PART I
INTRODUCTION

Part I (Chapters 1 and 2) examines the nature, scope and methods of managerial economics and the theory of the firm. Chapter 1 is therefore concerned with explaining why managerial economics is important and useful as an area of study, how it relates to other disciplines, what its core areas are, and the methods of analysis which it uses. Chapter 2 examines the basic profit-maximizing model of behaviour, and its underlying assumptions, and then proceeds to relax these assumptions to develop a more complex but realistic model of firms' behaviour. The focus is on the individual and the nature of transactions, with an emphasis on agency theory. These two chapters introduce the framework of parameters and analysis that are developed throughout the remainder of the text.

1 Nature, scope and methods of managerial economics

Outline

Objectives

1 To introduce and define managerial economics.
2 To outline the types of issue which are addressed by managerial economics.
3 To explain the difference between positive and normative economics.

4 To explain the relationship between managerial economics, economic theory and the decision sciences.
5 To explain how managerial economics is related to other disciplines in business, such as marketing and finance.
6 To identify the main subject areas in managerial economics, explain how they are related to each other, and describe how they are organized and presented in the text.
7 To explain the methods used in the development of scientific theories and show their relevance to managerial economics.
8 To explain how economic theory is presented from a pedagogical viewpoint, and how this relates to the organization and presentation of the material in the text.

1.1 Introduction

What is managerial economics about? What kind of issues does it deal with? How can it help us make better decisions, in business or elsewhere? These are fundamental questions which any student may ask when first approaching the subject. It is therefore a good idea to make a start by examining a situation that has become increasingly high on the economic and political agenda on a global basis over many years; yet it is not a situation where it might seem at first sight that managerial economics is particularly relevant. We shall see, to the contrary, that the methods studied and implemented in managerial economics are vital to identifying solutions to the problems raised.

Case study 1.1: Global Warming

Part I: What to do about global warming[1]

A UN treaty now under discussion looks promising – as long as it remains flexible

How should reasonable people react to the hype and controversy over global warming? Judging by recent headlines, you might think we are already doomed. Newspapers have been quick to link extreme weather events, ranging from floods in Britain and Mozambique to hurricanes in Central America, directly to global warming. Greens say that worse will ensue if governments do not act. Many politicians have duly jumped on the bandwagon, citing recent disasters as a reason for speeding up action on the Kyoto treaty on climate change that commits rich countries to cut emissions of greenhouse gases. This week saw the start of a summit in The Hague to discuss all this.

Yet hot-headed attempts to link specific weather disasters to the greenhouse effect are scientific bunk. The correct approach is coolly to assess the science of climate change before taking action. Unfortunately, climate modelling is still in its infancy, and for most of the past decade it has raised as many questions as it has answered. Now, however, the picture is getting clearer. There will never be consensus, but the balance of the evidence suggests that global warming is indeed happening; that much of it has recently been man-made; and that there is a risk of potentially disastrous consequences. Even the normally stolid insurance industry is getting excited. Insurers reckon that weather disasters have cost roughly $400 billion over the past decade and that the damage is likely only to increase. The time has come to accept that global warming is a credible enough threat to require a public-policy response.

But what, exactly? At first blush, the Kyoto treaty seems to offer a good way forward. It is a global treaty: it would be foolish to deal with this most global of problems in any other way. It sets a long-term framework that requires frequent updating and revision, rather like the post-war process of trade liberalisation. That is sensible because climate change will be at least a 100-year problem, and so will require a treaty with institutions and mechanisms that endure. The big question over Kyoto remains its cost. How much insurance is worth buying now against an uncertain, but possibly devastating, future threat? And the answer lies in a clear-headed assessment of benefits and costs. The case for doing something has increased during the three years since Kyoto was signed. Yet it also remains true that all answers will be easier if economic growth is meanwhile sustained: stopping the world while the problem is dealt with is not a sensible option, given that resources to deal with it would then become steadily scarcer.

That points to two general conclusions about how to implement Kyoto. The simplest is that countries should search out "no regrets" measures that are beneficial in their own right as well as reducing emissions – such as scrapping coal subsidies, liberalising energy markets and cutting farm support. The second is that implementation should use market-friendly measures that minimise the costs and risks of slowing economic growth.

Part II: Hot potato revisited[2]

A lack-of-progress report on the Intergovernmental Panel on Climate Change

You might think that a policy issue which puts at stake hundreds of billions of dollars' worth of global output would arouse at least the casual interest of the world's economics and finance ministries. You would be wrong. Global warming and the actions contemplated to mitigate it could well involve costs of that order. Assessing the possible scale of future greenhouse-gas emissions, and hence of man-made global warming, involves economic forecasts and economic calculations. Those forecasts and calculations will in turn provide the basis for policy on the issue. Yet governments have been content to leave these questions to a body – the Intergovernmental Panel on Climate Change (IPCC) – which appears to lack the necessary expertise. The result is all too likely to be bad policy, at potentially heavy cost to the world economy.

In our Economics focus of February 15th this year, we drew attention to (and posted on our website) telling criticisms of the IPCC's work made by two independent commentators, Ian Castles, a former head of Australia's Bureau of Statistics, and David Henderson, formerly the chief economist of the Organisation for Economic Co-operation and Development (OECD) and now visiting professor at Westminster Business School. Their criticisms of the IPCC were wide-ranging, but focused on the panel's forecasts of greenhouse-gas emissions. The method employed, the critics argued, had given an upward bias to the projections.

The IPCC's procedure relied, first, on measuring gaps between incomes in poor countries and incomes in rich countries, and, second, on supposing that those gaps would be substantially narrowed, or entirely closed, by the end of this century. Contrary to standard practice, the IPCC measured the initial gaps using market-based exchange rates rather than rates adjusted for differences in purchasing power. This error makes the initial income gaps seem far larger than they really are, so the subsequent catching-up is correspondingly faster. The developing-country growth rates yielded by this method are historically implausible, to put it mildly. The emissions forecasts based on those implausibly high growth rates are accordingly unsound.

The Castles–Henderson critique was subsequently published in the journal *Energy and Environment* (volume 14, number 2–3). A response by 15 authors associated with the IPCC purporting to defend the panel's projections was published in the same issue. It accused the two critics of bias, bad faith, peddling "deplorable misinformation" and neglecting what the 15 regard as proper procedure. Alas, it fails to answer the case Mr Castles and Mr Henderson had laid out – namely, that the IPCC's low-case scenarios are patently not low-case scenarios, and that the panel has therefore failed to give a true account of the range of possibilities. If anything, as the two critics argue in an article in the subsequent issue of *Energy and Environment*, the reply of the 15 authors gives new grounds for concern. This week the IPCC is preparing to embark on its next global-warming "assessment review" – and if the tone of its reply to the critics is any guide, it is intent on business as usual.

It is true, as the IPCC says in its defence, that the panel presents a range of scenarios. But, as we pointed out before, even the scenarios that give the lowest cumulative emissions assume that incomes in the developing countries will increase at a much faster rate over the course of the century than they have ever done before. Disaggregated projections published by the IPCC say that – even in the lowest-emission scenarios – growth in poor countries will be so fast that by the end of the century Americans will be poorer on average than South Africans, Algerians, Argentines, Libyans, Turks and North Koreans. Mr Castles and Mr Henderson can hardly be alone in finding that odd.

TUNNEL VISION

The fact that the IPCC mobilised as many as 15 authors to supply its response is interesting. The panel's watchword is strength in numbers (lacking though it may be in strength at numbers). The exercise criticised by Mr Castles and Mr Henderson involved 53 authors, plus 89 expert reviewers and many others besides. Can so many experts get it wrong? The experts themselves may doubt it, but the answer is yes. The problem is that this horde of authorities is drawn from a narrow professional milieu. Economic and statistical expertise is not among their strengths. Making matters worse, the panel's approach lays great emphasis on peer review of submissions. When the peers in question are drawn from a restricted professional domain – whereas the issues under consideration make demands upon a wide range of professional skills – peer review is not a way to assure the highest standards of work by exposing research to scepticism. It is just the opposite: a kind of intellectual restrictive practice, which allows flawed or downright shoddy work to acquire a standing it does not deserve.

Part of the remedy proposed by Mr Castles and Mr Henderson in their new article is to get officials from finance and economics ministries into the long-range emissions-forecasting business. The Australian Treasury is now starting to take an active interest in IPCC-related issues, and a letter to the British Treasury drawing attention to Castles–Henderson (evidently it failed to notice unassisted) has just received a positive, if long delayed, response. More must be done, and soon. Work on a question of this sort would sit well with Mr Henderson's former employer, the OECD. The organisation's economic policy committee – a panel of top economic officials from national ministries – will next week install Gregory Mankiw, head of America's Council of Economic Advisers, as its new chairman. If Mr Mankiw is asking himself what new work that body ought to take on under his leadership, he need look no further than the dangerous economic incompetence of the IPCC.

This case study illustrates the variety of issues with which managerial economics is concerned. The following questions arise:

1 Is there a problem to be addressed?
2 Is there a solution or solutions to the problem, in terms of strategies or courses of action that can be taken?
3 What objective or objectives can be defined for these strategies?
4 What constraints exist in terms of operating any strategies?
5 How can we identify strategies as solutions to the problem?
6 How can we evaluate these strategies in terms of costs and benefits, particularly when these involve life and health?
7 What is the best way of measuring the relevant variables?
8 What assumptions should be made in our analysis?
9 How do we deal with the problem of risk and uncertainty regarding the future and the effects of strategies in the future?
10 How can we approach the problems of conflicts of interest between different countries and between different consumers and producers?

11 What criteria can we use for selecting strategies from among different possible courses of action?
12 How do political biases and agendas affect decision-making processes in practice?

The above questions represent steps in the decision-making process involved not just in the global warming situation, but also in any situation involving decision-making. However, many people are unaware of the breadth of issue that is amenable to the analysis of managerial economics. In particular, they sometimes regard managerial economists as being apologists for greedy capitalists, who do not take quality of life into consideration, or the long-term interests of the public. They may view markets with suspicion and doubt their ability to allocate resources efficiently, for example the creation of trading rights in pollution. They may fear deregulation, seeing it as leading to the exploitation of consumers by monopolists. They may believe that it is impossible in principle to put a money value on human life or health. They may believe that governments should not be swayed by narrow economic interests and analysis, and have a duty to exercise ethical principles which otherwise would not be considered. Such antagonistic feelings towards global capitalism have been expressed at various meetings of international politicians to discuss world trade. On a more academic level, there has for some years been huge controversy surrounding the publication of a book by Lomborg[3] taking an economist's approach to these issues.

Much of the sentiment expressed is based on an ignorance of the issues involved, a misuse of statistical information and a lack of understanding of economic analysis, its relevance and application. One major objective of this book is to explain not just the methodology of managerial economics but also the breadth of its application, and to illustrate that it can have a lot to say about the types of issue raised in the above case study. All the case studies in the text have been selected with this objective in mind; for example the following situations and issues are discussed: prize money in sport, the law of diminishing returns applied to computer software, Internet banking and competition, price discrimination in the pharmaceutical industry, issues in the National Health Service, deregulation of electrical utilities, the level of fuel taxes and subsidized car manufacturing.

1.2 Definition and relationships with other disciplines

1.2.1 Definition

So what is **managerial economics?** Many different definitions have been given but most of them involve ***the application of economic theory and methods to business decision-making***. As such it can be seen as a means to an end by managers, in terms of finding the most efficient way of allocating their scarce resources and reaching their objectives. However, the definition above might seem to be a little narrow in scope when applied to the case study involving

global warming. This situation involves governments, non-profit objectives, non-monetary costs and benefits, international negotiations and a very long-term time perspective, with an associated high degree of uncertainty. Therefore it needs to be clarified that managerial economics can still be applied in such situations. The term 'business' must be defined very broadly in this context: it applies to ***any situation where there is a transaction between two or more parties***. Of course this widens the scope of the concept beyond the bounds that many people find comfortable: it includes taking someone on a date, playing a game with one's children in the park, going to confession in a church, asking a friend to help out at work, agreeing to look after a colleague's cat while they are away, taking part in a neighbourhood watch scheme. In all cases, costs and benefits occur, however intangible, and a decision must be made between different courses of action.

As an approach to decision-making, managerial economics is related to economic theory, decision sciences and business functions. These relationships are now discussed.

1.2.2 *Relationship with economic theory*

The main branch of economic theory with which managerial economics is related is microeconomics, which deals essentially with how markets work and interactions between the various components of the economy. In particular, the following aspects of microeconomic theory are relevant:

1 theory of the firm
2 theory of consumer behaviour (demand)
3 production and cost theory (supply)
4 price theory
5 market structure and competition theory

These theories provide the broad conceptual framework of ideas involved; the nature of these theories and how theories are developed is discussed in section 1.4. At this stage it is worth stating that these theories are examined and discussed largely in a **neoclassical** framework. This is essentially an approach that treats ***the individual elements within the economy (consumers, firms and workers) as rational agents with objectives that can be expressed as quantitative functions (utilities and profits) that are to be optimized, subject to certain quantitative constraints***. This approach is often criticized as dated and unrealistic, but can be defended on three grounds. The first is that it is very versatile and can easily be extended to take into account many of the aspects which it is often assumed to ignore, for example transaction costs, information costs, imperfect knowledge, risk and uncertainty, multiperiod situations and so on. The implications of all these factors are considered in the next chapter. The second and third grounds of defence are explained in section 1.4 and are related to scientific method and pedagogy.

There is one main difference between the emphasis of microeconomics and that of managerial economics: the former tends to be **descriptive**, explaining how markets work and what firms do in practice, while the latter is often **prescriptive**, stating what firms should do, in order to reach certain objectives. At this point it is necessary to make another very important distinction: that between **positive** and **normative** economics. This is sometimes referred to as the 'is/ought' distinction, but this is actually somewhat misleading. Essentially positive statements are factual statements whose truth or falsehood can be verified by empirical study or logic. Normative statements involve a value judgement and cannot be verified by empirical study or logic. For illustration, compare the following two seemingly similar statements:

1 The distribution of income in the UK is unequal.
2 The distribution of income in the UK is inequitable.

The first statement is a positive one while the second is a normative one. Normative statements often imply a recommendation, in the above example that income should be redistributed. For that reason they often involve the words *ought* or *should*. However, not all such statements are normative, they may in fact be prescriptive. For example, the statement 'Firm X should increase its price in order to increase profit' is a positive statement. This is because the word 'should' is here being used in a different sense, a conditional one; there is no value judgement implied. In practice it can sometimes be difficult to distinguish between the two types of statement, especially if they are combined together in the same sentence.

What is the relevance of the above to the study of managerial economics? It is often claimed, for example by those protesting against global capitalism, that economics is of no use in answering the fundamental questions involving value judgements, like reducing pollution. Indeed, economists themselves often admit that their science can only make positive not normative statements. However, this can give a misleading impression of the limitations of economics; it can indeed be helpful in making normative statements. First, consider the following statement: *governments should make use of market forces in order to achieve a more efficient solution in terms of reducing pollution*. This might sound like a normative statement but it is actually a conditional use of the word *should* as described in the previous paragraph. Provided that the term efficiency is carefully defined, the statement is a positive one, since the concept of efficiency does not involve any value judgement.

Of course the example above only shows that economists can make positive statements that might appear to be normative statements. Now consider this statement: *world governments should aim to reduce pollution by 90 per cent in the next ten years*. This is a genuine normative statement. Economists might estimate the costs and benefits of such a policy and show the costs to vastly exceed the benefits. This in itself cannot determine policy because it ignores the distribution of these costs and benefits, both over space and time. However, it might in principle be possible to show empirically that both

rich and poor countries would suffer overall from a policy of reducing pollution by 90 per cent and that future generations might not benefit either. A realization of this might then cause the maker of the statement to change their mind. The reason for this is that they are forced to revalue their values in the context of other values that they have, in the light of economic analysis. Thus the application of economic principles can help to make normative statements on which policies are based and action taken. This issue is examined in more depth in Chapter 12.

1.2.3 *Relationship with decision sciences*

The decision sciences provide the tools and techniques of analysis used in managerial economics. The most important aspects are as follows:

- numerical and algebraic analysis
- optimization
- statistical estimation and forecasting
- analysis of risk and uncertainty
- discounting and time-value-of-money techniques

These tools and techniques are introduced in the appropriate context, so that they can be immediately applied in order to understand their relevance, rather than being discussed *en bloc* in isolation at the beginning of the text.

1.2.4 *Relationship with business functions*

All firms consist of organizations that are divided structurally into different departments or units, even if this is not necessarily performed on a formal basis. Typically the units involved are:

1 production and operations
2 marketing
3 finance and accounting
4 human resources

All of these functional areas can apply the theories and methods mentioned earlier, in the context of the particular situation and tasks that they have to perform. Thus a production department may want to plan and schedule the level of output for the next quarter, the marketing department may want to know what price to charge and how much to spend on advertising, the finance department may want to determine whether to build a new factory to expand capacity, and the human resources department may want to know how many people to hire in the coming period and what it should be offering to pay them. It might be noted that all the above decisions involve some kind of quantitative analysis; not all managerial decisions involve this kind of analysis. There are some areas of decision-making where the tools and techniques of managerial economics are not applicable. For example a sales manager may want to

motivate a salesperson to achieve a higher level of performance. In this case an understanding and application of behavioural and psychological principles is relevant. That is not to say that economists can ignore these, but managerial economics tends to focus more on behavioural aspects when they concern consumers rather than when they concern the behaviour of employees. A more detailed discussion of the scope of managerial economics follows in the next section.

1.3 Elements of managerial economics

1.3.1 Subject areas and relationships

The main areas are illustrated in Figure 1.1. This only shows the core topics covered; other areas, for example capital budgeting, location analysis and product strategy, are also frequently examined.

1.3.2 Presentation of topics

Since the objectives of a business form the starting point of any analysis of its behaviour, the theory of the firm is the subject of the next chapter. Traditionally, pricing has formed the central core of managerial economics, although this narrow focus is somewhat misleading in terms of the breadth of analysis that is possible. As the various topics are examined, further applications and extensions of analysis will be discussed. In order to examine pricing it is necessary to consider demand and supply forces; in managerial economics supply forces are discussed under the theory of costs, as will be explained in Chapter 6. In order to consider demand we must first consider consumer theory and in order to consider costs we must first consider production theory.

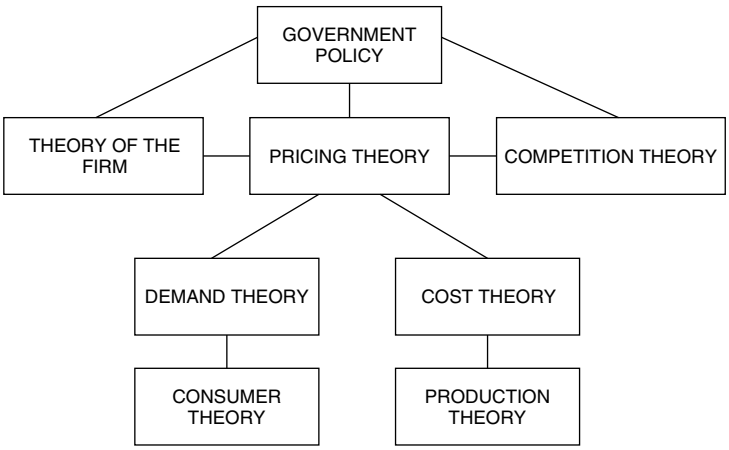

Figure 1.1. Relationships among subject areas.