3 Project Financial Appraisal

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Learning objectives

By the time you have completed this chapter you should be able to:

- ☐ Understand the basic financial concepts in the context of project management
- ☐ Discuss project selection methods using discounted cash flow approach
- ☐ Apply relevant financial concepts to the project appraisal process
- ☐ Appreciate the impact of taxation on project financial appraisal
- ☐ Discuss the impact of inflation on project financial appraisal

3.1 Introduction

In general, project managers have to face the challenging task of selecting from within a number of investment options. This requires ample knowledge about the basic concepts of project financial appraisal and investment decisions. This chapter will present and discuss the most commonly used project financial appraisal tools and techniques that project managers need to know. Indeed, in big projects, specialized financial managers under the leadership of the project managers, take responsibility for two basic decisions: investment and the financial decision. Generally speaking, the investment decision is which real assets to invest in, while the financing decision is related to how these should be financed. To achieve the firm's goal or to maximize shareholders' wealth, the top managers, especially the financial managers, play crucial roles in making both decisions.

'Investment decision' = Purchase of real assets
'Financing decision' = Sale of financial assets (Brealey *et al*. 2011: 31)

The investment decisions are also referred to as 'capital budgeting' or 'capital expenditure' decisions because most firms prepare budgets for their future projects. The two primary goals of this chapter are to describe how to deal with rates of return and how to make an 'Accept' or 'Reject' decision on investment projects.

> *"To understand the use and application of most project evaluation methods, knowledge of basic engineering economics concepts such as equivalence, time value of money (TVM), cash-flow diagrams, and economic evaluation factors is required"*
>
> (Remer and Nieto 1995, p. 80).

Figure 3.1 show economic valuation 10-step for project appraisal proposed by Remer and Nieto (1995).

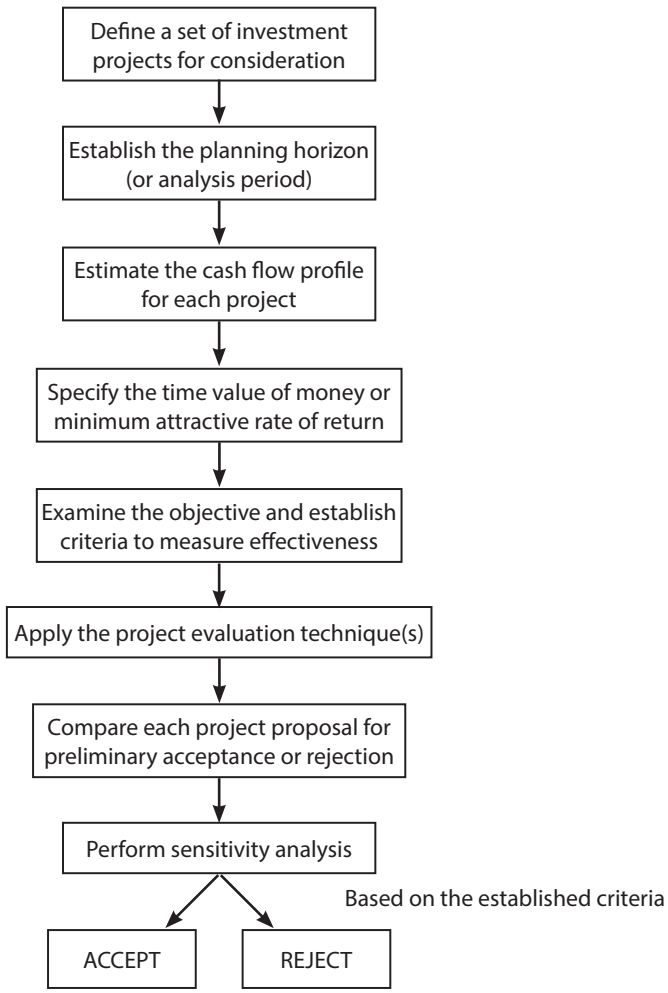

Figure 3.1: Economic evaluation steps (Remer and Nieto, 1995)

In the first section of Chapter 3, we assume that there are no taxes, no transaction costs, no disagreements, and no limits as to the number of buyers and sellers in the market. This is the so-called 'perfect market'. In Section 3.2, we start from the concept of the time value of money and the rate of return. Next, we explain a number of methods for project appraisal such as payback period, discount payback period, average rate of return, net present value, the internal rate of return and the modified internal rate of return. After studying this chapter, you should have an understanding of the techniques to use to arrive at the best investment decision when investment capital is rationed. This chapter will also help the reader understand the advantages and disadvantages of capital budgeting methods, as well as which to use in various situations.

3.2 Time value of money (TVM)

We start from the principle of the 'Time value of money'.

"£1 today is worth more than £1 tomorrow."

Future value and present value calculations rely on the concept of the time value of money. This section introduces the important concepts of future value, compound rate and present value. *Typical questions*: *if you gain* 10% *per year, how much will you earn over 5 years? If you earn 100% over 5 years, how much will you gain in each year?*

■ Compound interest versus simple interest

Before we calculate future value and present value, first of all, we should know the two basic types of interest: compound and simple interest. The first one occurs when the interest paid on the investment during the first period is added to the principal and in the following period interest is paid on the new principal. This is contrast with simple interest where the principal is constant throughout the period of investment. To explain the difference between simple and compound interest, we show an example as follows:

Example: Suppose an annual return rate of 10%, and the principal in a bank account is initially £50. After three years the balance on the account would be:

For simple interest: $[£50 + (3 \times 0.10 \times 50)] = £50 + £5 + £5 + £5 = £65$

For compound interest: $[£50 \times (1.10)^3] = £50 + £5 + £5.50 + £6.05 = £66.55$

The difference between simple and compound interest is the interest gained on interests. This difference increases over time with the interest rate and in the number of sub-periods with interest payments. Using the previous example, if