Chapter 1

Introduction to Economic Analysis in Health Care

1.1 LIFE, DEATH AND BIG BUSINESS: WHY HEALTH ECONOMICS IS IMPORTANT

You may come to this book knowing a great deal about economics, but not a great deal about health care, other than your personal experience of ill health and its treatment. Alternatively, you may come to this book with experience in the health care sector, but no training in economics. Whatever background you bring to it, we are confident that you will find the study of health economics fascinating. Learning to look at health and health care issues through the distinctive lens of the economist will forever change the way you think about them.

Understanding the economics of health care is important for a number of reasons. First, health is important to us as individuals and as a society, and health care is one, though not the only, way of modifying the incidence and impact of ill health and disease. The availability of health care can determine the quality of our lives and our prospects for survival. Economic analysis offers a unique and systematic intellectual framework for analysing important issues in health care, and for identifying solutions to common problems. Quite literally, then, the economics of health care is a matter of life and death.

Secondly, the health care sector of the economy is very large. In the USA, spending passed the US$ 1000 billion mark in 1997 and currently accounts for just over 15% of the US Gross Domestic Product (GDP). Forecasts by the Office of the Actuary at the Centers for Medicare and Medicaid Services (2005) suggest that spending on health care will account for US$ 3600 billion – nearly one-fifth of all US economic activity – by 2014. Researchers from the US National Bureau of Economic Research suggest that it is entirely plausible that health care spending will reach 33% of GDP by the middle of the century (Hall and Jones, 2004). In the UK, where health care is predominantly funded by general taxation, spending on health care comprises 17% of all government spending (Chote *et al.*, 2004) and health care is a major consideration in fiscal management of the economy. Indeed, health care is a major component of spending, investment and employment in every developed economy (Reinhardt *et al.*, 2002, 2004; Fuchs, 2005), so the economic performance of the health care system is crucially linked to the overall economic well-being of a country and its citizens.

Thirdly, decisions about how health care is funded, provided and distributed are strongly influenced by the economic environment and economic constraints. Global, national and local policy responses to health issues are increasingly being informed by economics ideas and methods of analysis. One good reason for understanding health economics, even if you do not intend ultimately to practise as an analyst yourself, is to be able to engage in policy debates as an informed critic. As Joan Robinson commented: 'the purpose of studying economics is not to acquire a set of ready-made answers to economic questions, but to learn how to avoid being deceived by economists' (Robinson, 1980, p. 17). Less cynically, for those working in the health services, familiarity with the theory and methods of economic analysis is becoming essential, both to understand the context of your practice and because evidence on productivity, efficiency and value for money are increasingly the norm in modern health care systems.

Health economics is the application of economic theory, models and empirical techniques to the analysis of decision making by individuals, health care providers and governments with respect to health and health care. It is a branch of economic science – but it is not merely the *application* of standard economic theory to health and health care as an interesting topic. Health economics is solidly based in economic theory but it also comprises a body of theory developed specifically to understand the behaviour of patients, doctors and hospitals, and analytical techniques developed to facilitate resource allocation decisions in health care. Health economics has evolved into a highly specialised field, drawing on related disciplines including epidemiology, statistics, psychology, sociology, operations research and mathematics in its approach. Alternatively, it may be regarded as an essential part of a set of analytical methods applied to health, which are usually labelled *health services research*.

This chapter provides a gentle introduction to some of the basic economics concepts that underpin the more detailed and rigorous treatment of health economics in the remainder of the book.

1.2 HEALTH CARE AS AN ECONOMIC GOOD

Economics is a social science. Its central concern is the study of behaviour of economic agents – individuals, firms, governments and other organisations – when confronted with scarcity. Underpinning economic analysis are the general observations that:

- resources are limited; and
- potential uses of those resources are unbounded.

The focus of economic analysis is decisions and choices about the production and consumption of *economic goods*, defined as any good or service that is scarce relative to our wants for it.

Using this definition, health care is an economic good, in the following specific sense. The resources that are used to produce health care services, such as human resources, capital and raw materials, are finite: more of these resources can be devoted to the production and consumption of health care only by diverting them from some other use. Our wants for health care – what we would choose to consume, in the absence of constraints on our ability to pay for it as a nation or as a consumer – have no known bounds. No health care system, anywhere in the world, has achieved levels of spending sufficient to meet *all* its clients' wants for health care.

If we accept that health care is an economic good, the implications are quite profound. Choices must be made about what quantity and mix of health care to produce, how to produce it, who pays for it and how it is distributed. These basic economic questions are unavoidable. Health care is not available in endless supply, and the more health care we choose, the more of something else must be sacrificed. And because health care is so important to our welfare as human beings, these choices are particularly difficult and contentious ones to make.

The nature of choice, and the inevitable tradeoffs encountered in making these choices, are captured in what is probably the most fundamental notion in economics – *opportunity cost*. The opportunity cost of committing resources to produce a good or service is the benefits forgone from those same resources not being used in their next best alternative.

Each action taken by patients, by health care providers or by governments with respect to the use of health care involves the sacrifice of the benefits that would have been enjoyed by other, alternative uses of the resources used to provide that care. The concept of opportunity cost lies at the heart of *all* economic analysis: when

economists refer to cost, we mean opportunity cost – not to an accounting procedure. For example, weighing up the costs and benefits of a decision to make beta-interferon available to all multiple sclerosis patients involves assessing the benefits to multiple sclerosis patients from that treatment, compared with the benefits that would have been possible by using those same resources to treat *other* patients, suffering other conditions. Box 1.1 illustrates the concept of opportunity cost in relation to a 2004 recommendation by the UK National Institute for Health and Clinical Excellence that the NHS should fund in-vitro fertilisation (IVF) services for infertility (NICE, 2004).

Focusing on opportunity cost provides a powerful way of sharpening thinking about decision making at all levels of the health care system. Table 1.1 represents these decisions as a series of choices, identifying the opportunity costs associated with each.

In a predominantly tax-funded health care system such as those in New Zealand and the UK, where the government fixes the budget at the start of each period, these choices are effectively a 'top-down' hierarchy of decisions, implemented in roughly the order shown. In other health care systems, such as Germany's social insurance system, or the complex mix of private insurance and federal- and state-funded programmes in the USA, there is no hierarchy – for example, how much is spent on health care overall is partly determined 'bottom-up', by decisions of individual insurers and patients.

Regardless of how the health care system is organised, the key point is this: the production and consumption of health care incurs real, human costs, as well as creating real, human benefits.

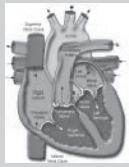
Box 1.1 The opportunity cost of in-vitro fertilisation (IVF)

To provide one course of IVF treatment, the UK's National Health Service pays around £2700. If each patient received, on average, three courses of IVF, the benefit, for women less than 40 years of age, is an increase in the probability of a successful pregnancy, defined as a live birth, by 0.3. Is this good value for money?

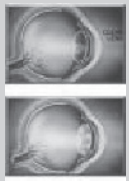
Answering this question requires us explicitly to weigh up this benefit against the opportunity cost (Devlin and Parkin, 2003). The resources devoted to each IVF patient could instead by used to provide the following.

In the UK health care sector

One-third of a cochlear implant



One heart bypass operation



Eleven cataract removals

One hundred and fifty vaccinations for measles, mumps and rubella (MMR)

Elsewhere in the UK public sector

One-thousandth of a Challenger 2 military tank

Half a junior school teaching assistant for a year

Two thousand school dinners

From a limited budget, the most efficient mix of services to fund will be that which generates the greatest aggregate benefit. But efficiency is not the only criterion: equity – fairness in the distribution of health care and health outcomes – is also an important consideration in most health care systems.

Data Sources

Challenger 2 price estimates: http://www.armedforces.co.uk/army/listings/l0023.html

Department of Health (2005) *National Tariff 2005–6*, Annex A. http://www.dh.gov.uk

Devlin and Parkin (2003)

National Institute for Clinical Excellence (2004) *Costing clinical guidelines: fertility (England)* 23 February 2004. http://www.nice.org.uk

Table 1.1 Choice and opportunity cost in the allocation of health care resources

We face choices about:	If we decide to:	The opportunity cost is:
How much should we spend on health care as a country?	Increase public spending on health care by increasing taxes/social insurance contributions	Lower net incomes for consumers, so benefits of private consumption are forgone. Higher taxes for firms either lowers profits, reducing incentives to invest and creating incentives to cut costs, including labour costs, or results in increased prices where taxes can be 'passed on' to consumers
	Increase public spending on health care by spending less on other government services	The benefits forgone from lower education, social welfare or defence spending
	Increase public spending on health care by running a fiscal debt	Economy-wide consequences of public sector debt and borrowing
How much of the health care budget is allocated to each state/region/health care purchaser?	Increase the share of the total health care budget devoted to one geographical area/health care purchaser	The health and other benefits forgone from reduced health care services in other areas
What share of the purchaser's budget should we devote to each type of health care service or product?	Increase the resources devoted to one set of services or products	The health and other benefits forgone from reduced resources for other services and products
Which patients should get access to the treatments we have decided to fund?	Ensure patients with particular characteristics, for example those who have been waiting the longest, get access to services	The health and other benefits forgone as a result of those same services not being made available to other patients, with different characteristics
How much of our limited income as consumers should be spent on health-related versus non-health-related goods and services?	Spend more of our income on health-related goods and services	The utility forgone from our consumption of other goods and services

1.3 HEALTH AND HEALTH CARE

We have referred to the subject matter of this book as health economics, but we have so far mainly discussed health care. This is an important point: *health* economics is not shorthand for *health care* economics. Although health economists are interested in

health care as a sector of the economy, it is recognised that the ultimate goal of health care is to improve health, and that other means by which health can be improved are of equal interest – as are the determinants of ill-health. Health economists may therefore be interested not just in the supply of treatment that hospitals provide but in the impact that this has on the health of patients and in the impact of housing, unemployment and lifestyles on the health of the population as a whole.

This is not to say that improving health is the only characteristic of health care that health economics takes into account. Many types of health care may impact on other aspects of a person's welfare – for example, providing reassurance or increased anxiety about their state of health, whether or not their health itself is changed. Some services offered by health professionals and health care organisations may be intended only to have such an impact, by simply providing information about health. And even when the main or sole purpose of health care is to improve health, the way in which it is provided may also be important – for example, the quality of meals that are provided during a stay in hospital may be important to people even if that aspect has no impact on health. But for most types of health care, their most important and interesting characteristic is that they are intended to alter health, not that they are services provided by the health care industry.

Given the importance of thinking about health itself, how is it to be conceptualised so that we can apply economic reasoning to it? The most powerful and important insight is that in addition to health care being an economic good, health itself can be thought of as a good, albeit one with special characteristics. It can be regarded as a 'fundamental commodity', one of the true objects of people's wants and for which other more tangible goods and services – such as health care – are simply means to create it. This theory originates from the work of Becker (1965) and Grossman (1972), but can be traced to eighteenth-century economists, principally Jeremy Bentham, who wrote of 'the relief of pain' as a 'basic pleasure' (Bentham, 1780). Economically relevant characteristics of health are that it can be manufactured by individuals and households; that it has an impact on people's welfare; that it is wanted and people are willing to pay for improvements in it; and that it is scarce relative to people's wants for it. Obviously, it is less tangible than conventional goods – though it may manifest itself in tangible ways such as episodes of sickness – and cannot be traded because it is intrinsic to people and cannot normally be transferred to others. Nevertheless, it is possible to derive important analytical insights by applying to it the tools of economic analysis such as demand and production theory, as will be demonstrated in Chapters 2 and 3. But in each case, as we discuss below, this application is not straightforward.

1.4 WANTS, DEMANDS AND NEEDS

If we accept that health is a 'fundamental commodity' we can analyse the demand for improvements in health in very similar ways to the analysis of demand for other goods

and services. A key difference is that, because health is not tradeable, it is not possible to analyse it in the context of a market – improvements in health cannot be purchased directly. Instead, we focus on the production of health as the key means by which individuals express their demand for it, which may involve the purchase of goods such as health care, thereby indirectly purchasing health improvements. Health care therefore has a 'derived demand' from the demand for health. Of course, such analysis can be used for almost any goods or services but it is of particular importance in health because the consumption of health care is usually not in itself pleasurable – indeed it is often the opposite – but is undertaken simply to improve health.

In analysing the demand for most goods and services, economics distinguishes between a *want*, which is simply the desire by someone to consume something, and *effective demand*, which is a want backed up by the willingness and ability to pay for it. Although these concepts can easily be applied to the analysis of the demand for health care, there is a complication. There is a widespread view that what matters in health care is not wants or demands, but *needs*. 'Need' is a far less precise concept than demand and is open to a number of different definitions – see, for example, Bradshaw (1972). However, health economists generally interpret the need for health care as the *capacity to benefit* from it – that is, to obtain a valued improvement in health from it. It follows, therefore, that not all wants are needs and vice versa. For instance, many women are opting to give birth by caesarean section – it is one of the most commonly performed surgical procedure on women in the UK – and 42% of these procedures are elective (Jones, 2005). Clearly many women *want* caesareans, but largely for reasons which are not related to health; indeed, the procedure entails some risks. Further, some needs are not wants. For instance, a person may experience pain and discomfort relating to their teeth and recognise that they would benefit from seeking dental treatment, but they may not *want* to seek care.

As we will see, the implications of basing the allocation of health care resources on needs rather than demands are profound. They call into question some of the most deeply-held assumptions and convictions held in economics, such as the primacy of the consumer's viewpoint in assessing their own welfare and the reliability of market forces to create efficient outcomes.

1.5 THE PRODUCTION OF HEALTH AND HEALTH CARE

Like any other good or service, health care is produced, and an understanding of many important issues in health economics requires knowledge of production theory. It is important in the analysis of the costs and supply of health care, and will be discussed in more detail in Chapter 3. It is also a key input to the understanding and carrying

out of economic evaluation, which is the subject of Part II of this book. It underlies some of the analysis of efficiency, which is, as has been noted, a key evaluative criterion. Moreover, as explained above, production is an important element of the theory of demand for health, so again some knowledge of concepts and tools of production analysis is required. It is therefore worthwhile considering briefly here the key elements and how they are applied in health economics.

Analysis of production is based on the concept of a *production function*. This is simply a relationship between the inputs to a productive process (resources such as personnel, equipment, buildings and raw materials) and the output of that process (for example, an amount of health care of a given quality). A production function focuses on analysing the relationship between quantities of inputs and quantities of outputs. It is not, however, a detailed description of the production process itself. Indeed, the production process is often regarded as 'black box' into which resources disappear and out of which emerge outputs, as illustrated in Figure 1.1. There may of course be other factors that affect the relationship between inputs and outputs – for example, market conditions – so the production function also takes account of 'mediating factors' as the figure shows.

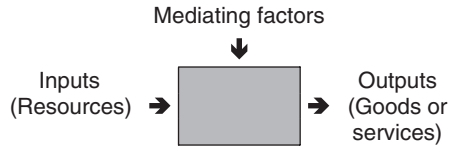


Figure 1.1 Production function.

This model is valuable because it can be used to analyse many different issues in the same framework. This flexibility arises because we can measure inputs and outputs in different ways, and look at different aspects of the relationships between them. For example, we can measure inputs as quantities of physical resources or weight them according to prices or costs; similarly, outputs can be measured in physical quantities or in terms of prices, costs or other values. By varying all inputs by the same amount and looking at the impact on output, we can look at economies of scale: is it more efficient to have large or small hospitals? By looking at the impact on output of changing one input, we can look at productivity: if we add an extra nurse to a hospital, how much does it raise the number of treatments that the hospital provides? By looking at how different combinations of inputs can produce the same level of output, we can analyse substitution between factors: is it more efficient for nurses to replace doctors in undertaking certain tasks?

Application of this model to the production of health by individuals, which will be covered in detail in Chapter 2, uses very similar kinds of analysis. For example, what

combination of prevention, self care and professional care would most efficiently produce a desired level of health?

1.6 DECIDING WHO GETS WHAT IN HEALTH CARE

As noted, to state that health care is an economic good is not to suggest that it is therefore the same as other consumer goods and services in every relevant respect. Indeed, a considerable part of past and current research in health economics is concerned with the questions of whether or not health care is 'different' and, if so, in what ways it differs and what the implications are for the manner in which society organises its production and consumption. Economics is concerned with *what* is produced, *how* it is produced and *for whom* it is produced – should these issues be decided differently for health care?

One way in which such decisions might be made is to allow market forces to determine who gets what. This is precisely the way in which production and consumption decisions about most economic goods and services – clothes, domestic insurance, MP3 players, industrial fork-lift trucks, books, wine, estate agencies, cinemas – are made. In the absence of government intervention, firms decide how much to produce and how to produce it, guided by the profit motive. Consumers decide how much to purchase and from where to purchase it, guided by their own view of their interests. Simple economic models of supply and demand predict how firms and consumers behave in such markets, and in some cases these will be relevant to health care. For example, in most countries, cosmetic surgery, such as liposuction, is bought and sold in private markets. A simple model, illustrated in Figure 1.2, would suggest that market forces will establish an equilibrium price (P), where the number of services demanded equals the number of services supplied (Q). The demand and supply curves in Figure 1.2 are explained in more detail in Chapters 2–4. Briefly, the demand curve slopes downward from left to right (P), indicating that as the price of liposuction falls the demand for it increases. The supply curve is upward sloping from left to right, indicating that as the price rises, the supply of liposuction also rises. In a private market such as this, not everyone who wants cosmetic surgery receives it; those who obtain such services are those who are both willing and able to pay for them. We can readily observe these effective demands. We do not observe wants that are *not* met because potential consumers are not either willing or able to turn them into effective demand.

However, in most countries and for most health care services and products, a reliance on unfettered market forces is rare. Typically, governments intervene in health care markets to a far greater degree than most other economic goods: regulating who may

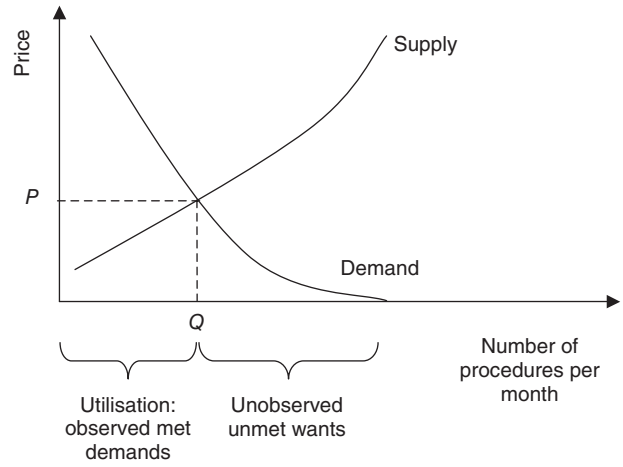


Figure 1.2 The demand for and supply of liposuction.

provide services; what providers can charge or what profits they may earn; subsidising health care either partially or fully, funded via various types of taxes; and, in some cases, directly providing health care, such as public hospitals. In the case of the UK National Health Service (NHS), the government dominates funding and provision of health care, so supply is essentially fixed in each time period by political decisions. Moreover, most health care is fully subsidised – nothing is charged at the point of consumption – so effective demand is higher than it would be if patients had to pay. Figure 1.3 shows a highly stylised economic model of the NHS, treating all health care services as measurable in some comparable unit on the horizontal axis. The demand curve is defined analogously to that in Figure 1.2. The supply curve is now vertical, indicating that supply is fixed at the level Q. Because there is no price system to reconcile supply and demand, demand exceeds supply. Who obtains health services is determined by factors other than price – for example, by waiting lists. A crucial difference is that in this case, because there is no distinction between wants, demands and needs, there are observed unmet needs.

Figures 1.2 and 1.3 show two extreme cases: a complete reliance on private markets and a complete reliance on public provision. In each case, not everyone who wants health care gets it – health care is rationed, either by price or by some other mechanism. In practice, most health care systems are a complex mix of private and public sector activities. Why are governments so often involved in health care? What is it that makes health care 'different'?

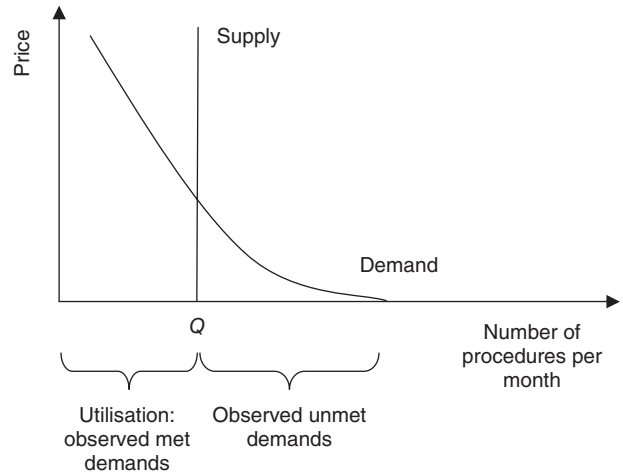


Figure 1.3 The demand for and supply of health care in the NHS.

1.7 IS HEALTH CARE DIFFERENT?

Arrow (1963) was the first to attempt a systematic analysis of this question; his seminal paper is still requisite reading for any serious student of health economics.

Arrow asserted that the principal characteristic of medical care is uncertainty. First, we do not know when we will become ill; or what health care we will require when ill health arises, or at what cost. Whereas the demand for most goods, for example food, is regular and predictable, ill health occurs randomly and its consequences can be severe. Secondly, there is uncertainty about how any given state of ill health will respond to health care. Recovery from a disease is as uncertain as its incidence.

Arrow noted the following key characteristics of consumer and provider behaviour in medical markets.

Patients Do Not Behave in the Same Way as Consumers

- They cannot 'test' the product before consuming it. Indeed, they often have difficulty gauging the quality of care even *after* experiencing it. Consumers of health care find it difficult to 'shop around' to get the best deal.
- It is difficult for patients to obtain information about what medical care is appropriate for their condition – medical knowledge is complex. As consumers, patients know considerably less than the seller, and place trust in the provider.

- There are interdependencies between consumers' actions: the health care seeking behaviour of one consumer in, for example, obtaining a vaccination against an infectious disease, affects the outcome – the likelihood of becoming infected – of others. In a more general sense, this interdependency extends to individuals caring about the health of others.

Doctors Do Not Behave in the Same Way as Other Firms

- Their entry into this 'industry' is restricted by medical licensing regulations.
- Advertising and overt competition are virtually absent in medical markets.
- Advice given by physicians is supposed to be completely divorced from self-interest – treatment is, or at least is claimed to be, dictated by clinical need, not by the financial interests of the provider.
- Providers with goals other than profit maximisation dominate provision. Profit maximisation is unlikely to be the sole or principal motivation of providers. Social and ethical factors are likely to be as important in determining their behaviour.
- Doctors sometimes charge different fees to different people: high fees to high-income people, and low fees to people with low incomes including, sometimes, charging no fees to very poor people.

The central tenet of Arrow's work is that *all* of the special economic features of medical care noted above stem from uncertainty regarding both the incidence of disease and the efficacy of treatment. Entry to the medical profession is limited to those who have met certain medical training requirements, because consumers cannot judge quality for themselves and need to be protected. And, because patients are poorly informed about what treatment is best for them, trust is the key feature in the doctor–patient relationship. If doctors were perceived to be behaving in a commercially aggressive manner, or their decisions to be influenced by pecuniary gain, this trust would quickly break down.

Finally, Arrow also noted that while the uncertainty element of ill health can be partly addressed through insurance markets, this too is problematic. Insurance markets 'work' where there is a given probability of the insured event arising; but for many conditions, demand is certain, because they are pre-existing chronic conditions. This means that there will be gaps in cover – many people will not be able to purchase health care insurance. Further, insurance works well where the person insured is unable to modify the probability of making a claim. In many cases, the demand for medical care will increase as a result of being insured, as consumers seek, and doctors provide, more and higher-quality care.

Arrow was careful not to claim that these characteristics are unique to medical care markets. For example, many professional markets share these characteristics. However,

taken together, they suggest that health care is an extreme case. The behaviours of consumers and providers of medical care are very different from the norm of a competitive market in standard economic theory. This has two implications.

First, economic analysis of health and health care behaviours requires specialised theoretical approaches that acknowledge these 'differences'. Arrow's paper marked the intellectual beginnings of health economics. Since then, theoretical and empirical research on these issues – detailed in subsequent chapters – has considerably improved our understanding of medical markets.

Secondly, a reliance on unregulated private markets for medical care is unlikely to produce outcomes that are socially optimal. Private markets are efficient where consumers are well-informed and choose firms that deliver high-quality goods at competitive prices over poor-quality, high-price firms. In such markets, the consumer's strategy is represented by the phrase *caveat emptor* – let the buyer beware. In medical care, the roles of consumers and providers are very different, and the behaviours of each are affected by the incentives created by third-party payment for care by private or social insurance or by government.

1.8 DESCRIBING VERSUS EVALUATING THE USE OF HEALTH CARE RESOURCES

We have established that, although health care is an economic good, the ways in which consumers and producers of health care behave are often fundamentally different from those observed in other markets. Economic analysis plays a valuable role in *describing* these behaviours and *predicting* the outcomes of market interactions, in terms of prices, quantities traded and the distribution of services between people. However, economic analysis frequently goes beyond description and prediction and is concerned with *evaluating* how resources are used. Much of economics – including health economics – is concerned with whether or not one set of arrangements is preferable to another.

Analysis that is restricted to the description or prediction of behaviours and outcomes is labelled *positive economics*. Positive economics is concerned with investigating the relationship between economic variables. It is descriptive and predictive in nature, and can include both theoretical and empirical analysis. For example, we might describe the market for dental care in the UK as regulated private practices that provide services to patients who pay a price for care that is subsidised by the state. We might construct a theoretical model that predicts that as price rises, demand falls. We could then obtain data on prices, use of services and other relevant factors and use statistical analysis to test this theory. We might then conclude that an increase in the price of dental services by 10% will, controlling for other factors, lead to a reduction in the number of dental

services demanded by about 6%. An example of evidence of this kind is the study by Manning and Phelps (1979). Such a study provides useful information for dentists and for those concerned with oral health policy. But the analysis, in itself, makes no judgement about the desirability of prices increasing, decreasing or staying the same – it simply tells us the consequence in each case.

In principle, facts are established in economics in the same way as in other sciences – as descriptions of theoretical relationships that are tested by real-world data. It is a characteristic of positive economics statements that they are in principle testable, whether they are derived by theoretical or empirical means. However, many statements by economists take the form of what are known as *stylised facts*. These are simplifications and generalisations of empirical findings, without precise scientific details. For example, the estimates given above of the response of demand for dental care to price changes would be regarded as valid only for the conditions under which the data were collected, such as the place and the time, and would have a quantified level of uncertainty attached to them such as a confidence interval. But if we were to observe a similar relationship in many other places and at many different times, we might state a stylised fact that the demand for dental care is not very responsive to changes in prices. Any theory of the demand for dental care would then have to be consistent with this finding.

The problem is that stylised facts are prone to misuse and to interpretation beyond the scientific goals of positive economics. As an example, Newhouse (1998) reported a survey of health economists in the USA and the UK, in which participants were asked whether they agreed with various propositions. One of these was that 'technological change is responsible for most of the medical care cost increase', which is a positive statement because it can be tested by reference to evidence. The vast majority (81%) of US economists answered this question 'correctly' – according to Newhouse's view of the evidence – by agreeing, but only around half (51%) of UK health economists agreed. The problem here is that the evidence may be very different in each country. In the USA, technological change is largely driven by market forces; in the UK, increases in health spending are politically determined, so responses to technology are a matter of choice, after weighing up costs and benefits on a case-by-case basis (Dolan, 1999). So this statement is context dependent and any view that it is a fact that can only be correct or incorrect, in a positive economics sense, is of doubtful validity.

Scientifically based positive economics provides useful information about how the world works. However, economics is also interested in what we ought to do with that information. For example, our study of the responsiveness of the demand for dental care to price might be used to determine what level of subsidy the government should provide to patients: should it be reduced, to deter excess demand, or increased to decrease unmet need? Such questions are typical of those that health economists are asked to investigate. Should we pay doctors on a fee-for-service basis, or by salaries?

Should the UK continue to fund health care through general taxation, or should it adopt a French-style social insurance system? Should the government continue fully to subsidise primary health care – or should GPs' patients be required to pay a fee? Should nurses be allowed full prescribing rights? Should Aricept™ be made available to people who have Alzheimer's disease?

In each case, scientifically based positive economics can be used to *describe* the outcomes, but a policy prescription ultimately relies on *value judgements* about their relative desirability. A value judgement is a weighing up of evidence based on the ethical and ideological values held by an individual or society. Analysis that relies at any point on value judgements is labelled *normative economics*. A normative statement can often be recognised by the inclusion of the word 'should' – for example, the NHS should not provide IVF because it provides small health benefits that are outweighed by its large costs. In summary, normative economics is concerned with the desirability of alternative economic outcomes; it is prescriptive in nature and rests on value judgements.

We noted above that an important implication of Arrow's observations about medical markets is that a reliance on private market interactions cannot be assumed to produce socially optimal outcomes. Although it does not make explicit recommendations, Arrow's paper is undertaken within a *normative* intellectual framework, observing, for example, that 'it is the general social consensus, clearly, that the *laissez-faire* solution for medicine is intolerable' (p. 967). The appropriate balance between private markets and public involvement is a central theme of health economics, and one that we will return to throughout this book.

Finally, it is important to note that the distinction between positive and normative economics is not always as clear-cut as our definitions above might suggest. One extreme view is that *all* economics research is normatively driven, in that the questions that are chosen to be the focus of positive economic investigation reflect a view on the relative importance of the topics and variables selected for analysis (Katouzian, 1980). Moreover, the interpretation of theory and data can be selected to fit a particular set of values. For example, the simple supply and demand model illustrated by Figures 1.2 and 1.3 could be used to make the points that the price mechanism is a different method of rationing from mechanisms such as waiting lists used in public services, rather than a means of avoiding having to ration; and that there may be an equal amount of unmet need using either system, but it is manifest in public provision and hidden in private provision. But it could equally have been used to make the point that publicly provided health care is not related to the value that consumers attach to health care, as expressed by their willingness to pay, and that this results in arbitrary shortages manifested as waiting lists. Given these ambiguities and complexities, one of the most valuable skills to possess as a health economist is the ability critically to scrutinise economic theory and empirical analysis – including the theory and analysis covered in this book! – to identify its both explicit and implicit normative content.

1.9 JUDGING THE USE OF HEALTH CARE RESOURCES

In economics, it is conventional to judge the use of resources using the criteria of *efficiency* and *equity*, which are dealt with in more detail in later chapters. These concepts arguably provide the main contribution of economics to decision making in health care. However, health economics inevitably has to deal with other criteria that may have analogies in other areas of economics but do not assume the same importance. The two most important are *effectiveness* and *ethics*.

The concept of efficiency is one of the most important in both positive and normative economics. Chapters 3 and 8 will give more precise and specific definitions of efficiency, but for our purposes a generic and non-technical definition, taken from Knapp (1984), is instructive: efficiency is 'the allocation of scarce resources that maximises the achievement of aims'.

The economic problem described earlier was that there are scarce resources and potentially unbounded uses for them. If our aim is to obtain the 'best' set of uses, defined in whatever way we like, then efficiency is simply the use of resources that maximises our achievement of it. For example, if our aim is to improve the health of the population given a fixed health care budget, an efficient allocation of resources will maximise the achievement of that aim.

In economic analysis more generally, efficiency issues largely concern the quantities provided of goods or services or the values attached to them. Whether or not the good or service actually 'works' is not usually a concern. However, health economics has to face that more fundamental issue: are health care services effective in improving health? Health economics analyses often assume that it is not possible for health services to be efficient unless they are effective, but the nature of health and health care means that effectiveness is not a clear-cut issue. In particular, economic evaluation of health care, which is covered in later chapters of this book, has to deal explicitly with the uncertainty surrounding the effectiveness of health care.

Efficiency is a relatively straightforward criterion compared with equity, for which it is far less clear how, for positive purposes, it should be measured and how, for normative purposes, it should be judged. It is far harder to give a general definition of equity, other than to distinguish it from efficiency and from other related concepts such as equality. Essentially, equity is a synonym for fairness; in this context, it means fairness in the distribution of health and health care between people. Equity is also relevant to assessments of the means by which health care is financed, principally the burden of finance, and whether the amount of money that people pay for health care is fair. Efficiency is largely concerned with the aim of maximising the value to society of health and health care, arising from production, consumption and distribution conditions,

while equity is concerned with distribution as an object in itself. Equality means an equal distribution, but equity means a fair distribution, with the implication that it may not always be fair to be equal – giving equal amounts of health care to both healthy and sick people, for example.

The analysis of equity issues has both positive and normative aspects. It can be positive where the focus is on using economic analysis to measure or describe distributional characteristics, such as the way health, utilisation of health care, or health care spending are spread over individuals or groups of individuals in a society. Although equity is not the same as equality, positive economics usually analyses equity defined with respect to equality – for example, whether or not people have equal access to health care given equal needs for it, or whether people with equal use of health care services pay the same amount of money for that use irrespective of their ability to pay for it.

Normative analyses are to a great extent dependent on views about which equalities define fairness – for example, equal health outcomes for equal desert, or equal use of health services for equal willingness to pay for it. It should be said that there is far less agreement within economics about equity than about efficiency and that other disciplines such as philosophy have more to say about it. But it is always an important consideration in economics, and one of the special characteristics of health and health care is that people attach more importance to equity than for many other goods and services. Chapter 7 will look at these issues and their consequences in more detail.

As we have seen, normative economics requires us to acknowledge the role of values in making judgements. Usually these values are based on ideology, but in health and health care they are often based on ethics. In principle, ethical issues apply to the economic analysis of many goods and services, but in health and health care they are very important and health care professionals have developed normative criteria which, if implemented, would impact on the way in which health care resources are used. For example, the Stanford University Medical Center Committee on Ethics has promulgated a set of ethical principles: preserve life; alleviate suffering; do no harm; tell the truth; respect the patient's autonomy; and deal justly with patients. These principles are unexceptional when applied to an individual patient but, taken literally, they conflict with economic analysis when they are applied to the real world where there are many patients. If resources are scarce, preserving life for one person might have the opportunity cost of failing to alleviate suffering for another. A more sophisticated ethical code might resolve this conflict, but ethical issues are often raised not about economics principles but about the way in which economic issues are addressed. A particularly widespread view is that it is ethically wrong for people to profit from others' ill-health, though what is meant by profit is unclear, as it presumably does not include the salaries of doctors and nurses! This view leads to a general discomfort with market-based solutions to health care issues. Box 1.2 provides an example of the discomfort generated by proposals to allow trade in human organs.

Box 1.2 Why not allow a market in human organs?

In April 2005, 88 025 US citizens were waiting for organs, principally kidneys, for transplant operations that would dramatically improve their length and quality of life (UNOS, 2005). In the UK, approximately 6000 people are waiting for organs – and fewer than 3000 transplants are performed each year (UK Transplant, 2005). In nearly all countries there is a persistent shortfall between the number of organs available – the supply of organs and the number of potential recipients – the demand for them – which results in a substantial loss of life and health. Human organs, tissues and blood products are clearly economic goods.

Why do these shortages persist? One reason is that medical technology has increased the success rate of transplantation, reducing the rate of rejection and increasing the number and type of operations that can be performed. It is alleged that another reason is that the supply of organs relies exclusively on voluntary donations: trade in organs is prohibited in the USA, as it is in all Western countries.

In 1999, an eBay trader in Florida attempted to sell one 'fully functioning kidney'. Bidding started at $25 000 and reached nearly $6 million before eBay removed the offer from its web-based auction (BBC, 1999). The outrage surrounding this event suggests a widespread view that buying and selling human organs is abhorrent.

Economists have for many years debated the case for allowing markets in blood – for a famous example see Cooper and Culyer (1968) and Titmuss (1972) – and in organs. Janet Radcliffe-Richards (1998, 2003), a bioethicist at University College, London, is among those who have recently questioned the rejection of proposals to legalise the trade in kidneys, concluding that there is little justification for the rejection of market solutions and that if the decision were based only on a careful weighing up of harms and benefits it is likely that it would be permitted. Of course, the supposition that legalising trade would improve the supply of good-quality organs is a positive economics question; moreover, it would have to be demonstrated that the health benefits from the extra supply outweigh the health benefits forgone owing to the additional resources used in collecting organs commercially. If that were the case, then the ethical counter to the argument against legalising trade is that even if it is true that trade in organs is abhorrent, the premature death and ill health resulting from an inadequate supply of donated organs is also abhorrent.

Data sources

BBC News online network September 3 1999 http://news.bbc.co.uk

United Network for Organ Sharing (UNOS) provide daily updates on numbers of potential organ recipients in the US: see www.unos.org

UK Transplant (2005) www.uktransplant.org.uk/ekt/statistics

SUMMARY

1. Health economics is the application of economic theory, models and empirical techniques to the analysis of decision making by individuals, health care providers and governments with respect to health and health care.
2. It is important because it offers a unique and systematic intellectual framework for analysing important issues in health care. This is useful because the health care sector consumes a great deal of resources, and because the organisation and delivery of health care are strongly influenced by the economic environment and economic constraints.
3. An economic good is any good or service that is scarce relative to our wants for it. Health care is an economic good.
4. A fundamental notion in economics is opportunity cost. The opportunity cost of committing resources to produce a good or service is the benefits forgone from those same resources not being used in their next best alternative. Consideration of opportunity cost means that the production and consumption of health care incurs real, human costs, as well as creating real, human benefits.
5. In order to understand the economics of health care it is important to understand the wants, needs and demand for health and health care by consumers, and the production of health and health care by producers.
6. Most health care systems are a complex mix of private and public sector activities. Government involvement in the finance and provision of health care is common. An important reason for this is the inherent uncertainty surrounding health and health care.
7. Economists often distinguish between positive and normative economics. Positive economics is concerned with investigating the relationship between economic variables. Normative economics is concerned with the desirability of alternative economic outcomes. Health economics has both positive and normative aspects.
8. In economics, it is conventional to judge the use of resources using the criteria of efficiency and equity. Efficiency can be simply defined as the allocation of scarce resources that maximises the achievement of aims. Equity is fairness in the distribution and finance of health and health care between people.
9. In health economics, we also have to take account of effectiveness and ethics. Effectiveness concerns whether or not health care 'works'; ethics essentially concerns strong value judgements widely held in health care.