Investment and Project Appraisal
1 What the Course is About

Welcome to the course Investment and Project Appraisal. This course is concerned with the methodologies used in the selection and appraisal of investment decisions in both the private and the public sectors. This first section will detail the techniques and issues that you will study within the eight units of the course.

The need for these techniques and methodologies arises from the importance of investment in allocating productive resources over time and between different sectors and activities in the economy.

- Should a new runway to serve South East England be situated at London’s Heathrow or Stansted airport?
- Should South Africa build more urban motorways, or improve its rural road networks?
- How quickly should retailers install systems to process payments by credit cards using chip technology and PIN numbers rather than customer signatures?

These are typical of some of the questions that might confront investment and project analysts. To tackle these, you need the ability to choose the right investment packages(s), and to discriminate between them on the basis of appropriate criteria. Sound selection and screening are certain to make a critical impact on the outcome of an investment.

Course themes

The first theme this course addresses is:

- What is needed from the micro, corporate sector, point of view in order to analyse, assess and gauge investment activities?

These issues are mainly covered in Units 2 and 3, which have an explicit private sector perspective on investment evaluation. These units introduce and illustrate with practical examples the application of various financial techniques for investigating the soundness of private investments.

The second grand theme is:

- How can we apply cost-benefit analysis to public sector investment projects?

This takes us through the cost-benefit literature principally developed in connection with public sector investment in the developed countries (namely, waterworks and irrigation, transport and communication, health and education, social services, etc). However, subsequent developments in the cost-benefit literature were associated with the growth and popularity of development projects in less developed countries (LDCs). The latter part of the course, therefore, explicitly addresses those issues (in the context of discussions of shadow pricing, environmental projects and other such examples). In all cases, to enrich the discussion of analytical methods and theoretical issues, a liberal package of case studies is provided in order to illustrate useful real-world applications.
2 Aims of the Course

This course aims at introducing you to the main theoretical and practical issues involved in the appraisal and assessment of investment projects. Private sector investment initiatives have to be assessed against the widely adopted and prevalent objective of maximising shareholders’ wealth (i.e. the value of the enterprise). Public sector projects, including development projects funded and assisted by donors and international development agencies, tend to have wider society- or economy-wide objectives and have to be appraised in terms of their net contribution to the economy as a whole.

Despite this apparent incoherence in objectives, there is much value in a comparative study of the analytical methods used in either private or public sector investment appraisal. Further, where private sector companies are selected to implement projects on behalf of governments they will be answerable both to shareholders and also to government departments or agencies responsible for sectors in which wider social objectives are of great concern. This course deals with investment appraisal methods in both sectors.

The structure of the course

The course units cover the following issues:

- **Unit 1** provides an overview of investment and investment activities, and differentiates private and public sector investments and projects.
- **Unit 2** deals with basic evaluation techniques covering traditional and time-value methods of investment appraisal.
- **Unit 3** extends the discussion of discounted cash flow analysis in Unit 2 by introducing capital rationing, risk and uncertainty, inflation and depreciation.
- **Unit 4** is a bridge unit between the first and second parts of the course. It introduces and illustrates the basic tenets of cost-benefit analysis and focuses on the identification of costs and benefits and their valuation.
- **Unit 5** is concerned with valuation of costs and benefits in the context of shadow pricing – that is, the use of world prices as benchmarks for efficiency prices or trade opportunity costs.
- **Unit 6** covers issues and problems associated with discounting.
- **Unit 7** focuses on the challenge of accounting for the environment in project appraisal, and on practical methods used for valuing environmental concerns.
- **Unit 8** deals with the question of income distribution (welfare weights) and extends the discussion of risk and uncertainty. To give you an opportunity to draw together what you have learned in the course as a whole, the unit ends with a useful overall case study of social and economic cost-benefit analysis.
3 An Overview of the Course

Unit 1 Introduction and Overview
1.1 Investment – an Overview
1.2 Investment Appraisal – Nature and Scope
1.3 Investment Appraisal and Financial Decision Making
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Unit 6 Discount Rate, Risk and Uncertainty in Cost Benefit Analysis
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8.6 Two Case Studies  
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4  The Course Authors  

Hassan Hakimian is currently working at the City University in London, after several years as Senior Lecturer in Economics at SOAS. He has co-written several courses for CeFiMS, and has also written and taught at Wye College, where he was centrally involved in their distance learning programme. Dr Hakimian has written widely on economic development and economic reform, with an emphasis on Iran and the Middle East. His books include Labour Transfer and Economic Development and The State and Global Change: The Political Economy of Transition in the Middle East and North Africa, both co-edited with Z. Moshaver.  

Erhun Kula was born in Constantinople and did his first degree in economics at Marmara University in the same city. His MSc is from the University of Wales and PhD from University of Leicester. His teaching interests include introduction to economics, microeconomics, investment and project appraisal, environmental and resource economics, business economics and public sector economics. 

Dr Kula has published seven books and numerous journal articles in these fields. He has taught at the University of Wales, University of Ulster, University of London, University of New Mexico USA, University of Bosphorus.
and University of Mumbai, and is currently Adviser to ESRC on the creation of genomic research centres in the UK.

Sonja Ruehl, who is the Academic Editor of this course, is Fellow in Financial and Management Studies; and Deputy Director, CeFiMS.

5 Study Materials

To support your studies on this course, you are provided with the following.

The Course Units

As always, this text guide is specially prepared to help you navigate through your other study material, and also to help you understand difficult concepts and issues in the course. You may think of it as equivalent to the University’s course lectures.

📚 Course Textbooks

There are five of these.

The first is by Steve Lumby and Chris Jones: Corporate Finance: Theory & Practice, and you will be reading the eighth edition, which was published in 2011. As the title suggests, this is mainly concerned with the financial analysis and appraisal of private sector investments. This will be your main textbook for the first three units of the course.


David Potts (2002) Project Planning and Analysis for Development, a particularly useful account of techniques and, as its title promises, the book deals mainly with projects for developing economies, although much of it is also relevant to transitional and developed economies. You will be reading this and the following two textbooks from Unit 4 onwards.

Pedro Belli, Jock Anderson, Howard Barnum, John Dixon and Jee-Peng Tan (2001) Economic Analysis of Investment Operations: these authors present a wide variety of real life examples of projects and their development; its subtitle ‘Analytical Tools and Practical Applications’ describes its content well.

Richard Layard and Stephen Glaister, Cost-Benefit Analysis, is a collection of papers from various scholars covering the main problems encountered in a cost-benefit undertaking; it was published (in its second edition) in 1994.

Reader Articles

To complement the reading material for the course, a carefully selected collection of readings from journals and books is also enclosed as a separate volume. As with the textbooks, you are prompted by the book symbols and introductory text to turn to the required readings from this volume, the ‘Course Reader’.
6 Teaching and Learning Strategy

This course combines specific analytical issues and models with relevant applied, or ‘how to’, skills. Sometimes key concepts are introduced through readings or from one of the set texts; on other occasions this is done through the unit text. The units set in-text questions or activities to build your learning of analytical frameworks and concepts and help you apply them to your own experience.

Throughout, when we ask you to apply a diagnostic approach or idea to your own organisation or experience, you may also do so in relation to another organisation with which you are familiar, preferably in the public sector.

7 Assessment

Your performance on each course is assessed through two written assignments and one examination. The assignments are written after week four and eight of the course session and the examination is written at a local examination centre in October.

The assignment questions contain fairly detailed guidance about what is required. All assignment answers are limited to 2,500 words and are marked using marking guidelines. When you receive your grade it is accompanied by comments on your paper, including advice about how you might improve, and any clarifications about matters you may not have understood. These comments are designed to help you master the subject and to improve your skills as you progress through your programme.

The written examinations are ‘unseen’ (you will only see the paper in the exam centre) and written by hand, over a three hour period. We advise that you practice writing exams in these conditions as part of your examination preparation, as it is not something you would normally do.

You are not allowed to take in books or notes to the exam room. This means that you need to revise thoroughly in preparation for each exam. This is especially important if you have completed the course in the early part of the year, or in a previous year.

Preparing for Assignments and Exams

There is good advice on preparing for assignments and exams and writing them in Sections 8.2 and 8.3 of Studying at a Distance by Talbot. We recommend that you follow this advice.

The examinations you will sit are designed to evaluate your knowledge and skills in the subjects you have studied: they are not designed to trick you. If you have studied the course thoroughly, you will pass the exam.

Understanding assessment questions

Examination and assignment questions are set to test different knowledge and skills. Sometimes a question will contain more than one part, each part testing a different aspect of your skills and knowledge. You need to spot the key words to know what is being asked of you. Here we categorise the types
of things that are asked for in assignments and exams, and the words used. All the examples are from CeFiMS examination papers and assignment questions.

**Definitions**
Some questions mainly require you to show that you have learned some concepts, by setting out their precise meaning. Such questions are likely to be preliminary and be supplemented by more analytical questions. Generally 'Pass marks' are awarded if the answer only contains definitions. They will contain words such as:

- Describe
- Define
- Examine
- Distinguish between
- Compare
- Contrast
- Write notes on
- Outline
- What is meant by
- List

**Reasoning**
Other questions are designed to test your reasoning, by explaining cause and effect. Convincing explanations generally carry additional marks to basic definitions. They will include words such as:

- Interpret
- Explain
- What conditions influence
- What are the consequences of
- What are the implications of

**Judgment**
Others ask you to make a judgment, perhaps of a policy or of a course of action. They will include words like:

- Evaluate
- Critically examine
- Assess
- Do you agree that
- To what extent does

**Calculation**
Sometimes, you are asked to make a calculation, using a specified technique, where the question begins:

- Use indifference curve analysis to
- Using any economic model you know
- Calculate the standard deviation
- Test whether

It is most likely that questions that ask you to make a calculation will also ask for an application of the result, or an interpretation.
Advice
Other questions ask you to provide advice in a particular situation. This applies to law questions and to policy papers where advice is asked in relation to a policy problem. Your advice should be based on relevant law, principles, evidence of what actions are likely to be effective.

- Advise
- Provide advice on
- Explain how you would advise

Critique
In many cases the question will include the word ‘critically’. This means that you are expected to look at the question from at least two points of view, offering a critique of each view and your judgment. You are expected to be critical of what you have read.

The questions may begin
- Critically analyse
- Critically consider
- Critically assess
- Critically discuss the argument that

Examine by argument
Questions that begin with ‘discuss’ are similar – they ask you to examine by argument, to debate and give reasons for and against a variety of options, for example

- Discuss the advantages and disadvantages of
- Discuss this statement
- Discuss the view that
- Discuss the arguments and debates concerning

The grading scheme
Details of the general definitions of what is expected in order to obtain a particular grade are shown below. Remember: examiners will take account of the fact that examination conditions are less conducive to polished work than the conditions in which you write your assignments. These criteria are used in grading all assignments and examinations. Note that as the criteria of each grade rises, it accumulates the elements of the grade below. Assignments awarded better marks will therefore have become comprehensive in both their depth of core skills and advanced skills.

70% and above: Distinction As for the (60-69%) below plus:
- shows clear evidence of wide and relevant reading and an engagement with the conceptual issues
- develops a sophisticated and intelligent argument
- shows a rigorous use and a sophisticated understanding of relevant source materials, balancing appropriately between factual detail and key theoretical issues. Materials are evaluated directly and their assumptions and arguments challenged and/or appraised
- shows original thinking and a willingness to take risks
60-69%: Merit As for the (50-59%) below plus:
- shows strong evidence of critical insight and critical thinking
- shows a detailed understanding of the major factual and/or theoretical issues and directly engages with the relevant literature on the topic
- develops a focussed and clear argument and articulates clearly and convincingly a sustained train of logical thought
- shows clear evidence of planning and appropriate choice of sources and methodology

50-59%: Pass below Merit (50% = pass mark)
- shows a reasonable understanding of the major factual and/or theoretical issues involved
- shows evidence of planning and selection from appropriate sources,
- demonstrates some knowledge of the literature
- the text shows, in places, examples of a clear train of thought or argument
- the text is introduced and concludes appropriately

45-49%: Marginal Failure
- shows some awareness and understanding of the factual or theoretical issues, but with little development
- misunderstandings are evident
- shows some evidence of planning, although irrelevant/unrelated material or arguments are included

0-44%: Clear Failure
- fails to answer the question or to develop an argument that relates to the question set
- does not engage with the relevant literature or demonstrate a knowledge of the key issues
- contains clear conceptual or factual errors or misunderstandings

[approved by Faculty Learning and Teaching Committee November 2006]

Specimen exam papers
Your final examination will be very similar to the Specimen Exam Paper that you received in your course materials. It will have the same structure and style and the range of question will be comparable.

CeFiMS does not provide past papers or model answers to papers. Our courses are continuously updated and past papers will not be a reliable guide to current and future examinations. The specimen exam paper is designed to be relevant to reflect the exam that will be set on the current edition of the course.

Further information
The OSC will have documentation and information on each year’s examination registration and administration process. If you still have questions, both academics and administrators are available to answer queries.
The Regulations are available at www.cefims.ac.uk/regulations.shtml, setting out the rules by which exams are governed.
This is a specimen examination paper designed to show you the type of examination you will have at the end of the year for Investment & Project Appraisal. The number of questions and the structure of the examination will be the same but the wording and the requirements of each question will be different. Best wishes for success in your final examination.

The examination must be completed in THREE hours. Answer THREE questions, at least ONE from EACH section.

The examiners give equal weight to each question; therefore, you are advised to distribute your time approximately equally between three questions. The examiners wish to see evidence of your ability to use technical models and of your ability to critically discuss their mechanisms and application.

PLEASE DO NOT REMOVE THIS PAPER FROM THE EXAMINATION ROOM. IT MUST BE ATTACHED TO YOUR ANSWER BOOK AT THE END OF THE EXAMINATION.
Answer THREE questions, at least ONE from each section.

SECTION A
(Answer at least ONE question from this section)

1. Compare and contrast financial and economic analysis of investment projects. Give examples, where necessary.

2. Justify the case for project analysis and appraisal as part of the wider framework of project planning and management.

3. In what sense (if any) is the treatment of risk and uncertainty in private and public sector investment projects likely to be different? Discuss, giving examples where necessary.

4. ‘It is meaningless to try and put value on such intangibles as human life.’ Critically discuss this statement.

SECTION B
(Answer at least ONE question from this section)

5. Discuss the theoretical basis for determining a social rate of discount in investment appraisal, and use this as a framework to assess the current approach in the UK Treasury’s ‘Green Book’ (2003).

6. Consider the rationale for, and problems involved in, applying welfare weights in public sector investment projects.

7. ‘The impact of global liberalisation has reduced the necessity for shadow price techniques in project appraisal.’ Critically discuss this assertion.

8. Compare and contrast any two methods used for evaluating environmental attributes of investment projects.

[END OF EXAMINATION]
# Investment and Project Appraisal

## Unit 1 Introduction and Overview

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**Unit Content**

This first unit introduces you to the issues you will study in the course *Investment and Project Appraisal*. It provides an overview of investment and investment activities; it differentiates private and public sector investments and projects; and it gives an outline of the evolution over time of the subject of investment and project appraisal. The final sections focus on project stages and issues in developing countries, and on the relationship of public and private sector appraisal.

**What you will learn**

When you have completed this unit and its associated readings, you will be able to

- analyse the meaning and significance of ‘investment’ and ‘investment appraisal’
- explain how to locate investment activities in the wider context of an enterprise’s financial decision making
- outline the meaning and usage of ‘cost-benefit analysis’
- describe how cost-benefit analysis has evolved over time
- discuss the meaning and significance of ‘project’ and ‘project appraisal’
- explain the meaning of ‘project cycle’ and different aspects of project analysis.

📖 **Readings for Unit 1**

**Textbooks**

Steve Lumby and Chris Jones (2011) *Corporate Finance: Theory & Practice*, Chapters 1 and 2


**Course Reader**


1.1 Investment – an Overview

The concept of ‘investment’ is almost certainly familiar to you. Investment can be defined as ‘an increase in the stock of physical assets’. In fact, the term investment as used by economists has a much stricter and more focused meaning than the more popular usage of the term (which may include such activities and events as the purchase of real estate, shares and/or bonds). In economics, the notion of (productive) investment refers to the flow of resources into the production of new (physical) capital.

First, it is a flow concept: it is measurable over a period of time and refers to changes in the level of capital stock. Secondly, it refers to physical assets (as distinct from financial assets). The economic notion of investment thus takes a variety of forms, which include the following:

- net additions to stocks (this includes changes in inventories and work in progress as that part of current output which is not consumed)
- plant and machinery (the acquisition of lathes, computers, lorries etc), which includes both replacement and additions to the capital stock
- construction (comprising houses, factories, offices, shops, storage and so forth).

In finance and business contexts, the term investment is used rather more widely to refer to any new activity or group of activities (‘investment projects’) to which an enterprise can commit its resources in anticipation of rewards. As in economics, this concept too distinguishes resource commitments for increasing current consumption from those intended for increasing or improving production capability at some future date. Even more broadly, investment may be defined as ‘an activity for which the required outlays and the benefits are not expected to be concurrent’. This notion stresses the importance of the investment horizon, or the time period over which the rewards of investment are expected. As the course will show, this is a critical factor in many methodologies dealing with the selection of investment projects.

Study Note

Pause here for a moment to think of a few examples of ‘investment’ with which you are familiar. An indicative list is given below.

Here are a few examples of different types of investment activities:

- building a factory
- extending a warehouse
- instituting a staff training programme;
- buying (or leasing) a new machine
- improving a delivery and distribution service
- launching a new product line
- automating processes, and so on.

As stated above, in the world of business and finance (as distinct from the world of economics), not all investment takes the form of additions to ‘real
physical assets’. It is often just as worthwhile to consider financial transactions which involve diversifying an enterprise’s assets portfolio (such as the purchase of shares and bonds, antiques and arts collections, foreign currency, etc). Financial transactions may well arise independently of real investment considerations and, in practice, broaden substantially the full array of investment decisions open to an enterprise.

It is convenient to consider ‘investment projects’ as a distinct subdivision of investment (a more detailed discussion of the term ‘project’ follows in Section 5 below). This is seen as a set or group of inter-connected activities that are typically considered together and will be accepted or rejected as a set. For instance, a plant automation programme would involve the installation of physical machinery, together with (possible) changes in factory floor layout as well as staff training. In practice, there are alternative investment ‘packages’ or projects, and the role of appraisal would be to assess the soundness of investment decision(s) across the full spectrum of possibilities against a background of well-defined objectives.

Investment opportunities vary considerably in nature. Appraisal techniques are needed to help investors or their financial managers and agents make soundly based decisions and select the best projects.

The list below categorises different types of investment activities and gives an idea of the range of the tasks to which the methodology of investment appraisal may be applied.

- **Expansion** – establishing the viability of expanding existing product lines.
- **Diversification** – appraising the soundness of investment into new products/services.
- **Cost saving** – some investment activities are expected to result in cost savings (for example, the office automation mentioned above), and such decisions need appraisal just as diversification and expansion of product lines.
- **Replacement** – not all investment decisions result in net additions to the capital stock, so deciding whether and when to replace existing capital (equipment and building) constitutes another type of consideration in investment appraisal.
- **Research and Development** – this can affect enterprise productivity, competitive position and, ultimately, financial performance. These activities, too, need appropriate assessment before resources are devoted to them.
- **Alternative choice** – this type of investment decision requires choosing between alternatives that achieve the same ends (e.g. purchasing ‘outsourced’ inputs from an external supplier or else producing the good or service in-house).
- **Financing** – comparison of the benefits of purchasing an asset against leasing it.
- **Others** – such as expenditure on complying with health and safety standards, a pollution control device, etc.
1.2 Investment Appraisal – Nature and Scope

The categories of different types of investment given above shed some light on the function and significance of investment appraisal. It is worth mentioning here that another term used to refer to capital investment and the analysis surrounding it is capital budgeting. Broadly, investment appraisal or capital budgeting is concerned with the selection and use of criteria and methodologies to guide the allocation of investment expenditure. It thus focuses on alternative measures of project acceptability.

For both private and public sector enterprises and firms, the decisions involved are important not only because the expenditure involved can be very large, but also because the decisions made are often irreversible, and the uncertainties regarding their future benefits may be considerable.

Suppose an office automation programme costs $65,000 and is expected to result in cost savings of $15,000 per annum for so many years. The question for the managers to address is whether a decision to commit so much of the firm’s resources is justified in the light of its expected benefits.

Study Note

Try to think through the general types of consideration that you would want to take into account when making this sort of decision. Unit 2 will discuss specific appraisal techniques.

Similarly, a public sector investment project such as the upgrading of a particular section of a railway line or a road improvement scheme has to rely on a ready-to-apply methodology to help with the investment decision.

The essence of all investment appraisals is the assessment of the worthwhileness of proposals that require economic and financial resource commitment, by taking into account their benefits and costs. For a private firm, bad investment decisions can result in poor economic and financial performance, limited future growth, loss of opportunities for attracting new investors or the dissatisfaction of existing owners (shareholders). Similarly, in the public domain, the future viability of an enterprise may depend critically on the decisions made today to commit resources for future benefits. Needless to stress that at a macroeconomic level, too, the overall performance of an economy both in terms of growth and efficiency of resource allocation depends on the constellation of micro level investment decisions, their benefits and demands on resources.

As we have seen, the nature of investment opportunities available to firms varies considerably: from expansion and diversification projects to cost saving investments and capital replacement decisions. In all such cases, specific and defined decision criteria are required to help investors decide whether required outlays are justified by the expected benefits or returns on capital committed. It is of course worth noting that investment decisions will never be made by companies purely according to financial decision criteria – consideration of how the proposed investment fits with the company strategy would be paramount. Here, however, it is the financial appraisal of investment opportunities that you are concerned with.
To indicate the importance of investment appraisal for private enterprises, let us try, in the next section, to locate this type of decision-making in the wider context of financial decisions as a whole.

1.3 Investment Appraisal and Financial Decision Making

It is worth bearing in mind that the appraisal of investments is as an aspect or component of the wider process of financial decision-making; the latter typically comprises the following three broad areas:

- investment decisions
- financing decisions
- dividend decisions.

As discussed earlier, investment decisions are important because they determine the total amount of assets held by firms, the composition of these assets and the business-risk complexion of the firms as perceived by shareholders. Thus, the future viability of an enterprise can crucially depend on its present investment decisions. Those decisions also set the context in which financing and dividend decisions are made.

However, while this typology of financial decision-making is convenient for analytic purposes, it does not necessarily reflect business and commercial practice, in which all three types are highly inter-related. For instance, the selection of investment activities is often dependent on the financing opportunities and constraints faced by the firms (and vice versa). Dividend decisions too are closely influenced by the choice of investments and financing decisions to implement them. Thus, each must be considered in relation to the objectives of the firm. Only an optimal combination of all three can help investors and owners to achieve those objectives.

In this course, we are mainly concerned with the first of these decision areas – investment decisions. Financing and dividend decisions are covered in other courses, such as Corporate Finance and Portfolio Analysis and Derivatives.

Reading

Now, please read Lumby and Jones’s introductory section, Chapters 1 and 2. These chapters give a broad overview of financial decision-making and its relevance to investment appraisal.

Lumby and Jones elaborate on many of the points raised above. Their ‘model’ approach situates investment appraisal and financing decisions within the broad framework of financial decision making as a whole.

As in all decision processes, choice implies the existence of alternatives that are not equally desirable in terms of defined objectives. The appraisal and assessment of alternatives (as well as a search for them) therefore implies deciding the worthwhileness of these alternatives in the light of their contribution to the objective.

The definition of objectives in financial decision-making takes up a certain amount of space in Lumby and Jones’s exposition. This is important because it sets the context for much of the discussion that follows. If you have been
an economics student, you will be familiar with the general principles of optimisation: the owners of a joint-stock company are assumed to aim for the highest net return to their stock of wealth (returns to their shareholdings). This requires the common assumptions in economics about the competitive nature of the markets for common stock and the information required to enable shareholders to move freely into and out of certain companies on the basis of their evaluation of company performance and expected benefits. The objective of a company’s financial decision-makers is thus defined by Lumby and Jones as: ‘the maximising of the flow of dividends to shareholders over or through time’. As we shall see, this is a common point of departure for many techniques used for appraising the worthwhileness of investment projects.

- Why is the time horizon important in this context?
  (Think of the extreme situation in which management can liquidate the firm’s assets and pay up maximum dividends for that year!)

- What is the difference between ‘maximising’ and ‘satisficing’ behaviour?

- What is the basis of the distinction between the two?

The distinction between satisficing and maximising behaviour arises from a common reality of modern joint-stock companies: the separation of ownership and control (or the problem of principal–agent mentioned by Lumby and Jones). This means that those who run and manage organisations need not necessarily pursue the same objectives as those of its owners (i.e. maximising the company’s real worth). In other words, managers may have profit targets to satisfy subject to other considerations (market share, growth rate and size of firm, etc). However, it is argued that both the competitive nature of the market for shareholder funds as well as that for managers’ jobs will ensure, at least in the medium to long term, that the two behavioural patterns will be strongly related and optimisation will ultimately prevail. Factors such as managers taking stakes in their companies will also strengthen the case for this assumption (although considerations of the significance of their behaviour in the short term might weaken it). This means that consideration of incentive schemes, such as share options for managers, is significant.

The significance and particular position of investment appraisal may be still better appreciated by an examination of the broad functions of financial management. Five principal areas of financial management responsibility include:

- converting a business plan into a financial plan
- appraising the viability and suitability of the financial plan in the light of the firm’s objectives
- the choice of financing with respect to the plan
- controlling the plan’s implementation
- presenting the result and outcome of the plan to interested parties (such as the Board of Governors and shareholders).

Investment appraisal intercedes between the stage where a business plan is translated into its equivalent financial plan and the decision to finance its implementation. Evaluation of the feasibility and viability of a financial plan
involves a careful study of its components, the alternatives and the costs and benefits associated with it. This is normally within the area of responsibility of senior or chief accountants, as distinct from treasurers who deal mainly with financing decisions (capital structure, sources of finance, liquidity planning, etc). However, both the accountants and the treasurers are accountable to Finance Directors, who oversee financial management in its entirety.

Finally, much investment decision-making takes place in a context ridden by risk and uncertainty. Conjectures about future benefits (as measured by cash flows) are often no more than guesswork at the time appraisal takes place. Uncertainties also abound in relation to the choice of costs (including capital financing costs) and the choice of alternatives. Economic and political uncertainties give rise to many types of risk, ranging from general business risk to country risk and foreign exchange risk. These are often compounded by risks associated with technological progress, which may have a serious impact on investments into new capital and machinery. For these reasons, considerations of risk and uncertainty are paramount in investment appraisal discussions and are commonly highlighted as critical factors for consideration at an early stage of analysis.

1.4 Cost-Benefit Analysis – Issues and Evolution

You have considered the fact that from a private sector or corporate point of view, investment appraisal and capital budgeting decisions focus on methods and techniques used for establishing project acceptability. In the world of private enterprise, profitability provides the principal yardstick or criterion for the judgement of performance. Accordingly, appraisal involves assessing investment projects on the basis of their contribution to the financial health and wealth of the enterprise (commonly measured by its effect on company market value).

The discipline or branch of economics that deals with the appraisal of public sector investment projects is known as cost-benefit analysis (also referred to as ‘benefit-cost analysis’ and ‘project appraisal’, though in a somewhat different context, as we shall see). Broadly speaking, cost-benefit analysis is concerned with the theory and application of criteria for investment decision making in the public sector. Whereas in the private sector appraisal of investments, financial analysis of private costs and benefits takes place against a wealth-maximising objectives function, cost-benefit analysis focuses on social costs and benefits (including externalities and costs and benefits to third parties). This gives cost-benefit analysis a wider social or economic character with the objectives of maximising the wealth or national product of a country as a whole (hence the term ‘social or economic’ cost-benefit analysis, to emphasise these aspects). Increasingly, the recognition of the importance of intangibles (items without a clear cut market or any other pricing value) and their incorporation into cost-benefit analysis has given the latter a more distinct flavour compared with a solely financial assessment of investments.

The short extract in Box 1.1 below puts this type of analysis into perspective.
Box 1.1 Benefit-Cost Analysis

Benefit-cost analysis is an art consisting of a series of techniques useful for decision making… As with any art, benefit-cost analysis can be done well or poorly and there are issues of science in using the art. Benefit-cost analysis is an art that to be done well requires an appreciation of a substantial amount of economics as well as sensitivity to ethical and philosophical issues. For this reason, benefit-cost analysis should be treated as an aid to decision making and not as a decision itself. Although we consider many narrow and technical issues of benefit-cost analysis, we think it is most useful to treat it as a tool for organising thinking about decisions…

Not only is benefit-cost analysis useful in itself, but the use of benefit-cost analysis shapes the framework for decisions. Such analysis requires a formal report and assessment and the application of a series of evaluation techniques. This has an extremely positive result. The techniques and data are exposed to possible criticism, discussion, revision, and improvement…

Benefit-cost analysis is a set of procedures for defining and comparing benefits and costs. In this sense it is a way of organising and analysing data as an aid to thinking. This concept of benefit analysis leads us to what we regard as a fundamental rule of benefit-cost analysis: Decisions are made by decision makers, and benefit-cost analysis is properly regarded as an aid to decision making and not the decision itself.

The well-informed benefit-cost analyst is aware that benefit-cost analysis cannot perfectly capture the thinking of the decision maker. The informed decision maker and analyst are aware that data are always imperfect, and that the very process of qualification imposes limitations on the conceptual framework, and that philosophical and normative assumptions always remain embedded in the analysis…

On the most practical level the justification for benefit-cost analysis is simply that knowledge about benefits and costs is useful in making decisions. This is true for a world of private as well as public decision making, and benefit-cost analysis can be regarded as a sort of profit and loss accounting such as is used by the private sector but with a different perspective… Traditionally, benefit-cost analysis is associated with government intervention and with the evaluation of government action and government projects.

Source Zerbe and Dively (1994:1–2)

The use of cost-benefit analysis as a technique of economic evaluation for public sector investment can be traced to the mid-nineteenth century. However, the first systematic attempts to develop and apply cost-benefit methods are associated with large-scale water works and water resource management in the USA in the 1930s. The application of these methods in advanced capitalist economies reflected the changing mood towards the government sector at the time. With the growing volume of public investment, what was needed were methods and criteria for guiding the allocation of public resources on grounds wider than conventional financial rules.

The growth and popularity of cost-benefit analysis rose continuously throughout the 1950s and 1960s as academic literature on the theory of public investment decisions proliferated. Work in the area of valuing non-marketed items such as human life, time and education, is also associated with this period.

An important landmark came with the application of cost-benefit in areas related to national planning and development projects in the Third World. In this regard, the work of Little and Mirrlees (OECD, 1968) was a significant
break-through, which was followed by UNIDO’s manual for the evaluation of industrial projects (UNIDO, 1972), and the book, Economic Analysis of Projects, by Squire and van der Tak (1975). The essence of Little and Mirrlees’ contribution was that trade opportunity costs as reflected in world prices should be taken as ‘shadow prices’ for the valuation of all goods and services (more of this in Units 4 and 5). Between them, these three important works moved trade efficiency and concerns with the balance of payments effect of projects onto centre stage. The result was a new ‘era’ in project appraisal and the emergence of a new ‘orthodoxy’ that proved widely popular with donors and international aid agencies.

1.5 **Projects and Project Appraisal**

The growth of cost-benefit analysis led to a fairly distinct strand of analysis and application known as ‘project appraisal’, sometimes with a direct focus on the developing world. Let us now think more about project appraisal, starting with a discussion of the meaning and significance of the term ‘project’ itself.

Clarifying what is meant by project can be helpful because of its extensive use in the literature of public sector investment and development. Until now, the term has been used in a somewhat loose sense, either independently or in connection with investment (‘investment projects’) to refer to a set of activities generally making up an investment package. Here is how one classic work on project appraisal (Little and Mirrlees, 1974, page 3) defines the term:

[A] project is any scheme, or part of a scheme, for investing resources which can be reasonably analysed and evaluated as an independent unit.

This general definition emphasises the ‘integrated’ nature of projects. That is, they comprise investment activities that make up a whole and are accepted or rejected as such.

Consider for instance the following two questions:

- Should a project to develop a transmission mechanism for passenger motorcars be treated as a project or as part of a car investment package?
- How about proposals by an irrigation authority to construct a dam and the main canal for distributing its water?

The answer in the first case (the motor car) is that it is probably possible to treat the investment proposal on its own merit (developing or buying transmission mechanisms as a separate economic or commercial proposition). Concerning the proposals for irrigation, however, it would be senseless to do so.

The de-composing of projects into sub-projects (or, conversely, the packaging together of certain sub-activities) is not always as easy or clear cut as it may appear. These examples do, nevertheless, emphasise the point that projects can (and should) be considered at many levels. If it makes sense to treat some components separately, that is what should be done (conversely, we may want to package together smaller propositions into a larger project). Projects need not by definition or design be grandiose or impressive undertakings.
Question for reflection

Now try to answer the following question. The commercial development and operation of a new aircraft will most probably require an extension and improvement to the existing airport facilities (e.g. passenger and baggage handling capabilities, telecommunications and radar equipment, runway, etc).

- Should we treat these as one or two different projects?

The answer, as you might have guessed, depends on who is considering the investment proposal. If the airline or aerospace company (developing the craft) are also in charge of the airport, then it should be treated as one package. However, it is becoming increasingly common for airport authorities and national airlines to be independently managed, in which case the two are separate potential projects.

In the development context, ‘project’ has a yet more specific meaning and usage compared to the broad definition given above. In his seminal manual prepared for the World Bank (Economic Analysis of Agricultural Projects, 1982: p.494), J.P. Gittinger defines a ‘project’ as

...an investment activity upon which resources – costs – are expended to create capital assets that will produce benefits over an extended period of time and which logically lends itself to planning, financing, and implementing as a unit. A specific activity, with specific starting point and specific ending point, intended to accomplish a specific objective. The smallest operational element prepared and implemented as a separate entity in a national plan or program. Generally unique in that it is not a segment of an ongoing program, although it may be a ‘time slice’ – a portion lasting several years – of a long-term program.

Or, put more succinctly, ‘The whole complex of activities for which money will be spent in expectation of returns’ (ibid, pp. 4–5). Note that Gittinger’s definition highlights certain important features of projects:

- they are investment packages
- they have their own (separate) identities (are well-defined in terms of the sequence of investment and production activities they embrace)
- they are bounded activities (both in terms of time and geographical location)
- they are thus different from ongoing development plans or programmes which may constitute a whole set of sectoral or infrastructural interventions in the economy over time.

The distinction between projects, plans and programmes is particularly interesting. To test your understanding of these, try to identify which items in the following list qualify as projects and which as programmes or plans (remember that projects are time-bound):

- a new irrigation and drainage improvement scheme for village X
- an export promotion strategy for the electronics industry
- a rotating credit and savings scheme to mobilise the savings of the urban poor
- a campaign to improve road safety (and alterations to traffic layout to achieve this in a specific location)
- an integrated rural development programme
• a youth training scheme.

The above ideas are elaborated further in the next reading for this unit, which is extracted from Gittinger’s Chapter 1: ‘Projects, The Cutting Edge of Development’. Although Gittinger’s manual (and the selected reading) is mostly about agricultural projects, the discussion is, nevertheless, useful in a broad development context.

Reading

Now turn to Gittinger’s chapter, and read pages 3–7 first; then read pp. 7–12, and try to answer the following questions.

- What are the advantages of an approach that adopts a ‘project format’ to development?
- How about its disadvantages?

Gittinger cites many advantages of the project approach. For example, the project approach

- provides a framework for gathering, assessing and analysing information
- allows a breakdown of costs over time and over sectors and people affected
- assists with systematic and effective administration and management of development efforts
- raises our awareness of alternative courses of action
- helps contain the data problem (which can be serious, particularly in the national context in many developing countries).

The limitations of the approach are, nevertheless, also important and must be borne in mind when interpreting results.

- Project outcomes are dependent on the quality of what (assumptions and information) goes into them (garbage in, garbage out: ‘GIGO’, p. 9).
- As with other investments, project implementation and assessment are beset by risk and uncertainty.
- Projects are based on ‘partial’ analyses (abstracting from their potential impact on the rest of the economy).
- Benefits (or costs) do not always lend themselves easily to measurement (as in the case of externalities; this will be discussed more extensively later in the course). This can make the comparison of alternatives difficult.
- Project analysis suffers from a common criticism of welfare economics that it treats the prevailing bases for valuation (prices and costs) as independent of the prevailing income distribution.
- Projects and policies are not to be seen as alternatives.
- Projects are implemented in broad contexts. They are therefore multi-dimensional and must be understood to be so.

The rest of the reading by Gittinger is devoted to a discussion of the broader aspects and dimensions of projects (the last point above), highlighting
several of these that are pertinent to the preparation and analysis of projects. The important ones are cited briefly below.

- **Technical** – consideration of a project’s supplies (inputs) and its production (output), focusing on technical relations and aspects such as climatic features and attributes, soils, water, spatial considerations, etc.

- **Institutional/organisational** – concerns for the administration and management of projects. Here the focus is on the institutional factors and setting (e.g. laws and regulations), communication networks, structures of authority and responsibility, etc.

- **Social** – consideration of the project’s impact on and implications for particular groups and regions, gender implications, wider effects on the health, culture, quality of life, etc. of those affected by it directly and indirectly. Traditionally, environmental considerations were covered under this heading. However, growing concerns with the environment in general, and the environmental consequences of projects in particular, have led to growing demands for separate and explicit consideration of these factors in recent years, as you will see in Unit 8.

- **Commercial** – covering all the commercial considerations and arrangements for procurement of supplies and the marketing of output.

- **Financial** – budgeting considerations such as operating expenses and investment funds required for various participating agencies; credit terms to be arranged, etc.

- **Economic** – this addresses the project’s impact and its worthwhileness from the viewpoint of the whole society. It is different from financial analysis in that it goes beyond the concerns of participating agents alone. As we shall see later in the course, this has important implications for the way appraisal is carried out (for instance, the treatment of transfer payments such as taxes and subsidies, market prices, and interest on capital is different in the two approaches).

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**Reading**

Now read pp. 12–21 of the chapter by Gittinger.

### 1.6 The Project Cycle

Situating investment decisions within an enterprise’s broader financial decision-making enables us to understand better the context in which these decisions are made. Similarly, a consideration of the broad context of project planning and implementation can shed light on the process that incorporates the appraisal of projects. This is done with reference to the concept of the project cycle. The notion of a cycle implies a ‘natural’ sequence of events and activities, which commences with the identification of a potential project and culminates in its implementation and evaluation.

The project cycle consists of the following stages:

- identification
1.6.1 The identification stage

This is the conception stage in a project’s life cycle. In the past, the procedure that led national governments and other borrowers to generate proposals for external financing was fairly ad hoc. In recent years, major donor agencies (such as the World Bank) place much emphasis on project identification as an important element in the overall success of the project. Defined priority areas within broad development strategies are used to encourage project generation, for instance, or to screen incoming projects.

In-depth knowledge and experience of local conditions can be an important source of suggestions for project formulation, as can occasional field missions and technical surveys aimed at identifying potential projects. Factors that complicate project identification in practice are numerous and include such issues as conflicting interests between involved parties (local and regional bodies, sectoral ministries, national governments and external donors) and varying levels of capability in project formulation.

1.6.2 Preparation and analysis

Projects that survive the early stage of successful identification need to be prepared and analysed before money is allocated to them. Although this is formally a borrower responsibility, in practice it is common for donor agencies to extend technical and financial assistance to borrowing countries to assist them in the preparation and analysis of projects. A ‘project brief’ is used to describe the project’s objectives, its main issues and the timetable within which its implementation and processing are conceived. The length of time taken for preparation and analysis is not fixed: it will almost certainly be a function of the nature of the project (its size, borrower experience, whether it is a new project or the extension of an existing one, etc). Often it may also involve a feasibility study (or a sequence of them) to establish at an early stage which projects are worth pursuing further. Consideration of alternatives is important at this stage as another ‘early signalling’ mechanism for deciding worthwhile projects.

Through careful and detailed analysis, projects are likely to be shaped and redefined (sometimes beyond recognition) to take them a step closer to the realistic conditions under which they may be implemented. This is required for detailed planning, which should take account of the full range of technical, institutional, social, environmental, commercial, financial and economic aspects of the project that we encountered earlier (see the last section).

1.6.3 Appraisal

This is probably the best-known stage of the cycle, which is the responsibility and primary concern of the lender. Its purpose is to establish the

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1 This section is based on Baum (1982).
worthwhileness of a prepared project in the light of its resource commitments and expected benefits.

In practice, this is an intricate and sophisticated process of enquiry into the viability of the project that may require the specialised services of appraisal missions and appointed consultants.

Appraisal covers four major aspects of the project: technical, institutional, financial and economic.

**Technical aspects**

This is mainly concerned with issues related to physical scale, layout, location of facilities, technology used, cost estimates and their relation to engineering or other data on which they are based, proposed procurement arrangements, procedures for obtaining engineering, architectural or other professional services, the potential impact on the human and physical environment, and a host of other similar concerns related to the technical adequacy and soundness of the project.

For instance, in the technical appraisal of an educational project considerations will have to be given to the curriculum, the number and nature of educational establishments, their physical facilities (classroom, space, laboratories, libraries, and equipment), personnel, skills gaps and training requirements, etc.

**Institutional aspects**

As stated earlier, the objective of many projects is not merely to add to physical assets and capital, but also to create and enlarge human and institutional capabilities to manage and maintain development undertakings.

Institutional appraisal is concerned with a host of questions that deal with the adequacy or otherwise of such human capability and the institutional framework in which projects are implemented. This is possibly the most challenging aspect of the project’s overall success. There may be no shortage of technically well-designed and well-endowed projects (in terms of their ‘hard’ inputs). But rare are the projects that are not somehow handicapped by shortcomings at the human and institutional level (the so-called ‘soft’ inputs). Measured and sensitive considerations of the institutional dimension and local conditions are needed to help avoid disappointing outcomes.

**Financial and economic aspects**

Since these two aspects of project appraisal constitute a main part of the course, they are only briefly reviewed here. (You must satisfy yourself that you are familiar with the distinction between them at this stage.)

Financial appraisal concerns such questions as the adequacy of funds, the financial viability of the project, the borrower’s ability to service debt, procedures for recovering investment and operating costs, etc.

This is different from economic appraisal, which addresses the viability and worthwhileness of the project from the broader point of view of its contribution to aggregate or national economic and social welfare.

This course will show how the application of social cost-benefit analysis can help at the stage of appraising development projects.
1.6.4 **Implementation**

A project that is deemed to be sound at the appraisal stage qualifies for implementation. Implementation tends to be complicated in practice by many unforeseen problems. Flexibility is therefore required at this stage to enable the successful execution of the project. The process of implementation can be long and drawn out (depending on the nature of the project and the time period over which it spans). It is normal to consider it over three phases:

- investment
- development
- operation.

There is considerable variation in the length of each of these stages between different projects (infrastructure projects tend to have long investment periods, for example; human resource development projects – such as expansion of the tertiary sector – also take very long to develop). It is probably true to claim that a project is as good as its execution. Thus, implementation of a project is another critical stage in the project’s life cycle.

1.6.5 **Monitoring and evaluation**

While the project is being carried out, continuous monitoring is required to satisfy project implementers that things are proceeding according to plan. Monitoring typically requires the putting in place of a systematic information gathering and management system that can check the progress of the project according to the plans drawn up and objectives laid out.

Once the project is completed (and possibly also several times during its implementation), it needs to be evaluated so as to enable analysts (borrowers or lenders) to assess its performance and outcome. Has the project been successful in attaining its objectives? If not, in what respect has it failed? How might its design and/or implementation have been improved?

The *ex-post* audit, to which all World Bank-assisted projects are now subjected, allows a reworking of the estimates of the economic rate of return on the basis of actual implementation costs and updated information on operating costs and expected benefits.

Evaluation thus helps bring out elements of strength and weakness, success or failure. The results are valuable in planning future projects and in attempts to avoid repeating or committing ‘mistakes’. This is why Baum (1982, p. 23) described the evaluation system as ‘a gold mine of information, supplementing and complementing that provided by the broader stream of project supervision reports’. ‘Some of the findings are sobering’, he continued (*idem*), ‘many are reassuring’.

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**Reading**

Now read up the rest of the chapter by Gittinger, pp 21–26.

Another interesting perspective on the World Bank project operations and criteria appears in the article, ‘The World Bank and Project Analysis: an
Introduction’, by Ugo Finzi (which has been included with your course material). This author introduces the various aspects of project work as conducted by the World Bank and its several departments. The different stages of the project cycle mentioned above are related to the operational and methodological ground rules of the Bank. The final section provides an extended bibliography on the subject in an historical perspective. This can be a useful source of information if you decide to consult the literature more widely.

**Reading**


### 1.7 Public and Private Sector Appraisal

From the structure of the unit and, indeed, of the course, it will be clear to you that much of the discussion of investment and project appraisal in the private and public sectors has been undertaken as if these were two separate and parallel universes – even though some of the methodology of appraisal is in fact closely linked. However, it is clear that in many countries, including the UK, the option of using the private sector to implement aspects of a public policy or programme, or a project, is now routinely considered. This means that, while a private company contemplating a government contract must analyse such a project from the point of view of corporate profitability, its internal appraisal process, from a wider ‘corporate strategy’ perspective, will also have to take into account the way in which wider social and economic aspects of government policy could impact upon the execution of the project – opening up the company to criticism and loss of reputation, for instance, from ‘stakeholders’ in the outcomes of the project who are in this case not company shareholders.

**Reading**

Turn now to *The Green Book*, a UK government publication, and read the sections on pp. 40–41 on ‘Involving the Private Sector’, ‘Considering Private Sector Provision’ and ‘Commercial Agreements’.

Though the next unit, Unit 2, will continue with the consideration of private sector investment appraisal techniques, the unit confronts a question common to all investment analysis.

- Because investment concerns current costs and future estimated benefits, how should investment appraisal methods handle the issue of time?
References


Little, Ian MD and James A Mirrlees (1968) *Manual of Industrial Project Analysis in Developing Countries*, vol. 2, Paris: OECD.


Squire, Lyn and Herman G Van der Tak (1975) *Economic Analysis of Projects*, Baltimore: Johns Hopkins University.
