

# **XI. COST OF CAPITAL-INVESTMENT APPRAISAL**

## **1. Introduction**

1.1 One of the key variables on which management has to focus attention is appraising capital expenditures in the spread between the rates of return earned by ~ing money compared with the cost of raising the capital needed. If rate of return can be measured in such a way as to compare directly with the cost of capital then the safety margin available to cover risk factors can be gauged clearly.

1.2. Just as everyone thinks quite clearly on the problem of investing money and getting a cash return in, say, dividends and interest payments, industrial engineers also should think in exactly the same terms when they spend money for plant and equipment, and receive back benefits in terms of profits. The problems are the same spending money and obtaining cash benefits in the future-but the setting is different. Reconciling the needs of the investor with those of the user of capital is fundamental to the appraisal of capital expenditure.

## **2. Supply and Cost of Capital**

2.1. Deciding whether to raise capita~ through equity or debt is very similar in nature to deciding whether to spend money on plant and equipment in relation to the future cash benefits expected. The cost 'of raising capital to finance a project is, therefore, one of the crucial features of investment appraisal.

2.2. While there are many theories on the cost of capital, it can be said, within reasonable limits, which theories are sufficiently accurate for most investment appraisal

processes. For example, if you are considering a return on a project of 15%, it does not matter whether the cost of capital is 7.5% or 7.8%.

2.3. The capital should also be considered in relation to the normal capital structure of the company, and include both debt and equity. This avoids widespread, but misguided, belief that capital can be raised through borrowing without affecting the terms on which new equity capital can be obtained.

2.4. One advantage of debt financing, from the company standpoint, is that the cost of interest is a charge against earnings before income-tax. In other words, the Government helps pay the cost of the debt. From the point of view of the ordinary shareholder, the existence of funded debt in the company can be very helpful in increasing earnings. It can also work the other way, and a word here on "Leverage" might be relevant.

### **3. Leverage or Gearing**

3.1. Take the capitalization of two companies-Company 'A' with 1,00,000 equity shares sold at Rs. 10 a share, and Rs. 10,00,000 in capital, and Company 'B' with Rs. 6,00,000 in debenture bonds and Rs. 4,00,000 made up of 40,000 equity shares of Rs. 10. Each company has a capitalisation of Rs. 10,00,000. Company 'A' has no debt, so there is no deduction, and Company 'B' has an interest cost of, say, Rs. 30,000 deducted from the sum of Rs. 1,00,000. Company 'A' has a net profit before taxes of Rs. 1,00,000 and Company 'B' a net profit before taxes of Rs. 70,000. Let us assume income-tax at 50%-Company 'A' pays income-tax of Rs. 50,000 leaving a net profit of Rs. 50,000. Now calculate the percentage of net profit in return to share capital-the owners' position. In the case of Company 'A' there is a 5% return on capital, and in the case of Company B there is an 81% return on capital-50 paise per share in the case of Company 'A', and 871 paise per share in the case of Company 'B'.

3.2. Obviously there is quite a difference. The shares are the same in each case, but Company 'B' had the advantage of "leverage." In effect, the earnings in excess of the debt interest requirements of Company 'B' (or the "leverage" factor) provided the equity shareholder with a greater profit than he would have had if the company had no debt at all. However, if a company has such debt, the equity shareholder is, exposed to a greater risk. When a company has a fixed obligation of capital and interest, there is no way to get away from it. In the case of Company 'A', there is no risk as far as any debt obligation is concerned. So "leverage" can work both ways.

### **4. Capital Expenditure**

4.1. *Definition:* A clear understanding of the concept underlying the term "Capital Expenditure" is essential to the proper selection and evaluation of Capital

Projects. Kohler has defined Capital Expenditure in *A Dictionary for Accountants* thus:

"An expenditure intended to benefit future periods, in contrast to revenue expenditure, which benefits a current period is capital expenditure. The term is generally restricted to expenditures, capacity, efficiency, span of life, or economy of operation of an existing fixed asset."

4.2. It must be appreciated that this conventional definition is highly limiting as many relevant expenses of an intangible nature, which are written off to revenue, may, in fact, lock-up large funds for long periods. Joel Dean has considerably broadened this definition, and shifted the emphasis from accounting allocations to rate of turnover of committed funds into cash. But by far the best definition of Capital Expenditure has come from Dr. Helfert of Harvard University. According to him:

"It appears that the answer to determining the nature of capital expenditure lies in the incremental amount of capital committed, regardless of their rate of turnover for a protracted period of time. If the level of capital investment is raised through the execution of a project, the critical question is not the relative turnover nor the classification of the expenditure on the books of account, but the amount of capital that is added to or occupied in the permanent capital reservoir."

4.3. It follows from this definition that funds locked up in working capital due to implementing a capital project are very much a part of the investment cost. It should be appreciated that in a developing economy working capital should receive as much, if not greater, attention than capital expenditure on fixed assets, because incentives in the form of development rebates and liberal depreciation allowances make it possible for a businessman to recover major portions of fixed capital cost within 3 to 5 years from the date of installation of machinery, and other fixed assets. But in the case of working capital, funds are tied up during the life-span of capital assets" and are only released when plant and machinery are scrapped or business terminated.

## **5. Search for Profitable Opportunities**

5.1. Any systematic approach to investment decisions must start with a search for profitable investment opportunities. A planned effort is necessary continuously to explore potential markets for products, review the operating efficiency of existing plants, and the need for modernisation as well as to 'Misestimate the potential competition from new products. Only those projects that show definite promise should be processed further. Developing a cut-off rate or minimum acceptable rate of return would also help in eliminating unprofitable projects. Alternative plans should, however, be prepared so that management has a choice in selecting one to the exclusion of another although they should be presented in such a way that a fair comparison is possible.

## 6. Classification of Projects

6.1. After preliminary screening, projects should be grouped according to their economic characteristics.

6.2. 'Conventional accounting procedures for control of capital items generally classify items according to -the nature of fixed assets, such as land, buildings, machinery, and furniture. This classification is, of course, more useful for taxation and control of physical assets than for economic evaluation purposes.

6.3. Broadly speaking, certain projects are defensive, as their main concern is to maintain the present return on capital employed, while aggressive projects have as their main concern improving the R.O.R. However, this classification being too broad, a more detailed one is necessary, somewhat on the following lines:

<b>Classification</b>	<b>Source of Productivity</b>
1. Replacement Investment	Cost savings.
2. Expansion Investments	Doing more of the same thing.
3. Product Line Investment	Involving new products and improving old ones.
4. Strategic Investments	Comprehensive benefits from more than one source.

6.4. An effort will have to be made to measure not only increased benefits from different productivity sources, but also to integrate all benefits by giving appropriate weight age by various handicap allowances to bring out overall benefits. These weight ages are, necessary to compensate for special risks associated with certain types of projects, and to make it possible to integrate various selected plant for an overall company budget.

## 7. Rate of Return on Capital

7.1. In order to measure the profitability of a project, we must find out what would be the real rate of return on invested capital. Many methods are in 'use in industry, practically all being variations of the pay-back period, internal rate of return or discounted rate of ret. methods.

7.2. The pay-back period method consists of finding the number of years required for earnings on It project to pay back the original outlay with no allowance for capital wastage. Very often it is confused with the R.O.R. concept. For example, if capital 'is recovered in 4 years in the case of Project 'A', as against 5 years in the case Of Project 'B'. The rate of return in the former case is supposed to be 25%, as against 20%, other case of the latter. This is grossly misleading as Project 'B' may have a

longer life than Project 'A'. Again, it may have a rising income in Project 'A'. It should, therefore, be appreciated that the pay-back should not be viewed as the R.O.R. In fact, it indicates no more than the rate of recovery of capital.

7.3. The pay-back period method, however, should occupy a special place in a developing economy like India. Because of the need for generating more real resources in an under-developed economy, projects with a faster pay-back should be preferred to other projects, even if the expected return may be somewhat lower. Moreover, other things being equal, projects with a shorter life may be preferred to investments with a longer life. One obvious advantage from this approach would be greatly to eliminate the risk of obsolescence.

7.4. The second method is the level-book rate of return. In its raw form, the rate of return may be computed, by adding earnings on a project over its entire life, and finding the percentage on investment. It would, however, be realistic if earnings were computed on "after depreciation and tax" basis.

7.5. Management must see that the accuracy of the chosen method is reasonable. The biggest shortcoming is not to take into account the time aspect of earnings and investments. For example, the economic worth of present earnings is greater than that of distant earnings, because the former can be reinvested. Moreover, there is a greater degree of uncertainty involved in distant earnings which may not materialise.

7.6. The most scientific method of measuring the profitability of a project is to use the discounted cash flow rate of return. There are two variations of this method. The first is a discounted rate of return, and the second, the present value computation. The former is computed by reference to appropriate tables to find that the rate of interest which equates the present value of expected capital outlays with the present value of expected cash earnings. It is similar to finding the effective yield to maturity. This rate of return is described as the internal rate of profit or marginal efficiency of capital. The 'present value' approach involves the computation of the present value of expected capital outlays by discounting with the cost of capital. Similarly, the present value of future earnings is discounted with the cost of capital. If the present value of earnings is greater than that of capital outlays, the project is profitable, and should be accepted.

7.7 On the face of it, both methods look similar, and, in fact, the cost of capital is used as a basis of comparison in the first method, and the discounting rate in the second. But formidable problems are involved when it comes to selecting from closely competing mutually exclusive proposals. Ezra Solomon has made a useful study of the basic source of conflict by citing an interesting example:

"Project 'X' requires an outlay of Rs. 100 at time  $t_0$  and promises to return Rs. 120 exactly 1 year hence at time  $t_1$ . Project 'Y' also requires an outlay of Rs. 100 now, and

promises to return Rs. 174.90 exactly 4 years hence at time  $t$ . Assume also that the degree of certainty attaching to each project is identical, and that the investor's present cost of capital is 10%. The discounted rate of return of Project 'X' is 20%, and on 'y' it is 15%. The present value of Project 'X' discounted at the cost of capital is Rs. 109.09. For Project 'y' the present value discounted at the cost of capital is Rs. 119.46."

Thus the 'rate of return' method favors Project 'X', whereas the 'present value' approach favors Project 'Y'. Which of these is better? The logic behind the rate of return approach is that the cash released from Project 'X' could be reinvested at a rate which is at least equal to that yielded by Project 'Y', which in the above example amounts to 15%. The present value approach as usually defined assumes that the funds released from any project can be reinvested at the present cost of capital which in this particular case amounts to 10%. The rate of return concept appears to be optimistic, and, to some extent, speculative, whereas the 'present value' method takes a more conservative view of future conditions. The conflicting results obtained by these two methods can be avoided by making a realistic forecast of reinvestment rates between two terminal points. For example, assuming that the reinvestment rate between terminal points  $t_1$  and  $t$ , is 12%, then the following results will appear:

Terminal value at time  $t$ ,

Project 'Y'	Rs. 174.90
Project 'X'	Rs.168.47

Rate of Return

Project 'Y'	15%
Project 'X'	13.9%

Thus the, superiority of Project 'Y' over 'X' is established by both methods.

7.9 In the light of the present-day economic conditions in India, the following factors are in favour of a discounted rate of return:

7.9.1 In an inflationary economy, money loses its value. Therefore, the replacement cost of assets increases, and, consequently, earning must also increase to provide a fair return on the replacement value of capital employed.

7.9.2 The corporate tax level has 'leached the saturation point, and any relaxation in this area would improve the "after tax return" on capital employed.

7.9.3. The cost of capital is determined by interest rates and earnings on equity, both of which show signs of increase.

## 8. Measurement of Return on Investment

8.1 The relative merits of the various methods of appraising capital expenditure may not be relevant here. It is generally agreed that the sole merit of "pay-back" is as a measure of "protection of capital", and not one of profitability. As such it

is a useful device in project appraisal For measurement of profitability, return on investment is essential. In the case of companies which are primarily geared to decisions on different projects of diversified nature, the discounted cash flow method is used which shows what the return on the project would be on the same system as that used to measure the cost of capital. This enables spread to be seen clearly between the return by luring the money for capital expenditure compared with the price paid for the money in terms 'of interest on debt and dividends on equity.

## **9. Measuring Cost of Capital**

9.1. Whereas the superiority of -the discounted cash flow method is generally recognised, this cannot be said about the different methods of computing the cost of capital. It is important to examine the nature of the problem, to recognise the different approaches to it, and to select the most practical method in the context of India's developing economy.

9.2. The cost of capital is the rate that the company has to pay for in using capital to finance a project. The project cost can be met by different sources of finance, and the cost of each source can be different. For example:

9.2.1. Internal Company Funds such as retained earnings and depreciation funds.

9.2.2. Issue of Share Capital.

9.2.3. Bank loans or Debenture Bonds.

9.3 It is sometimes argued, that internal funds do not have any cost, as no interest is payable. This argument is invalid as funds could be invested either in new capital projects in the company, or in outside investments. In a developing economy, we can assume that opportunities exist for companies to expand, and, therefore, internal funds should be grouped with equity funds to provide one block of equity funds. The problem is reduced, therefore, to finding the cost of equity and debt capital.

9.4. Many methods are used in computing the cost of equity stocks, one being to accept all projects that offer the rate of return currently being earned on corporate capital. Another is to accept a project if the rate of return it promises is higher than the present ratio of dividend payments to the market price of existing shares. Yet a third method is to accept a project if it offers a rate of return which is higher than the present market value 'per share. One objection that can be raised against all these approaches is that they ignore the dynamic, nature of the business world. Future earnings will fluctuate as will the market price of shares. Shareholders take into consideration many intangible factors, like the future growth capacity of a company, and the future of industry, and the country's economy in general It is, therefore, appropriate to be guided by future earnings in taking an investment decision.

9.5 Let us now assume that part of a project is financed by equity, and the rest by debt. How does one measure the cost of capital? The capital structure of a company is largely determined by management policies, which, in turn, determine "the overall equity and debt relationship. The capital structure of companies are by no means static; the post-war trend in the U.S.A. reveals that the proportion of outside debt has substantially increased, thus leading to rapid industrial expansion~ For example, the net assets in the chemical and electrical manufacturing industries increased by 150 % and 200 % respectively from 1950 to 1960 largely due to greater reliance on loan finance. A trend in this direction has also been, noticeable in: India in recent years.

9.6. A practical way to compute the cost of capital is to determine an ideal capitals structure which a company would like to achieve, in, says years, and then find the weighted average cost of capital. For example, assuming that a company wants to maintain a relationship of 60 % equity and 40% debt, the interest rate is 9% and expected earnings per share market price per share is 15%, and then the weighted average cost of capital would be 12.6%.

9.7. This approach really falls somewhere between two other extreme approaches known as Net Operating Income and Net Income methods. The former consists of considering only the cost of equity capital, while ignoring the advantages that arise out of meeting part of the project cost by loan finance. The supporters of, this method assume that the total risk incurred by all the shareholders of a company is not altered by the capitalisation policy of the company. Part of the increased risk on account of loan finance is assumed by lenders, and the rest by shareholders. Any differential profits arising out of different capitalisation policies should, therefore, be ignored in judging the profitability of projects. On' the other hand, supporters of the Net Income approach take into consideration all the advantages that arise out of borrowed capital in financing projects. For example, if a capital expansion programme can be met by raising 60% of the cost by borrowing, and 40% by the issue of share capital, this relationship would help in determining the relevant cost of capital, the argument being that by raising part of the required finance by loans, the risk element does not necessarily increase. Moreover, the tax advantages favoring borrowed money cannot be ignored. It is definitely a more aggressive and dynamic approach.

9.8. These methods have their strong and weak points, but in the light or the Indian .conditions the Net Income approach is favored for the following reasons:

9.8.1. The corporate taxation level being what it is, a sizable portion of debt finance has become inevitable in all new projects.

9.8.2. It is virtually impossible to raise capital in the present depressed capital market. Thus success of share issues depends largely on the support of financial institutions.

9.8.3. With incentives available in the form of development rebates, liberal depreciation allowances, etc., cash generation tends to be large in the earlier years, enabling companies quickly to payoff large portions of debts.

9.8.4. In a controlled economy, like India, where supply generally falls short of demand, the risk of business failure is not great.