, there is possibility of more than one solution rate, inasmuch as IRR is calculated by a polynomial equation. If the polynomial is of degree n, there will be n roots and n solution rates and in a changing cost-of-capital framework, the computation of IRR would not make an easy comparison, whereas the NPV rule incorporates such changes into the calculation of the cost of capital.

Profitability Index versus Net Present Value

If the initial investment differs, the same amount of cash inflow may yield different results under the two methods. It is possible that PI may be higher in case of lower NPV and so the decision would be different in case of these two different methods. However, since NPV represents an absolute value, it should be relied upon even if the PI is higher.

COMPUTATION OF THE CASH FLOW

Basics of Cash Flow

The taking up of a new project demands a part of a firm's current wealth, but in return, brings in funds and adds to the firm's stock of wealth in future. The former results in cash flow from the firm, while the latter is represented by cash flows into

the firm. Cash outflow occurs on account of capital expenditure, other expenses (excluding depreciation), and the payment of taxes. Cash inflow includes revenue on account of additional sale or cash from eventually selling of an asset which is known as *salvage value*.

Cash flows are grouped under three heads:

1. Initial investment during the period, t_0;
2. Operating cash flow during the period, t_1 to t_n;
3. Terminal cash flow or the salvage value that emerges at the end of the period, t_n.

To compute the operating cash flow, the following facts should be taken into account.

Depreciation is a non-cash expense having no direct bearing on cash flow pattern, although it has a bearing on tax liability. Since it influences the amount of tax to be paid, the depreciation amount is deducted from the revenue in order to arrive at the pre-tax profit. But since it does not represent cash outflow, it is added again to the amount of net profit. The procedure can be illustrated as follows:

Suppose a project generates $ 20,000 annually. The operating expenses amount to $ 10,000 and depreciation amounts to $ 5,000. The tax rate is 50 per cent. The net cash inflow will be:

Cash receipt	$ 20,000
Less operating expenses	10,000
Balance	10,000
Less depreciation	5,000
Taxable income	5,000
Less taxes	2,500
Net profit	2,500
Add depreciation	5,000
After-tax cash inflow	7,500

The following factors should be noted:

(a) The cash flow is considered only on an after-tax basis.

(b) Financing cost is not included despite the fact that capital has a cost because such costs are considered elsewhere while determining the project's required rate of return.

(c) Cash flow is computed on an incremental basis and represents the difference between cash flow after the investment and cash flow in the absence of investment.

(d) There are certain costs that do not involve cash flow but necessarily involve the opportunity cost. If there is such cost, that is included in the decision process.

Parent Unit's Perspective and the Cash Flow

At the very beginning of multinational capital budgeting, the question arises whether the cash flow should be computed from the viewpoint of the parent company or from the viewpoint of the subsidiary. This question arises because the cash flow accruing to the subsidiary may not be represented entirely by the cash flow accruing

to the parent company. In some cases, the cash outflow of the subsidiary is treated as the cash inflow of the parent company. It is also possible that the cash inflow accruing to the subsidiary may be large enough to justify the investment proposal, but its size accruing to the parent company may be too small. In such cases, it seems difficult to take a decision regarding acceptance or rejection of the investment proposal. In fact, there may be many situations when the disparity in the cash flow between the parent and its subsidiary occurs. For if example, tax rates in the home country and the host country are different, disparity in cash flow shall arise. It is possible that on account of lower tax rates in the host country, after-tax cash inflow is large enough to justify the investment proposal. On the other hand, owing to high tax rates in the home country, the investment proposal may not be feasible from the viewpoint of the parent company. The parent company may not accept the investment proposal due to low inflow of cash on account of exchange control applied by the host government, despite the fact that the cash flow of the project in question is sufficient for implementation. In a situation where the parent company charges an exorbitant price for the technology and management, the cash inflow accruing to the parent company will be larger justifying the investment proposal, but such exorbitant payments may lower the cash flow of the subsidiary and the subsidiary may not like the investment proposal. Lastly, changes in exchange rate may change the cash flow of the parent company. When the currency of the host country appreciates, the parent company gets a larger flow of cash in terms of its own currency. This may change its accept-reject decision.

The ethics of the corporate financial management are very clear on this issue; that the value of the project is determined by the net present value of the future cash flows available to the investor. Since the parent company is the investor, it is the cash flow of the parent company that is taken into account in the context of international capital budgeting. This is why cash flowing from subsidiary company to parent company either in the form of royalty and technical service fees, or in any other mode is treated as cash inflow. On the contrary, any cash flowing from the parent company to the subsidiary, is treated as cash outflow. The parent company will agree to investment in a foreign project only if the net present value of the cash flow is positive from its own point of view.

The cash flow, as mentioned earlier, is broadly compartmentalised into three heads. These are:

1. Initial investment
2. Operating cash flow
3. Terminal cash flow

Here the parent's perspective will be explained in case of these three heads of cash flow.

Initial investment

Let us first take the case of initial investment. If the entire project cost is met by the parent company, the entire amount of initial investment is treated as the cash outflow. In some cases, the project is partly financed by the subsidiary itself through local borrowing but such borrowings of the subsidiary do not form a part of the initial cash outflow.

In some cases, the subsidiary makes additional investment for expansion out of retained earnings. At the first instance, there is apparently no flow of cash from the parent company to the subsidiary but it should be treated as an opportunity cost because in the absence of retention of earnings, these funds could have been remitted to the parent company rather than invested in the project in question. Thus, the investment out of retained earnings should be treated as cash outflow from the parent company's perspective. The issue of blocked funds is also very pertinent in this respect. Sometimes the host government imposes exchange control and does not allow any cash to flow to the parent company. These funds are known as *blocked funds*. For this reason, that part of the cash inflow of the subsidiary which is represented by blocked funds is not treated as cash inflow from the parent's perspective. Suppose the incremental cash inflow of a project is $ 20 million, out of which only $ 15 million is allowed by the host government to flow to the parent company. In this case, only the sum of $ 15 million will be treated as the cash inflow. If, however, the blocked funds are invested in some new project, that amount is treated as the investment by the parent company and is recorded as cash outflow. In the event of the host government providing subsidised initial establishment for the subsidiary, the amount does not form a part of the initial investment of the parent company.

Example: A project of the subsidiary costs $ 15.5 million. The parent company makes an initial investment of $ 10 million, a sum of $ 2 million is invested out of blocked funds, another sum of $ 2 million is taken out of retained earnings, and $ 1 million is met by the subsidiary out of local borrowing. At the same time, the host government provides some subsidised establishment for the project that brings in a gain for $ 0.5 million. Thus in this case, the cash outflow recorded for initial investment from the parent's perspective will be: $ 10 + 2 + 2 = $ 14.0 million. It may be mentioned here that the initial investment outflow out of blocked funds and retained earnings is shown at the spot exchange rate.

PROBLEM 12.5

The cost of the subsidiary's project is $ 20 million. It is financed through different modes of funds. The parent unit makes an investment for $ 12 million. A sum of $ 3 million is drawn out of retained earnings and another sum of $ 2 million is drawn out of the blocked funds. The subsidiary borrows $ 2 million from the host country market. The remaining $ 1 million is in the form of free land and building supplied by the host country government. Find out the amount of initial investment from the viewpoint of the parent unit.

Solution

Initial investment from parent's viewpoint = $ 12 + 3 + 2 = 17 million.

Operating cash flow

Besides the initial investment, the operating cash flow too needs some adjustment. As a normal practice, the revenue generated through the sale of a subsidiary's product in the local market as well as in other countries, is shown as the operating cash inflow from the parent's perspective but it is subject to downward adjustment by the lost income on sales previously realised through the parent company's export

operating cash flow - Revenue in export of P.C.
Less: Reduction in export of S.C.
Add Addition in import of S.C.
Add Addition saving of T.P.

to these markets. On the contrary, if the operation in the subsidiary leads to import of components and raw material from the parent company, the value of such import will be added to the revenue.

Example: A subsidiary is fetching $ 15 million through sale of the product in the local market and a sum of $ 3 million through export to a third country, but this sale replaces the parent company's export to these markets by $ 7 million. Again, the subsidiary imports components from the parent company worth $ 2 million. The total operating cash inflow on account of sales in this case will be: $ 15 + 3 + 2 – 7 = 13 million.

The operating cash flow is influenced by some other factors also. Let us assume the subsidiary pays royalty to the parent company worth $ 3 million, the operating cash inflow in the above example will rise to $ 16 million, but if the parent company faces loss on account of diseconomies of scale due to shifting of production to the host country to the extent of $ 1 million, the operating revenue will come down to $ 15 million.

The transfer pricing, when the parent company or any other unit of the firm charges arbitrary prices for intrafirm movement of intermediate goods, also influences the operating cash flow. It may be noted here that transfer pricing is adopted either for better working capital management or for reducing the overall burden of taxes on the company through shifting of the before-tax profit to a country with lower tax rates. If transfer pricing lowers the overall tax burden of the company and thereby increases the revenue of the parent company, the additional revenue or saving should be treated as cash inflow. It may, however, be noted that such inflows are discounted at a higher rate because they involve greater risk.

If a host government offers incentives, they should be included in the capital budgeting decision. For example, if the host government offers tax incentives or provides loan at a subsidised rate, the amount of gain on this account should be added to the operating cash inflow. When the subsidiary makes local borrowings to meet a part of the initial investment and pays interest on such borrowings, the amount of interest payment is deducted from the operating cash inflow. Had it been a case of domestic capital budgeting, the interest payment on such borrowings would not have formed a part of cash flow since financing cost is included in the discount rate; but in case of international capital budgeting, the cash remitted to the parent company will stand overstated if interest payments are not treated as cash outflow. The present value of cash flow received by the parent company should take into consideration the interest paid by the subsidiary on the local borrowing and then only it should be compared with the initial investment made by the parent company.

Inflation influences both the cost and revenue streams of the project and hence the inflation rate differential also needs to be taken into account. If the inflation rate is higher in the host country and if the import from the parent company constitutes a significant portion of the input of the subsidiary, the cost will not move up very high but if the inputs are obtained locally, the cost increase may be substantial. Again, as far as revenue is concerned, it will move up if there is no competition from foreign suppliers and if the demand for the product is price-inelastic. So the computation of cash flow relies on the inflation forecast in the host country and its possible effects. If, however, the inflation is quite volatile from year to year, as is found in many developing countries, an accurate forecast is not easy to make.

Inflation rate differential needs consideration as it influences the cash flow.

The exchange rate fluctuation influences the size of cash flow. Changes in the exchange rate are themselves tagged with the changes in the rate of inflation but there are other factors too that shape the exchange rate fluctuations. It is difficult to predict the behaviour of all those factors. Nevertheless, the cash flow computation process incorporates different scenarios of exchange rate movements. From the parent company's point of view, appreciation in the currency of the host country will be favourable and will increase the size of the cash inflow in terms of the currency of the home country. This gain may partially be offset by higher inflation rate for the moment, but if the rate of inflation is expected to be lower in future thus helping appreciate the value of the host country's currency, the subsidiary may invest locally the amount of its payments to the parent company till the strengthening of the currency. The accumulated earning of the parent company will be larger after the appreciation of the host country's currency.

Exchange rate changes influence the cash flow and also the discount rate.

PROBLEM 12.6

Calculate the operating cash flow on the basis of the following data:

(a) Sales in the domestic market = $ 10 million
(b) Export = $ 4 million
(c) Replacement of parent's export = $ 2 million
(d) Parent's export of components to subsidiary = $ 3 million
(e) Royalty payment by subsidiary = $ 0.5 million
(f) Dividend flow to the parent = $ 0.5 million

Solution

$10 + 4 + 3 + 0.5 + 0.5 - 2 = $16 million.

Terminal cash flow

Besides adjustments in the initial investment and in the operating cash flow, some adjustments have to be made for the salvage value that influences the terminal cash flow. If there is provision in the foreign collaboration agreement for reversion of the project to the host government after a certain period of time on the payment of a specific amount, that specific amount is treated as the terminal cash inflow. Also, if the first condition is not present, the net cash flow generated in the terminal year is multiplied by a specific number of years and the product is treated as the terminal cash inflow. In case the project is dismantled in the terminal year, the scrap value is treated as the terminal cash inflow.

When the salvage value is uncertain, the parent company makes various estimates of the salvage value or terminal cash flow and computes the NPV based on each possible outcome of the terminal cash flow. Alternatively, it computes the break-even salvage value which is the terminal cash flow necessary to achieve zero NPV for the project. The break-even salvage value or the break-even terminal cash flow is then compared with the estimated terminal cash flow. If the estimated terminal cash flow is less than the break-even salvage value, the investment proposal will be rejected because it means, the NPV will be negative. On the contrary, if the parent company assesses that the subsidiary would sell for more than the break-even salvage value, it will incorporate this assessment into its accept-reject decision.

Break-even salvage value exists at zero NPV.

Here the break-even salvage value needs some further explanation. Rearranging Eq. (12.1) and segregating the cash flow beginning from the first year to the nth year into the operating cash flow, OCF_t and the terminal cash flow, TCF_n, break-even salvage value can be derived:

$$NPV = \sum_{t=1}^{n}\left[\frac{OCF_t}{(1+k)^t}\right] + \left[\frac{TCF_n}{(1+k)^n}\right] - I_0$$

$$0 = \sum_{t=1}^{n}\left[\frac{OCF_t}{(1+k)^t}\right] + \left[\frac{TCF_n}{(1+k)^n}\right] - I_0$$

$$I_0 - \sum_{t=1}^{n}\left[\frac{OCF_t}{(1+k)^t}\right] = \frac{TCF_n}{(1+k)^n}$$

$$TCF_n = \left[I_0 - \sum_{t=1}^{n}\frac{OCF_t}{(1+k)^t}\right] \times (1+k)^n \qquad (12.4)$$

Thus it is clear from Eq. (12.4) that for the computation of the break-even terminal cash flow, there is need to estimate the present value of operating cash flows or the future cash flows without the salvage value. When computed, it is deducted from the initial investment and the difference is then multiplied by $(1 + k)^n$.

Suppose the net cash inflow in a three-year period, which is the life span of the project is respectively, $ 10,000, $ 12,000 and $ 13,000. If the initial investment is $ 20,000 and the discount rate is 10 per cent, the break-even salvage value will be:

$$\$\ [20{,}000 - \{10{,}000/1.10 + 12{,}000/1.10^2 + 13{,}000/1.10^3\}] \times (1.10)^3 = \$\ -11{,}680$$

PROBLEM 12.7

Find the break-even salvage value if:

(a) Initial investment = $ 30 million
(b) The net cash inflow during the first and the second year respectively = $ 20 million and $ 15 million
(c) Discount rate = 10%

Solution

Applying Eq. (12.4), we get

$$[30 - (20/1.10 + 15/1.21)] \times 1.21 = \$\ 0.70 \text{ million.}$$

Computation of Blocked Funds

In many cases, the host government imposes restrictions on the outflow of funds from the country in view of strained balance of payments. Such funds, as mentioned earlier, are known as *blocked funds*. Suppose if the host government says that the net revenue will be transferred to the parent only after the completion of the project and not every year, this provision will certainly influence the cash flow.

Blocked funds occur when the host government restricts outflow of funds from the country.

Let us take an example where a US subsidiary in India takes up a project that has a life of three years with the expected net operating cash flow of $ 20,000, $ 40,000 and $ 42,000 respectively in the first, second and the third years. Discount rate is 10 per cent. One can think of three possible scenarios in this case. *First*, the Indian Government allows the outflow of cash to the home country every year. *Secondly*, the Indian Government allows the outflow of cash only after the life of the project and not every year. The blocked fund thus created is not invested by the subsidiary. *Thirdly*, the subsidiary invests the blocked funds that earn 10 per cent interest. The amount of cash flow will be different in each of these three scenarios.

If there is no such exchange control and the cash flows to the parent every year, the total cash flow will be:

$$\$\ 20{,}000/1.10 + 40{,}000/(1.10)^2 + 42{,}000/(1.10)^3 = \$\ 82{,}795$$

Again, if there is exchange control and the subsidiary does not invest the blocked funds, the amount of cash flow to the parent unit after the third year will be: $\$(20{,}000 + 40{,}000 + 42{,}000)/1.10^3 = \$\ 76{,}634$.

Yet again, if there is exchange control, but the subsidiary invests the blocked funds, the cash flowing to the parent unit inclusive of interest earned after the third year may be calculated as:

$$\$\ 20{,}000\ (1.10)^2 + 40{,}000\ (1.10) + 42{,}000 = \$\ 110{,}200$$

$$\$\ 110{,}200/(1.10)^3 = \$\ 82{,}795$$

PROBLEM 12.8

A project of the subsidiary with an initial investment of $ 10 million has a net operating cash flow of $ 10 million each for three years during the life time of the project and a salvage value of $ 4 million. The host government permits the cash flow to the home country only after the life time of the project. But the subsidiary invests the funds at a rate of 12 per cent till the actual outflow takes place. Find the NPV assuming a discount rate of 10 per cent. What will be the NPV if (a) the funds are not invested, and (b) there is no restriction on the outflow of funds.

Solution

The total invested value $= \$\ 10\ (1.12)^2 + 10(1.12) + 10 = 12.544 + 11.2 + 10$

$= \$\ 33.744$ million

$$NPV = -10.0 + (33.744 + 4.0)/1.10^3 = \$\ 18.357 \text{ million.}$$

If the funds are not invested,

$$NPV = -10.0 + (10.0 + 10.0 + 10.0 + 4.0)/1.331 = \$\ 15.545 \text{ million}$$

If there is no restriction, the funds will flow annually to the home country without any investment.

$$NPV = -10.0 + 10/1.10 + 10.0/1.21 + 14.0/1.331 = \$\ 17.873 \text{ million.}$$

Parent-Subsidiary Perspective: An Alternative Approach

The analysis of project appraisal in the earlier pages of this chapter takes into account the parent unit's perspective, of course, on valid reasons. Even in this case, the parent unit takes into account the subsidiary's perspective at least to some extent and makes adjustments in the cash flow and the discount rate under the NPV framework. But it is often argued that for a more transparent appraisal of the investment project, project appraisal needs to be made in greater details—both from the parent's point of view and from the viewpoint of the subsidiary. It is for this reason that in a survey of 121 US MNCs operating in early 1980s, 48 per cent of the decisions were made on the basis of the project's cash flow, 36 per cent were taken on the basis of the parent's cash flow while 16 per cent of the decisions considered both the viewpoints (Stanley and Block, 1983).

The very rationale of this argument is that if project's NPV is positive, it is bound to add to the corporate wealth of the firm as a whole. Under this approach, two NPVs are computed. One is the NPV from the parent's perspective (NPV_P) and the other is the NPV from the viewpoint of the project itself that is known as the subsidiary's perspective (NPV_S). Finally, acceptance/rejection decision of the project is based on the NPV of both of them.

In order to find out the NPV_P, the following successive steps are taken:

1. Estimate the cash flow in the host-country currency
2. Estimate the future spot exchange rate on the basis of available forward rates
3. Convert the host-currency cash flow into the home-country currency
4. Find NPV in home-country currency using the home-country discount rate.

Here the cash inflow represents all cash flowing towards the parent unit in a manner similar to what has been explained earlier. Cash outflow will represent cash flowing out of the parent unit.

Similarly, to find out the NPV_S, the following steps are taken:

1. Estimate the cash flow in host-country currency
2. Identify the host-country discount rate
3. Discount the host-currency cash flow at the host-country discount rate
4. Convert the resultant NPV into the home-country currency at the spot exchange rate.

In this case, the cash inflow represents the earnings of the project in the host-country currency irrespective of the fact whether cash moves towards, or away from, the parent unit.

These two methods assume all-equity capital structure and so, if the parity conditions existed in the real world, the result of the two approaches would have been the same. But in the real world, debt is normally included in the capital structure in order to lower the cost of capital; and moreover, the parity conditions do not exist. Naturally, the result of the two approaches will differ. The possible results will be:

1. NPV_P and NPV_S both being negative. In such case, project cannot be accepted.
2. NPV_P and NPV_S both being positive. In such case, project shall be accepted.

3. $NPV_P > 0 > NPV_S$. The project is attractive from the viewpoint of the parent unit but not attractive from the subsidiary's viewpoint. In such case, project may be accepted but there will be chances for loss in the value in terms of the host-country currency.
4. $NPV_P < 0 < NPV_S$. The project being attractive from the subsidiary's perspective shall be unattractive from the parent's perspective. The project may be accepted but it is doubtful how far it will be useful for the parent unit.

COST OF CAPITAL

In the preceding section, the discussion was limited to the numerator of the NPV-rule equation. The denominator of the equation, which is known as the *discount rate* or the *hurdle rate* and which is based on the risk-adjusted cost of capital, is also very significant for the computation of cash flow. We now discuss the concept of the cost of capital, and the adjustments in it that are required for international capital budgeting decision.

Average Cost of Capital

Average cost of capital represents the weighted average of the cost of equity and the cost of debt. As an equation, the average cost of capital,

$$k = k_d(1 - t)W_d + k_eW_e \qquad (12.5)$$

where k_d is the cost of debt, k_e is the cost of equity, W is the relative weight of different forms of capital in the capital structure and t is the tax rate.

Cost of Debt

Interest is the cost of debt adjusted for taxes because interest is tax-deductible and is debited in the income statement before tax is calculated. Tax-adjusted cost of debt,

$$k_d = \text{interest/principal} \times (1 - t) \qquad (12.6)$$

The cost of new debt differs from the cost of existing debt as the former includes the floatation cost. The cost of new debt is

$$k_d \text{ (new)} = [I + \{(P - \text{NP})/n\}/\{(P + \text{NP})/2\}] \times (1 - t) \qquad (12.7)$$

where I is the interest, P is the principal, NP is the net proceeds after floatation cost and n is the maturity.

Example: If annual interest charges amount to $ 5,000, the cost of $ 100,000 ten-year debt with a tax rate of 50 per cent will be:

$$5{,}000/100{,}000 \times (1 - 0.50) = 2.5\%$$

If it is a new debt and the floatation cost is $ 2,000, the cost of debt will be:

$$[5{,}000 + \{(100{,}000 - 98{,}000)/10\}/\{(100{,}000 + 98{,}000)/2\}] \times (1 - 0.50) = 2.63\%.$$

When a debt instrument is issued at a premium or discount, the net proceeds differ from the face value and the same procedure is used that is used in case of new debt. Suppose a ten-year bond having a face value of $ 100 is sold at $ 90 with a coupon of 5 per cent. The cost of debt with a 50 per cent tax rate will be:

$$[5 + \{(100 - 90)/10\}/\{(100 + 90)/2\}] \times (1 - 0.50) = 3.15\%$$

Again, if the company raises debt from another country's financial market, the cost of debt will be inclusive of the changes in the exchange rate. For example, suppose an Indian company raises debt from the US dollar market at an interest rate of 6.0 per cent. But if dollar appreciates by 3.0 per cent, the cost of debt in terms of rupee will be higher than 6.0 per cent. It will be:

$$(1 + 0.06)\ (1 + ..03) - 1 = 0.0918 = 9.18\%$$

The readers are suggested to go through Chapter 15 for a detailed discussion.

Cost of Equity Shares

Dividend is the cost of equity shares. The computation of the cost of equity shares is not so easy as there is no fixed contractual obligation for the payment of dividend to equity shareholders. Sometimes the cost is based on the historical rate of return, but the problem with this method is that it does not embrace the expectations about future performance of the firm. The usual practice is to rely on the current value of shares. The price of equity share P, is equal to the present value of expected dividend D given the risk-adjusted rate k_e required by the investors. To arrive at the cost of equity shares, the normal practice is to divide the expected amount of dividend at the year-end by the current value of shares. In equation form,

$$k_e = D/P_0 \qquad (12.8)$$

But since the investors expect growing rate of dividend per share, growth factor g is added to Eq. (12.8). Then

$$k_e = (D/P_0) + g \qquad (12.9)$$

Example: If dividend in the past has grown at 5 per cent per annum and the firm expects to pay dividend at $ 4 per share at the year end, the cost of equity share with a current price of $ 50 will be:

$$(4/50) + 0.05 = 13\%$$

As far as the cost of new share is concerned, it is computed after adjustment of floatation cost. This means that the floatation cost is deducted from the market price of the share. Suppose, the floatation cost is $ 5 per share, then the cost of equity share will be:

$$4/(50 - 5) + 0.05 = 13.89\%$$

There is one more method for computing the cost of equity shares. It is based on the security market line where *Beta* is used as a measure of risk (Friend and Blume, 1970). Under this method, the cost of equity share,

$$k_e = k_r + (k_m - k_r)\beta_e \qquad (12.10)$$

where

k_r is the riskless rate of interest,

k_m is the expected rate of return (average) on the portfolio of all securities in the market, and

β_e is the product of the standard deviation of the return on the equity share in question SD_e, and their correlation with the market, $corr_{em}$ divided by the standard deviation of the rate of return on the market portfolio, SD_m.

The estimate of β is made from the past rates of return since historical β is often close to real or true β. If β is equal to 1, it means that the risk contained in the equity shares is equal to that found in the total portfolio in the market. A higher β shows share risk higher than in the market. Similarly, riskless rate is equal to the rates found in class-one securities. The average market rate is close to the historical average rate of return in a large sample of securities.

Example: If k_r is 10%, k_m is 15%, and β is 0.8, then

$$k_e = 0.10 + (0.15 - 0.10) \times 0.8 = 0.14 = 14\%$$

Cost of Retained Earnings

Funds for investment come normally from the retained earnings. In case of domestic investment, the cost of such funds is not calculated separately because the market price of shares, which determines the cost of equity, embodies also the influence of retained earnings. But in case of international investment, cost of retained earning is calculated separately because the earnings repatriated by the subsidiary to the parent company are subject to tax. Thus, the normal practice is to make tax adjustments in the cost of retained earnings. The after-tax cost of retained earnings

$$k_s = k_e(1 - t) \tag{12.11}$$

If the retained earnings involve transfer cost when they move from the parent to subsidiary, Eq. 12.11 will be written as

$$K_s = K_e(1 - t)(1 - C) \tag{12.12}$$

where C = transfer cost

Example: An American subsidiary operating in India has 15.0 per cent as cost of equity. The repatriation of retained earnings causes an incremental tax of 20.0 per cent. The transfer cost in remittance is expected to be 2.0 per cent. The cost of retained earnings will be:

$$0.15\ (1 - .20)\ (1 - 0.02) = 0.1176 = 11.76\%$$

PROBLEM 12.9

Calculate the weighted average cost of capital when the capital structure shows:

(a) Existing debt of $ 5.0 million at 10 per cent for 6 years (tax rate is 30 per cent)

(b) New debt of $ 3.0 million at 8 per cent for 10 years with a floating cost of $ 200,000

(c) Existing equity shares of $ 7.0 million ($ 15 per share), EPS $ 4, growth rate of 5 per cent and dividend pay-out ratio of 50 per cent, and

(d) Proposed equity share (100,000 shares) to be sold at $ 15 with $ 200,000 floatation cost.

Solution

Cost:
Existing debt: 0.10 (1 – 0.30) = 0.07
New debt: [240,000 + {(3,000,000 – 2,800,000)/10}]/(3,000,000 + 2,800,000)/2
= 0.08965 (1 – 0.3) = 0.062755
Existing equity: 2/15 + 0.05 = 0.1833
New equity share: 2/13 + 0.05 = 0.2038
Proportions:
Existing debt: $ 5,000,000/16,500,000 = 0.31
New debt: 3,000,000/16,500,000 = 0.18
Existing equity: 7,000,000/16,500,000 = 0.42
New equity: 1,500,000/16,500,000 = 0.09
Weighted average cost:
Existing debt: 0.31 × 0.07 = 0.0217
New debt: 0.18 × 0.0628 = 0.0113
Existing equity: 0.42 × 0.1833 = 0.0770
New equity: 0.09 × 0.2038 = 0.0183
Weighted average: 0.1283 = 12.83%

Significance of Weight

We have seen Eq. (12.5) where the cost of equity and the cost of debt are added up along with their relative weight. The weight is significant in the sense that the cost of debt, as it is tax-deductible, is often lower than the cost of equity; and so, if the capital structure consists more of debt or the lower-cost capital, the weighted average cost of capital will be lower and for this reason the introduction of debt in the capital structure called *financial leverage* lowers the average cost of capital and thereby raises the return on investment. However, there is difference in views as to what extent the use of debt reduces the weighted average cost of capital.

The net income approach suggests that with growing proportion of debt, the average cost of capital declines and is the minimum where the entire capital is composed of debt. One of the shortcomings of this approach is that it does not take into account the risk borne by the equity shareholders as a result of increasing share of debt in the capital structure. The net operating income approach on the other hand, takes this very fact into account and suggests that the risk borne by the equity shareholders rises at the rate at which the cost of capital falls after the introduction of debt. The ultimate result is that the average cost of capital remains constant irrespective of the changing ratios between debt and the equity capital. However, there is a compromising view which suggests that up to a certain point, an increase in debt-equity ratio does not lead to a rise in the risk borne by equity shareholders with the result that the average cost of capital begins to fall but if the company goes on increasing the debt-equity ratio beyond this point, the increase in such risk outweighs the benefit of increasing debt and the average cost of capital begins to rise. This means that the average cost of capital curve is U-shaped.

Solomon (1963) agrees with the compromise approach but suggests that the average cost of capital curve in actual practice is not exactly a U but a saucer-shaped one. It is because both the cost of equity and the cost of debt rise with a continual rise in the debt-equity ratio. Increasing debt raises risk not only of the

equity shareholders but also of the bondholders because increasing debt raises the risk of default. The optimal debt-equity ratio represents the point where the average cost of capital is lowest.

Average and Marginal Cost of Capital

When a firm sets up a subsidiary and makes additional investment for this purpose and if the relative weight of different forms of capital and their cost remain constant even in respect of additional capital raised, the average and the marginal cost of capital are the same. But since these two variables change with raising of additional capital, marginal cost of capital is different from average cost of capital. Thus, while setting up a subsidiary, this factor needs to be considered, especially when the sources and the cost of capital change.

International Investment and Cost of Capital

Let us first consider why the cost of capital in case of an MNC's operation is not necessarily the same as in case of a domestic company. The size of an MNC is quite large, so it gets preferential treatment from the creditors and the size of its issue being large, the floatation cost per share or bond also works out lower.

MNCs' easy access to international capital market lowers the cost of capital, but the existence of exchange rate and political risks raises it.

It has easy access to the international capital market and so it gets funds from the least-cost source. The subsidiary too borrows from the domestic capital market if it finds the cost of capital low there. Importantly, an MNC can internationally diversify its sources of funds and so ensure a stable inflow of funds which reduces the probability of bankruptcy and lowers the cost of capital. But at the same time, as the flow of funds in multinational operation is highly exposed to exchange rate changes, it raises the bankruptcy cost and compels the creditors and shareholders to require a higher rate of return on the capital. Again, the international operation is subject to political risk which also requires a higher rate of return on capital. Thus these facts need to be incorporated into the computation of the cost of capital in the context of multinational investment.

Parent's Perspective and Adjustment to Cost of Capital

Those who believe in efficient capital market suggest that the cost of capital in different countries is analogous and hence the parent company's cost of capital may be used for discounting the cash flow from foreign operations without any adjustment. But in practice, the international capital market is segmented which requires adjustments to the parent unit's cost of capital. If the cash flow is discounted at the subsidiary level, the cost of capital obtained in the host country is used for this purpose. But in cases where the parent unit uses the home-country cost of capital, it makes some adjustments to it.

Firstly, the cost of capital should be adjusted for the variation in capital structure norms that is very evident in international investment. Normally, the MNCs whose operation is well diversified across countries have a comparatively stable cash flow and can handle more debt. They have large share of debt also because they have easy access to credit, and are exposed to lower credit risk. On the other hand, the MNCs which have relatively large profits, use more of their retained earnings and not debt.

Determinants of Capital Structure

The debt-equity ratio in a multinational firm depends on the company's own characteristics as well as on the economic environment in the host country. Higher debt-equity ratio is found if there is:

1. Stable cash flow
2. Easier access to the sources of debt
3. Low interest rate and low credit risk
4. Low level of retained earnings
5. Restrictions in the host country on the participation in equity shares
6. Restrictions in the host country on dividend repatriation
7. High degree of exchange rate risk and political risk in the host country

The capital structure norms depend also on the rules and regulations in the host country. In host countries where foreign equity participation is restricted to lower limits, the debt-equity ratio is generally high. Again, when the subsidiary is more exposed to exchange rate risk, a higher debt-equity ratio is desirable. Yet again, when political risk is very high in the host country, the MNCs rely more on loan from host-country creditors because the creditors will then put pressure on the local government to maintain good relations with the MNC. If however, the interest rate is high in the host country as it is in many developing countries, the MNC uses more of equity capital. Capital structure norms thus vary from one host country to another and from one MNC to another. If the same MNC invests in different countries, its target capital structure in each host country will differ from its global target capital structure. In order to minimise this difference, the MNCs adopt different norms in different host countries. If they rely more on debt in one host country, they try to rely more on equity in another host country. If the debt-equity mix in all the subsidiaries taken together does not match its (parent unit's) own capital structure norms, it tries to adjust its norms to the global target capital structure norms through adding a premium to, or making a discount from, the parent unit's cost of capital.

If debt-equity norms in host countries differ greatly from those of the parent company, the MNC makes adjustment in its global target capital structure norms.

Secondly, the parent unit's cost of capital is adjusted in keeping with the extent to which the subsidiary is able to get funds at lower cost either from the domestic financial market or from the international financial market. If the cost is lower than the cost of capital of the parent unit, the discount rate needs to be reduced.

Thirdly, the discount rate also needs adjustment for inflation. If the cash flow is adjusted for inflation, it should be discounted by the real discount rate or the inflation-adjusted discount rate, but if the cash flow is not adjusted for inflation, it should be discounted by the nominal discount rate.

Fourthly, the discount rate is adjusted for various types of risks, political, economic, or both prevalent in the host country. If these risks are expected to be present in the host country, the discount rate needs an upward revision. The extent of upward revision depends upon the severity of the risks.

ADJUSTED PRESENT VALUE APPROACH

Lessard (1979) has developed a technique for international capital budgeting that is known as the *adjusted present value (APV) technique*. It incorporates most of the

complexities emerging in the computation of cash flow and in the determination of the discount rates already explained in the preceding sections.

Under the APV technique, the *initial cash flow* consists of the capital cost of the project minus blocked funds, if any, in the host country activated by the project. This amount is converted into the home-country currency at the spot exchange rate.

Similarly, the *operating cash flow* under the APV technique consists of:

- Present value of after-tax cash flow from subsidiary to parent converted into the home-country currency at the expected spot rate minus the profits on the lost sales of the parent company
- Present value of tax-adjusted depreciation allowances in terms of the home-country currency
- Present value of the contribution of the project to borrowing capacity in terms of home-country currency subject to adjustment for taxes
- Face value of loan in the host-country currency minus the present value of repayments converted into the home-country currency
- Present value of the expected savings on account of tax deferrals and transfer pricing and,
- Present value of expected illegal repatriation of income.

Terminal cash flow consists of the present value of residual plant and equipment.

It may be noted that for tax adjustment, the APV technique takes into account the higher of the home-country and host-country tax rates. This technique is unique in that it uses different discount rates for different types of cash flows. The cash flow on account of sales and other such revenue is discounted at the all-equity cost of capital; depreciation allowances are discounted at the nominal rate; the contribution of the project to borrowing capacity is discounted at the riskless rate, and the repayment of loans in host-country currency is discounted at nominal interest rate prevalent in the host country. Again, the rate used for discounting the savings on account of taxes and of transfer pricing and illegal repatriation includes the risk premium.

Despite uniqueness of the APV technique, it has been found that if the complexities are incorporated in the cash flow and if the risk-adjusted weighted average cost of capital is taken as the discount rate, the adjusted present value approach is not different from the NPV approach (Booth, 1982).

PROBLEM 12.10

An Indian company is making appraisal of its project to be set up with its subsidiary in the USA. The initial project cost amounts to US $ 125,000 which, as expected, will add Rs. 30 lakh to the Indian company's borrowing capacity over a period of three years. A sum of Rs. 40 lakh of the initial investment is met by the Indian parent and the remaining $ 25,000 is borrowed at 10 per cent interest rate in the USA. The project has a life of three years. The net operating cash inflow is $ 50,000, $ 60,000 and $ 72,000 respectively in the first, second and third year. The salvage value is expected to be $ 10,000.

The spot exchange rate is Rs. 40/$. It is assumed that PPP holds with no lag and that real prices remain constant in both absolute and relative terms. Hence the sequence of exchange rate reflects anticipated annual rates of inflation equating

8 per cent in Rs. and 5 per cent in dollar. Depreciation allowances amount to Rs. 15 lakh a year for three years. Tax rate is 30 per cent in India and 25 per cent in the USA. Expected tax saving from intra-firm transfer pricing is Rs. 50,000 a year in all the three years. Discount rate for cash flows assuming all equity financing is 20 per cent. Discount rate for depreciation/tax saving on interest deductions from contribution to borrowing capacity is 12 per cent. Discount rate relating to loan repayment is 20 per cent and on tax saving on account of transfer pricing is 25 per cent. Find the APV.

Solution

Spot exchange rate = Rs. 40/$

Year 1 = Rs. 40 × (1.08/1.05) = Rs. 41.14/$
Year 2 = Rs. 41.14 × (1.08/1.05) = Rs. 42.32/$
Year 3 = Rs. 42.32 × (1.08/1.05) = Rs. 43.53/$

Operating cash flow (including salvage value):
Year 1 = 50,000 × 41.14 = 2,057,000/1.20 = Rs. 1,714,167
Year 2 = 60,000 × 42.32 = 2,539,000/1.20^2 = Rs. 1,763,333
Year 3 = (72,000 + 10,000) × 43.53 = 3,569,460/1.20^3 = Rs. 2,065,660
Total = Rs. 5,543,160

Depreciation allowance × tax @ 0.30:
Year 1 = Rs. 1,500,000 × 0.3 = 450,000/1.12 = Rs. 401,785
Year 2 = Rs. 1,500,000 × 0.3 = 450,000/1.12^2 = Rs. 358,737
Year 3 = Rs. 1,500,000 × 0.3 = 450,000/1.12^3 = Rs. 320,307
Total = Rs. 1,080,829

Borrowing capacity:
Year 1 = Rs. 1,000,000 × 0.10 × 0.3 = 30,000/1.12 = Rs. 26,786
Year 2 = Rs. 1,000,000 × 0.10 × 0.3 = 30,000/1.12^2 = Rs. 23,916
Year 3 = Rs. 1,000,000 × 0.10 × 0.3 = 30,000/1.12^3 = Rs. 21,354
Total = Rs. 72,056

Tax saving on account of transfer pricing:
Year 1 = Rs. 50,000 × 0.3 = 15,000/1.25 = Rs. 12,000
Year 2 = Rs. 50,000 × 0.3 = 15,000/1.25^2 = Rs. 9,600
Year 3 = Rs. 50,000 × 0.3 = 15,000/1.25^3 = Rs. 7,680
Total = Rs. 29,280

Loan repayment (interest + amortisation):
Year 1 = 10,833/1.20 = $ 9,028
Year 2 = 10,000/1.20^2 = $ 6,944
Year 3 = 9,167/1.20^3 = $ 5,305
Total = $ 21,277

APV = Rs. –(1,25,000 × 40) + 5,543,160 + 1,080,829 + 72,056 + 29,280 + [(25,000 – 21,277) × 40] = Rs. 1,874,145

SENSITIVITY ANALYSIS

The focus of the foregoing discussion was on how adjustments are made in the cash flow and the discount rate in the case of international capital budgeting. It is true

that the estimated cash flow is fitted into the evaluation rules, such as NPV and IRR. But the question arises as to how the estimates of cash flow vary under different scenarios. For example, if the host country experiences boom conditions, the cash flow will be different from that in case of a normal period or in case of a depression. Again, the subsidiary may substitute the parent company's export partially, or fully, depending upon varying conditions existing in the host country and if the host government agencies are strictly monitoring the international transactions, it will be difficult for the company to employ transfer-pricing techniques and the saving on this account will be minimum. Obviously, it is difficult to foresee the future possibilities and so equally difficult to estimate the future cash flows with complete certainty. Similarly, the cost of capital will vary widely under varying degrees of business, financial and political risk. The varying cash flows and the varying discount rates under different scenarios will have a bearing on the accept-reject decision. The sensitivity analysis considers the varying scenarios or "what-if" scenarios. The purpose is to determine how sensitive the NPV is to alternative values of the input variables.

It may be noted here that when the cash flow is not known with complete certainty, probabilistic techniques are used for this purpose. The magnitude of uncertainty is measured in terms of dispersion from the expected value and then it is included either in the cash flow or in the discount rate. The former is known as the *certainty equivalent approach*, while the latter is known as the *risk-adjusted discount rate approach*. In cases of sequential investment, a decision-tree approach is followed. The readers are advised to consult any book on corporate finance for the analysis of risk.

REAL OPTIONS AND PROJECT APPRAISAL

International investment is more risky than domestic investment insofar as the foreign investor does not know much about the economic, political, and other conditions prevailing in the host country. There is every possibility for changes in the cash flow from the originally anticipated one. If demand falls suddenly, the operation would have to be suspended for some time. If situation does not improve, it may be abandoned. If, on the contrary, demand rises suddenly, operation may be expanded. In the cases where the investor needs more information, the operation may be postponed for some time. These are the options facing the international finance manager. These options are known as the *real options* as they influence the real assets. They influence the international cash flow and therefore form a part of international capital budgeting. At the present juncture, we shall take up only one or two options so that the readers are acquainted with how real options influence the cash flow.

Real options start when there is expected a change in cash flow from that originally anticipated. They are concerning postponement/ abandonment/ expansion/ contraction of the operation.

Postponement

In case of postponement, option value is decomposed into the value of options if exercised today and the value if waiting is involved. Investing today is the intrinsic value and waiting for a specific period represents time value. Let us take an example to explain its impact on the cash flow. Suppose a petroleum exploration

company has to undertake a project abroad. If it invests today, considering that perpetual cash flow begins in the first year, the NPV of investing today,

$$NPV_0 = [\{(P - V)Q\}/r] - I_0 \quad (12.13)$$

If it waits for one year before making any investment, the NPV at time $t = 0$,

$$NPV_0 = [\{(P - V)Q\}/r]/(1 + r) - I_0 \quad (12.14)$$

If initial investment is $ 5 million, risk-free interest rate is 10 per cent, the expected price level of oil is $ 10 per barrel, the variable cost is $ 4 per barrel, and the expected production is 1,00,000 barrels a year, the NPV of investing today will be:

$$[\{(10 - 4)1,00,000\}/0.10] - 50,00,000 = \$\ 10,00,000$$

If, on the contrary, the company waits for a year because price of oil is expected to go up to $ 15 per barrel, the NPV after one-year wait will be:

$$[\{(15 - 4)1,00,000\}/0.10]/1.10 - 50,00,000 = \$\ 50,00,000$$

Here NPV for wait is higher. So the company should postpone the investment for one year. The value of the option to postpone the investment can be viewed as managerial flexibility. It is because of this flexibility that the company gains more. However, if the price of oil per barrel shrinks unexpectedly to a lower value, the company will not make an investment after one year. It can be analogised with the out-of-money option when the option buyer does not exercise the option.

Abandonment

The project may be abandoned if the cost structure does not justify it. If the extraction and refining cost rises unexpectedly to $ 8 per barrel (with price per barrel being $ 10), the NPV of abandonment today will be:

$$[\{(10 - 8)\ 1,00,000\}/0.10] - 50,00,000 = \$(-)\ 30,00,000$$

The company will abandon the project in view of the negative NPV. But if price of oil is expected to rise by 100 per cent after one year, the project will not be abandoned. Rather, the company shall wait and watch for the price rise. If it rises as per expectations, it will continue to operate. If the price does not rise after one year, the project will be abandoned finally.

In fact, in case of MNCs, it is not easy to abandon a project and restart the same project. It is because they have to incur high entry and exit cost. If they once invest, they prefer to operate at loss for some time unless and until the loss attains abnormally a high level. Normally, they watch for some time in the expectation that favourable conditions will prevail. Such a situation is known as *hysteresis* that usually arises following changes in real exchange rates when the MNCs have to face loss for sometime and then gain if the exchange rates move in their favour.

Hysteresis denotes MNCs' behaviour when they prefer to operate at loss for some time in the expectation of favourable conditions to reappear.

Expansion and Contraction

If demand goes up suddenly and the company raises its production level, it will find out the option value of expansion. It will expand the level of operation if the NPV is greater than for the case when there is no expansion.

Again, if demand falls suddenly, the company will find out the NPV of contracted level of production. If it is greater than for the case with no contraction, it will go for contraction in the level of operation. The readers should try to compute the NPV in different scenarios and then conclude what should be the real option before the firm.

PROBLEM 12.11

A Japanese automobile company has decided to manufacture 10,000 motor cars per year in India with an initial investment of Rs. 500 crores. The price is Rs. 2 lakh and the variable cost including also the import cost of the spares is Rs. 1.30 lakh. The risk-free interest is 10 per cent. The car is the lowest-price car in the market and so the demand is expected to rise from 10,000 cars in the first year to 12,000 cars in the second year and even more in the following years. On the other hand, the rupee is expected to depreciate vis-à-vis yen and the variable cost is expected to rise fast from Rs. 1.30 lakh to Rs. 1.80 lakh. Find out what are the options available to the manufacturer.

Solution

At the current level of production,

NPV = [{(2.00 – 1.30) × 10,000}/0.10 – 5,00,00,00,000 = Rs. 2,00,00,00,000.

If demand moves up to 12,000 units,

NPV = [{(2.00 – 1.30) × 12,000}/0.10 – 5,00,00,00,000 = Rs. 3,40,00,00,000.

But if variable cost rises to Rs. 1.80 lakh due to exchange rate changes,

NPV = [{(2.00 – 1.80) × 10,000}/0.10 – 5,00,00,00,000 = Rs. –3,00,00,00,000.

The manufacturer will bear the loss within a reasonable period of time till any clear-cut indication is not visible for a favourable movement in the exchange rate. If favourable move is visible, production will be continued; otherwise, the project will be abandoned.

EVALUATING M&As

Value of the Merged Firm and Gains from M&As

M&A is a gainful strategy only when the value of the combined firm is greater than the sum of the values of the two firms computed individually in the absence of the merger. In the form of an equation,

$$\text{Gain} = V_{AB} - (V_A + V_B) \tag{12.15}$$

However, the gain so derived has to be compared with the cost of M&A that is arrived at after deducting the value of the target firm from the price that the acquiring firm pays to the target company. This means that the net gain from M&A accruing to the acquiring firm exists only when

$$[V_{AB} - (V_A + V_B)] > (\text{Price} - V_B) \tag{12.16}$$

Thus, in this context, it is very significant to know what price the acquiring firm should pay to the target firm for acquisition and what the impact of the changes in price on the post-merger value of the firm would be. The price is known as the *consideration* value that is fixed within the two extremes. One is the *floor price* for the package, any price below which is not acceptable by the target company. It is basically the market value of the shares of the target company. For example, if Firm A acquires Firm B and if the market value of Firm B's share is $ 15, the consideration value must be at least $ 15. In practice, it is more than $ 15 as Firm B will attract a premium for the acquisition.

Consideration value is the price the acquiring company gives to the target company for acquisition.

However, this does not mean that the amount of premium will swell infinitely. If it moves up beyond a certain limit, the value of the acquiring firm will reduce and the very objective of the acquiring firm behind the merger will be marred. This limit is known as the *ceiling price* where the EPS of the acquiring firm in the post-merger period is equal to that in the pre-merger period. In other words, the ceiling price would be equal to the product of the EPS of the target firm and the P/E ratio of the acquiring firm.

Suppose the financial data of the two firms are as follows:

	Firm A	*Firm B*
Present earnings ($)	20,000.00	8,000.00
Shares (No.)	5,000.00	3,000.00
EPS ($)	4.00	2.67
Market value of shares	32.00	16.00
Price-earning ratio (PER = EPS)	8.00	6.00

At the floor price, the value of Firm B in the post-merger period will be the same as during the pre-merger period. The owners of Firm B will get 16/32 or 0.5 share in Firm A for their one share in Firm B. Thus, the wealth of Firm B in the post-merger period will be $ 32 × 1,500 shares or $ 48,000 which is equal to $ 16 × 3,000 shares during the pre-merger period.

At this floor price paid, the EPS of Firm A after the merger will increase to $ (20,000 + 8,000)/(5,000 + 1,500 shares) or to $ 4.31. Assuming a price-earning ratio of 8.0, the value of one share of Firm A after the merger will be $ 4.31 × 8.0 or $ 34.48 and the value of the merged firm will be $ 34.48 × 6,500 shares = $ 224,120 which is higher than the sum of the value of the two firms in the pre-merger period. Using Eq. (12.16), the net gain from the merger will be:

$$\$ \{224,120 - (160,000 + 48,000)\} - (48,000 - 48,000) = \$ 16,120$$

The higher the price than the floor price, the lower will be the gain to the acquiring firm and higher the gain to the target company. However, Firm A may pay a large premium to Firm B in order to lure the latter for acquisition. The ceiling will reach where the price will be equal to the product of EPS of the target company and the price-earning ratio of the acquiring firm. In the above example, it is $ 2.67 × 8 = $ 21.36. At this price, Firm B will receive 0.6675 shares in Firm A in lieu of its one share or in all 2,003 shares in Firm A meaning that there will be in all 7,003 shares in the merged firm. The EPS will then be $ 28,000/7,003 shares ≈ $ 4.0 which is equal to the pre-merger EPS of Firm A. Assuming the price-earning ratio of 8, the value of the merged firm will be $ 32 × 7,003 shares or $ 224,096. Thus at both the ceiling price and the floor price, the value of the merged firm is almost the same, but at the ceiling price, the net gain to the acquiring firm would be zero because the gain from the merger will be reaped entirely by the target company.

In practice, the actual price is determined between these two limits depending upon the bargaining power of the acquiring firm and the target firm; and accordingly, the net gain is shared by the acquiring firm and the target firm. Suppose, the consideration value is $ 20 per share of Firm B. In this case, Firm A will issue 0.625 share for one share in Firm B which would amount to 1,875 shares. The value of owners' wealth in Firm B would now be $ 32 × 1,875 shares or $ 60,000 as compared to $ 48,000 in the pre-merger period. The EPS of the merged firm would be $ 28,000/6,875 shares or $ 4.07. Assuming a price-earning ratio of 8, the value of the merged firm will be $ 32.56 × 6,875 shares or $ 223,850 which is higher than the sum of the pre-merger value of the two firms. The net gain to the acquiring firm as per Eq. (12.16) will be:

$$\$ \{223,850 - (160,000 + 48,000)\} - (60,000 - 48,000) = \$ 3,850$$

Thus, at a price agreed upon between the floor and the ceiling, both the acquiring firm and the target firm will reap benefits and as a result, both will agree to the merger. However, there are cases when the acquiring firm opts for acquisition even when its net gain is zero. This is, however, done if some other significant benefits are going to accrue to the acquiring firm.

PROBLEM 12.12

Firm A absorbs Firm B on the basis of the following data:

(a) Present earnings: Firm A—$ 40,000, Firm B—$ 18,000
(b) No. of shares: Firm A—5,000, Firm B—3,000
(c) EPS: Firm A—$ 8.0, Firm B—$ 6.0
(d) Market price of shares: Firm A—$ 40.0, Firm B—$ 21.0
(e) Price-earning ratio: Firm A—5.0, Firm B—3.50

Find out the gain to Firm A if the consideration price is $ 24.0 per share.

Solution

At a price of $ 24.0, a share in B = 0.6 share in A. This means that 1,800 shares will be added to A's already existing 5,000 shares in the merged firm. The EPS in the merged firm will be: 58,000/6,800 = $ 8.53. Assuming a P/E ratio of 5, the value of one share in the merged firm is $ 42.65 and the value of total 6,800 shares at the rate of $ 42.65 a share in the merged firm will be $ 42.65 × 6,800 = $ 290,020.

Applying Eq. (12.16), the gain will be

$$\$ [290,020 - (200,000 + 63,000) - (72,000 - 63,000)] = \$ 18,020.]$$

Factors Influencing the Consideration Value

The consideration value has so far been discussed in absence of any changes in the international environment, but in international M&A, such changes cannot be overlooked. One such change is the change in exchange rate. The lower the existing spot rate of the currency of the target-company country, the lower is the price to be paid by the acquiring firm. If it is higher, the salvage value will be higher from the viewpoint of the acquiring firm. If the future spot rate is expected to be higher, the acquiring firm will receive a greater cash flow.

The second is the required rate of return that influences the value of the acquisition because the cost of capital varies from one country to another. This is why acquisition of a particular country's firm may be more beneficial than that in another country.

Thirdly, the value of acquisition differs in case of different countries because of variation of the ability to use financial leverage among countries. Since acquisition is financed mostly through borrowings, acquisition of firms in a country where flexibility to borrow is large is more common. For example, in the United States, a high debt ratio is not preferred, and the acquiring firm does not get much incentives on this count.

Last but not least, the important factors in this respect are the legal formalities regarding tax and accounting. If they are favourable, they create competitive advantages for acquiring firms in some countries. This means that when these rules are more favourable and liberal, the acquiring firm may bid a higher price for acquisition.

NON-FINANCIAL FACTORS IN CAPITAL BUDGETING

Non-financial factors influencing capital budgeting decision are: 1. behavioural characteristics of the organisation, and 2. business strategy.

In the international capital budgeting process, financial factors do dominate explaining how much cash flow the project is going to generate and what the discount rate should be but it does not mean that the non-financial factors are negated. Rodriguez and Carter (1984) group these factors as, the behavioural characteristics of the organisation, and the business strategy.

A firm has various levels of management depending upon its organisational structure. In an international set-up, the structure is more complex, based normally on the line-and-staff or functional pattern. Any decision passing through the different levels of management is influenced by the attitude of the managers. The view of one manager is normally different from that of another and consequently, the final decision is the result of bargaining among the different levels of management.

Divergence in the views of managers is more apparent in an international firm where the managers come from varying cultural and social backgrounds and are trained in diverse conditions. England and Lee (1971) have found that behavioural emphasis varies widely between Japanese and American managers; American managers emphasise organisational efficiency and profit maximisation, while Japanese managers lay greater stress on organisational growth and productivity. Thus the projects fulfilling the financial norms pass in the final selection only when they meet the expectations of the more powerful managers. It sometimes happens that the organisational factors considerably mar the impact of financial evaluation based on the cash flow analysis, although they do not negate it.

Apart from the organisational behaviour that influences the capital budgeting decision, proposals meeting the financial norms must fit into the corporate strategy. The management frames the combinations of strategies depending upon its preferences and capabilities and then fits the financially viable projects into its strategy framework. For shaping the strategy framework, the management develops a set of criteria including the product's life-cycle stage, market characteristics, possibilities for replacement or expansion, etc. Keeping in mind the product's life-cycle stage, the management groups various host countries on the basis of market size, investment

climate, availability of local resources and access to market. An index is prepared for the products to be launched in each market and finally that product-country combination is chosen of which the index number is the highest.

As far as market characteristics are concerned, products are classified according to potential market growth and the present state of market penetration. In this context, the price of the product and the elasticity of demand are also taken into consideration. As regards the replacement-expansion decision, it is estimated as to which of the two options is more beneficial for the firm, preferably in a subjective way. Depending upon these considerations, a composite index is built and only those projects which are financially viable and have the highest score in terms of the index.

SUMMARY

- The evaluation criteria of domestic investment projects, such as accounting rate of return, pay-back period, NPV, IRR, and PI are followed also in case of international investment projects but since the parent's perspective and the subsidiary's perspective differ on a number of issues, some adjustments need to be made and care has to be exercised while computing the cash flows. The parent is the investor and so it is the parent's point of view that shapes the cash flows either as inflow or as outflow. Any cash flow from subsidiary to parent is treated as cash inflow and the reverse flow is treated as cash outflow. In fact, this is the principle on the basis of which the initial cash flow, the operating cash flow, and the terminal cash flow are entered into the evaluation formula. However, to make the appraisal more transparent, cash flow from the subsidiary's point of view is also calculated. Accept/reject decision is based on the two NPVs.
- The cash flow during period t_1 to t_n is discounted to the present value at a rate equal to the risk-adjusted cost of capital. The average cost of capital—the sum of the cost of debt, and the cost of equity along with their respective weight—is taken into account but the marginal cost of capital forms the basis of the discount rate, if it is different from the average cost of capital. Again, though MNCs are often able to raise finance at lower cost, there are some additional risks inherent in international business and the cost of capital is adjusted for these facts.
- Lessard has developed a technique for international capital budgeting that is known as the APV technique. This technique takes into account the various adjustments necessary in international capital budgeting and uses different discount rates for different types of cash flows. Again, the sensitivity analysis helps improve the quality of the capital budgeting process, for the finance manager gets a detailed idea of the quantum and pattern of cash flows under varying scenarios. The accept-reject decision will thus be more realistic. There are also real options facing international finance managers that influence the capital budgeting decisions.

- Evaluating M&As considers whether they bring in additional wealth to the acquiring company. In fact, the gain depends on the consideration value that needs to be determined with much care.
- Besides, the non-financial factors, such as the behavioural characteristics of the organisation and the corporate strategy are often crucial. They influence the final decision about taking up of the project.

CASE STUDY

DAIICHI SANKYO OF JAPAN BUYS OUT 34.8 PER CENT STAKE IN RANBAXY OF INDIA

Daiichi Sankyo of Japan was established in 2005 following the merger of two leading century-old Japanese pharmaceutical companies. Being Japan's second largest drug maker, it focuses on therapeutic areas such as cardio-vascular disease and cancer and maintains a robust R&D setup.

On the Indian side, Ranbaxy was founded in 1937 and since 1952, it has been one of India's leading generic drug maker. Despite the fact that it focuses least on drug discovery, it has presence in more than 100 countries. In 2007, its sales touched $ 1.6 billion.

On June 11, 2008, an agreement between the above two companies was signed as per which Daiichi decided to buy out Ranbaxy's promotor's 34.8 per cent stake and to make an open offer for acquiring another 20 per cent of the public shareholdings of the company at a rate of Rs. 737 per share in Ranbaxy.

Is this deal gainful for Ranbaxy?

Now a very pertinent question arises as to what motivated the two companies to agree for this type of acquisition. Experts believe that, first, Ranbaxy, through this deal, will be able to tap the Japanese market where the rate of generic drug use is barely 17 per cent of the volumes compared to 63 per cent in the USA. In the absence of such a deal, it is difficult to enter the Japanese market in view of strict regulatory environment.

Secondly, in the pharmaceutical sector, giant MNCs are operating. The level of competition is very high. It is difficult for a single firm to compete. But if two or more firms merge, competitive strength will naturally be greater. Survival in a keenly competitive environment would be easy.

Thirdly, based on the present scenario, it is not possible for the generic business firms to survive for a longer period without making huge investment in R&D. From this point of view, Ranbaxy would benefit from the strong R&D base of Daiichi.

Fourthly, the consideration value of Rs. 737 is lucrative. If one looks at the Ranbaxy's share price in the market, it was found moving to and fro between Rs. 506.80 and Rs. 560.70 during the preceding 10 days. Thus, if the consideration value is Rs. 737, it would have a gain of around one-third of the prevailing price in the market. The gain is still more significant in view of the fact that the company has not experienced an encouraging trend in the return on equity in the recent past.

Fifthly, in view of the emerging synergies, it is expected that Ranbaxy will reach its 2015 sales target three years earlier.

Gains to Daiichi Sankyo

After this deal, Daiichi will have an added share in the market for generic drugs. The quality of these drugs will certainly improve with its own strong R&D. This will add further to its market share. Moreover, Daiichi's presence in the international market will improve. So far, it has presence in only seven overseas markets. With Ranbaxy's greater spread in the overseas market, it will improve its position definitely.

The earning per share in the combined firm will improve. With greater consideration value, a shareholder owning 100 share in Ranbaxy will own around 76 shares in the combined firm. The number of shares in the combined firm will be lower and the earnings will tend to swell due to reaping of synergies. The earning per share may lead to higher market price of the shares in the combined firm.

Last but not least, Daiichi is expected to hit the 1.5 trillion yen target earlier by 2012, as around one-third of the revenue should come from Ranbaxy's Soda.

Source: Based on the reports published in *Financial Express*, 12/13 June 2008 and *Mint*, 12/13 June 2008.

QUESTIONS

1. Which form of M&A does the present deal represent?
2. Is it beneficial for both the parties?
3. Explain how the earning per share in the combined firm should increase.

REVIEW QUESTIONS

Objective-Type Questions

1. State whether true (T) or false (F):

(a) Depreciation is included in the cash flow.

(b) Cash flow is considered only on after-tax basis.

(c) Average cost of capital is the weighted sum of cost of equity, cost of debt and cost of retained earnings.

(d) Cost of retained earnings is included in the cost of equity.

2. Choose the correct answer:

(a) International capital budgeting incorporates:
(i) only financial factors
(ii) financial and non-financial factors
(iii) only the non-financial factors

(b) Cost of new debt:
(i) includes floatation cost
(ii) does not include floatation cost
(iii) does not include taxes

(c) Free land and building given by the host-country government is
(i) not included in the initial cash flow
(ii) included in the initial cash flow
(iii) added to the initial cash flow

(d) Higher exchange rate risk/political risk
(i) adds to the cost of capital
(ii) lessens the cost of capital
(iii) bears no influence on the cost of capital

(e) Investment proposal is accepted if:
(i) break-even salvage value is greater than the actual salvage value
(ii) break-even salvage value is lower than the actual salvage value
(iii) none of these

(f) The maximum amount of consideration value in M&As is equal to:
(i) the product of EPS of the target company and the price-earning ratio of the acquiring firm
(ii) the wealth of the merged firm during the pre-merger period
(iii) none of these

Short-Answer Questions

1. Do you agree that the NPV rule is better than the IRR rule for international capital budgeting?
2. "Parent's interest dominates while making capital budgeting analysis." Explain.
3. How do you treat the use of blocked funds for calculating the initial cash flow?
4. How do you calculate the cost of debt and cost of equity?
5. Is it correct to say that cost of capital varies between domestic and international capital budgeting?

Long-Answer Questions

1. How do you compute the cash flow in international capital budgeting?
2. Explain the various methods of estimating terminal cash flow.
3. Explain the Adjusted Present Value approach.
4. How do you evaluate M&As? Explain the role of consideration value in this respect.

Numerical Problem

1. The cost of the subsidiary project is US $ 20 million. It is financed through different modes of funds. The parent unit makes an investment for $ 12 million. A sum of $ 3 million is drawn out of retained earnings and another sum of $ 2 million is drawn out of the blocked funds. The subsidiary borrows $ 2 million from the host country market. The remaining $ 1 million is in the form of free land and building supplied by the host country government. Find out the amount of initial investment from the viewpoint of the parent unit.
2. Calculate the operating cash flow (US $) on the basis of the following data:
(a) Sales in the domestic market = US $ 14 million
(b) Export = US $ 4 million
(c) Replacement of parent's export = US $ 2 million
(d) Parent's export of components to subsidiary = US $ 3 million
(e) Royalty payment by subsidiary = US $ 0.5 million
(f) Dividend flow to the parent = US $ 0.5 million

3. Find the break-even salvage value if:
   (a) Initial investment = $ 30 million
   (b) The net cash inflow during the first and the second year respectively = $ 20 million and $ 15 million
   (c) Discount rate = 10%
4. A project of the foreign subsidiary has a beta of 1.10, the risk-free return of 15%, and the required return on the market being estimated at 20 per cent. Find out the project's cost of capital.
5. A firm with an overall debt-equity ratio of 1:2, an after-tax cost of debt at 7 per cent, and cost of equity capital at 15 per cent is taking up a project abroad. The debt-equity norm of the foreign project is not different but the systematic risk pulls down the cost of equity to 12 per cent. Again, there is no change in the expected after-tax cost of debt. Calculate the weighted average cost of capital.
6. Firm A absorbs Firm B on the basis of the following data:
   (a) Present earnings: Firm A—$ 40,000, Firm B—$ 18,000
   (b) No. of shares: Firm A—5,000, Firm B—3,000
   (c) EPS: Firm A—$ 8.0, Firm B—$ 6.0
   (d) Market price of shares: Firm A—$ 40.0, Firm B—$ 21.0
   (e) Price-earning ratio: Firm A—5.0, Firm B—3.50

   Find out the gain to Firm A if the consideration price is $ 24.0 per share.

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