

## Chapter 5 Net Present Value and Other Investment Criteria

### OVERVIEW

- This chapter reviewed the NPV rule for capital budgeting.
- The NPV rule's competitors—the book rate of return, the payback period and the internal rate of return (IRR)—were discussed. These methods have a number of shortcomings and therefore NPV comes out on top.
- It was shown that NPV is the most appropriate method, so long as the objective is to maximise value. Discounted payback and modified IRR methods were discussed briefly.
- The chapter ended with a discussion of capital rationing and profitability index (PI).

### LEARNING OBJECTIVES

After studying this chapter, you should have understood:

- the NPV method;
- the payback period, book rate of return and internal rate of return (IRR) methods;
- the advantages and disadvantages of the above-mentioned methods and compare them to the NPV method; and
- capital rationing.

### POINTS EMPHASISED IN THE LECTURE

#### A review of the basics

The instructor restated the reasons why capital projects should be judged by their NPVs, and emphasised that the discount rate should be the investor's opportunity cost of capital. This chapter also introduces the competitors to the NPV method namely; the payback period, book rate of return and the internal rate of return. It emphasizes the importance of the value adding-up property of the NPV.

#### Payback period

This describes the payback and discounted payback rules. These rules ignore cash flows that occur after payback. Also, the cutoff period is usually chosen arbitrarily. Discounted payback method is also discussed briefly.

#### Internal (or Discounted-Cash-Flow) Rate of Return

The internal rate of return (IRR) rule can give the correct accept-reject signal if used carefully. However, there are a number of possible pitfalls:

- Not all cash-flow streams have NPVs that decline as the discount rate increases.
- A project may have multiple IRRs.

- IRR often gives incorrect rankings for mutually exclusive projects, particularly if the projects differ in scale (amount of initial investment required) or economic life.

The IRR, because it is a single number, cannot be applied where the situation calls for more than one opportunity cost of capital. You may need to use more than one opportunity cost of capital if the term structure is strongly upward sloping or downward sloping (i.e., spot rates for discounting cash flows at different time points are significantly varying). The comparison becomes difficult as the IRR can be thought of as a complex weighted average of the opportunity cost of capitals. The modified internal rate of return method is also discussed briefly.

### **Choosing capital investments when resources are limited**

Simple capital rationing problems can be solved by trial and error or by ranking projects using profitability index. This chapter also distinguishes between “soft” and “hard” rationing and discusses whether value maximisation remains the appropriate objective if hard rationing is encountered.