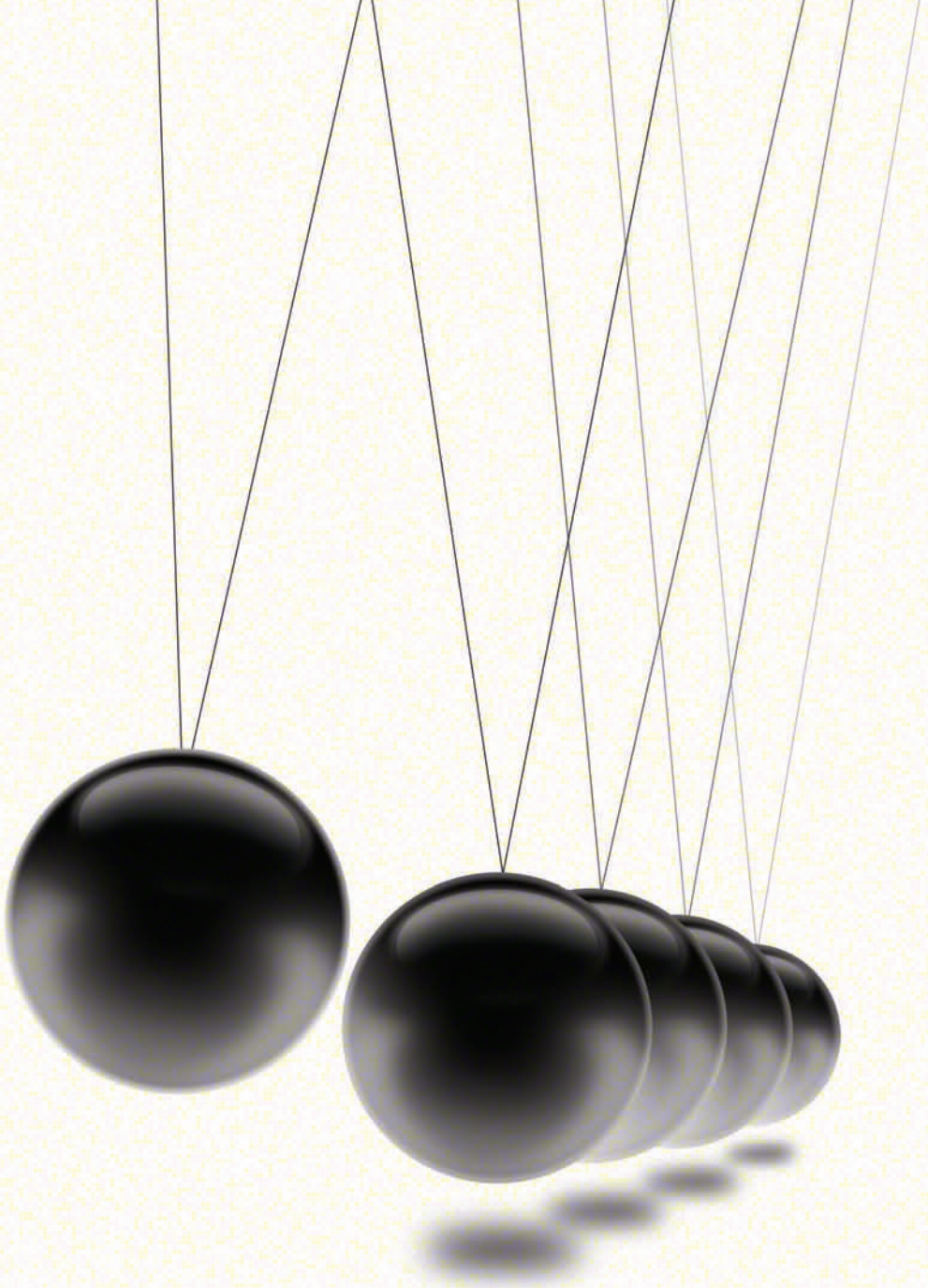

ADVANCED FINANCIAL DECISION MAKING

DIGITAL EDITION

HERIOT WATT UNIVERSITY | EDINBURGH BUSINESS SCHOOL

Pearson

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Advanced Financial Decision Making

8 Insert the missing values in the following table:

	P_0	D_0	D_1	g	b	R	k_e
(i)	£8.44	£0.35	?	8.5%	0.5	17%	13.0%
(ii)	£4.98	£0.20	£0.219	?	0.6	16%	14.0%
(iii)	?	£0.10	£0.108	8.0%	0.4	20%	15.0%
(iv)	£2.75	?	£0.220	10.0%	0.5	20%	18.0%
(v)	£10.20	£0.60	£0.610	2.0%	?	10%	8.0%
(vi)	£0.60	£0.05	£0.054	8.0%	0.8	20%	?
(vii)	£1.47	£0.12	£0.133	10.5%	0.7	?	19.5%

Note: answers may have some minor rounding errors.

9 Leyburn plc currently generates profits before tax of £10 million, and proposes to pay a dividend of £4 million out of cash holdings to its shareholders. The rate of Corporation Tax is 30 per cent. Recent dividend growth has averaged 8 per cent p.a. It is considering retaining an extra £1 million in order to finance new strategic investment. This switch in dividend policy will be permanent, as management believe that there will be a stream of highly attractive investments available over the next few years, all offering returns of around 20 per cent after tax. Leyburn's shares are currently valued 'cum-dividend'. Shareholders require a return of 14 per cent. Leyburn is wholly equity-financed.

Required

(a) Value the equity of Leyburn assuming no change in retention policy.

(b) What is the impact on the value of equity of adopting the higher level of retentions? (Assume the new payout ratio will persist into the future.)

Practical assignment

List three decisions in a business with which you are familiar where cash flows arise over a lengthy time period and where discounted cash flow (DCF) may be beneficial. To what extent is DCF applied (formally or intuitively)? What are the dangers of ignoring the time-value of money in these particular cases?

Investment appraisal methods

Portrait of a frontier investor

No sooner had US investor Gabriel Schulze moved to China to gain a foothold in the world's most promising untapped markets eight years ago than he realised he was already behind. 'I moved to China thinking I'm on the frontier, I'm ahead of the curve, and of course as I lunched in China where are all the Chinese going? They're going to Africa.'

Mr Schulze, fifth generation of a billionaire mining family, quickly followed them to Ethiopia. 'People told me I'm nuts . . . [but] if you were looking for a place that wasn't fully appreciated yet Ethiopia won hands down,' he says.

Mr Schulze is at the cutting edge of frontier investment, whose promise of reward for risk-taking is attracting increasing interest and delivering returns against the grain. He diverges from the prevailing trend of big funds that spread emerging market risk through regional diversification and controlling stakes. Instead he favours single-country funds and minority stakes. So far he says he has exited more than a dozen deals with internal rates of return in excess of 30 per cent.

But even North Korea may not be the final frontier. At a recent board meeting, Mr Schulze and his father discussed the potential for opportunities in outer space. 'The boundaries of frontier investment will keep moving,' he smiles. 'Some day in the decades to come we'll be looking for first-mover advantage on Mars.'

Learning objectives

Having read this chapter, you should have a good grasp of the investment appraisal techniques commonly employed in business, and have developed skills in applying them. Particular attention will be devoted to the following:

- The net present value approach and why it is consistent with shareholder goals.
- The three discounted cash flow approaches – net present value, internal rate of return and profitability index.
- The underlying strengths and limitations of the above methods.
- How net present value and internal rate of return methods can be reconciled when they conflict.
- Non-discounting methods.
- Analysing investments when capital availability is an important constraint.

6.10 INTRODUCTION

Every day managers and investors, like Gabriel Schulze in the introductory cameo, make long-term investment decisions. How do they go about this? A major US company explains how it employs the net present value (NPV) approach in assessing capital projects:

> We measure all potential projects by their cash flow merit. We then discount projected cash flows back to present value in order to compare the initial investment cost with a project's future returns to determine if it will add incremental value after compensating for a given level of risk.

There are, however, a number of alternative techniques to the NPV method. The aim of this chapter is to present the main methods of investment appraisal and to consider their strengths and limitations. In this chapter, we consider their practical application in businesses, large and small.

6.11 CASH-FLOW ANALYSIS

The investment decision is the decision to commit the firm's financial and other resources to a particular course of action. Confusingly, the same term is often applied to both real investment, such as buildings and equipment, and financial investment, such as investment in shares and other securities. While the principles underlying investment analysis are basically the same for both types of investment, it is helpful for us to concentrate here on the former category, usually referred to as capital investment. Our particular emphasis on strategic capital projects concentrates on the allocation of a firm's long-term capital resources.

Self-assessment activity 6.7

Investment projects do not only include investment in plant and equipment or buildings. Think of some other types of capital projects.

Cash flow matters more than profit

Managers in business usually pursue profit-related goals. It might, therefore, be assumed that capital project appraisal should seek to assess whether the investment is expected to be 'profitable'. Indeed, many firms do use such an approach.

There are, however, many problems with the profit measure for assessing future investment performance. Profit is based on accounting concepts of income and expenses relating to a particular accounting period, based on the *matching principle*. This means that income receivable and expenses payable, but not yet received or paid, along with depreciation charges, form part of the profit calculation.

Consider the case of the Oval Furniture Company, with expected annual sales from its new factory of £400,000 and profits of £60,000. In order to stimulate demand, customers are offered two years' credit. While this decision has no impact on the reported profit, it certainly affects the cash position – no cash flow being received for two years. Cash-flow analysis considers all the cash inflows and outflows resulting from the investment decision. Non-cash flows, such as depreciation charges and other accounting policy adjustments, are not relevant to the decision. We seek to estimate the stream of cash flows arising from a particular course of action and their timing.

Timing of cash flows

Project cash flows will usually arrive throughout the year. For example, if we acquire a machine with a four-year life on 1 January 2018, the subsequent cash flows related to it may involve the monthly payment purchases and expenses and daily receipt of cash from customers throughout each year. Strictly speaking, these cash flows should be identified on a monthly, even daily, basis and discounted using appropriate discount factors.

In practice, to facilitate the use of annual discount tables, cash flows arising during the year are treated as occurring at the year end. Thus, while the initial outlay is assumed to occur at the start of the project (frequently termed Year 0), subsequent cash flows are deemed to arrive later than they actually arise. This has the effect of producing an NPV slightly lower than the true NPV, assuming that subsequent cash flows are positive.

Decision-making can be viewed as an *incremental* activity. Businesses generally operate as going concerns with fairly clear strategies and well-established management processes. Decisions are part of a sequence of actions seeking to move the organisation from its current to its intended position. The same idea is apparent in analysing projects – the decision-maker must assess how the business changes as a direct result of selecting the project. Every project can be either accepted or rejected, and it is the difference between these two alternatives in any time period, t, expressed in cash flow terms (CF_t), that is taken into the appraisal.

Definition of capital budgeting

Capital budgeting (also known as investment appraisal) is the process by which a company determines whether projects (such as investing in R&D, opening a new branch, replacing a machine) are worth pursuing. A project is worth pursuing if it increases the value of the company.

A project typically adds value to the company if it earns a rate of return that exceeds the cost of capital. The opportunity cost of capital (also known as the hurdle rate) is the expected return that is forgone by investing in the project rather than in comparable financial securities, such as shares, with the same risk as the project under consideration.

While capital budgeting is a fairly straightforward process from a conceptual viewpoint, it can be very challenging in practice. Not only is it difficult to determine the group's appropriate cost of capital, it is often even trickier to accurately forecast the incremental cash flows that result from taking on the project.

Incremental analysis

Project CF_t = CF_t for firm *with* project − CF_t for firm *without* project.

6.12 NET PRESENT VALUE

We have assumed that the paramount objective of the firm is to create as much wealth as possible for its owners through the efficient use of existing and future resources. To create wealth, the present value of all future cash inflows must exceed the present value of all anticipated cash outflows. Quite simply, *an investment with a positive net present value increases the owners' wealth*. The elements of investment appraisal are shown in Figure 6.4.

Most decisions involve both costs and benefits. Usually, the initial expenditure incurred on an investment undertaken is clear-cut: it is what we pay for it. This includes the cash paid to the supplier of the asset plus any other costs involved in making the project operational. The problems start in measuring the worth of the

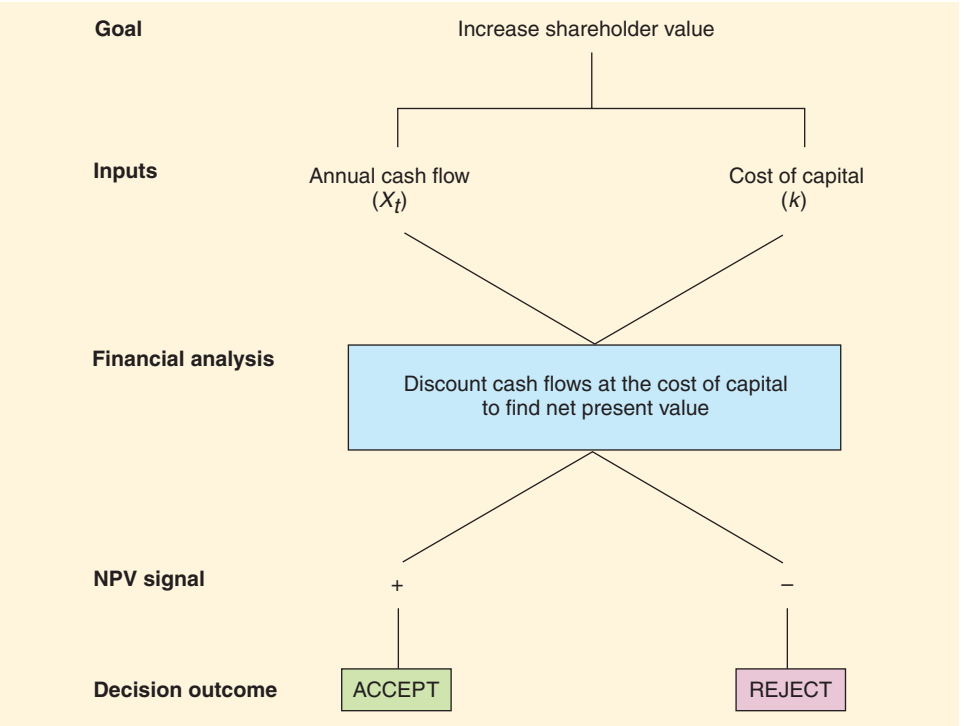

Figure 6.4 Investment appraisal elements

investment project. What an asset is worth may have little to do with what it cost or what value is placed on it in the firm's statement of financial position or balance sheet. A machine standing in the firm's books at £20,000 may be worth far more if it is essential to the manufacture of a highly profitable product, or far less than this if rendered obsolete through the advent of new technology. To measure its worth, we need to consider the *value of the current and future benefits less costs* arising from the investment. Wherever possible, these benefits should be expressed in terms of *cash flows*. Sometimes (as will be discussed later) it is impossible to quantify benefits so conveniently. Typically, investment decisions involve an initial capital expenditure followed by a stream of cash receipts and disbursements in subsequent periods. The net present value (NPV) method is applied to evaluate the desirability of investment opportunities. NPV is defined as:

$$\text{NPV} = \frac{X_1}{(1+k)} + \frac{X_2}{(1+k)^2} + \frac{X_3}{(1+k)^3} + \cdots + \frac{X_n}{(1+k)^n} - I$$

which may be summarised as:

$$\text{NPV} = \sum_{t=1}^{n} \frac{X_t}{(1+k)^t} - I$$

where X_t is the net cash flow arising at the end of Year t, I is the initial cost of the investment, n is the project's life and k is the minimum required rate of return on the investment (or discount rate). (The Greek letter Σ, or sigma, denotes the sum of all values in a particular series.)

A project's net present value (NPV) is determined by summing the net annual cash flows, discounted at a rate that reflects the cost of an investment of equivalent risk on the capital market, and deducting the initial outlay.