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Economics

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Economics

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Professor Lumsden consults with major companies throughout the world. He is currently engaged in organising and teaching in executive seminars and programmes for many international companies.

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Introduction to the Economics Course

A not unreasonable question you might ask is, ‘What use is a knowledge of economics to the practising businessman or businesswoman?’ The answer is in two parts: the first is a ‘consumption’ benefit, the second an ‘investment’ benefit.

What this course can give you is an understanding of how the market economy functions: what its strengths and weaknesses are; how all the different parts of the economy relate to each other through the market mechanism; and what we as a society can do to modify this market mechanism to serve us better. What this course can also give you is an ability to evaluate the typically biased views of politicians pursuing their own party’s policies and criticising the opposition’s. From the myriad of statistics emerging from the economy, politicians are past masters at carefully selecting those that support their position and highlighting others with negative connotations as being attributable to mismanagement by the opposition. Almost all politicians also use the tools of economists to predict a rosy future if their policies are enacted and dire results if the opposition prevails. These are some of the principal ‘consumption’ benefits.

What of the ‘investment’ benefits? The major benefit that a comprehension of economics can bestow on the practising manager is an understanding of how economists tackle problems and an adoption of the economist’s approach. The world in which the economist operates is a very complex world because it is the real world. To understand this world, the economist builds models that attempt to isolate critical factors and strip away peripheral ones. The critical factors remaining must capture the core of the problem being investigated; without this capability, rigorous analysis of the problem is impossible.

Major managerial decisions for the successful company must be treated in a similar fashion. If your company is contemplating setting up a plant abroad and you have to decide on precise location, size of plant, layout of factories, positioning of warehouses, establishment of a research and development centre, a legal department, an international exchange department – to name but a few – you will not find the answers to these problems in an economics textbook. What you will find, however, is a methodology for setting out the major issues to be resolved, and a method and tools for analysing such a complicated problem.

Economic Concepts, Issues and Tools

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1.1 Introduction

The pattern of this book is to introduce economic concepts and theories, apply these concepts and theories to real-world problems, and finally to evaluate economic policies based on the theories. Since one issue faced by students in many subjects is not knowing whether they have absorbed their course material, this book has been designed to eradicate this perennial problem. Multiple choice questions at the end of each chapter allow self-testing of how well fundamental concepts and principles have been mastered. Accompanying cases or real problems permit testing of analytical ability in economics and help to develop the higher-order skills of synthesis and evaluation. Those, in turn, can be tested in the essays contained in the Practice Final Examinations which appear at the end of the book.

In all aspects of life, scarcity exists both for individuals and societies. Since all living creatures have wants that they attempt to satisfy but limited means of satisfying these wants, choices have to be made. Economics is the subject that studies how individuals and societies tackle such a problem. For many individuals and societies, the making of choices is not an unpleasant experience. Where to go on holiday, which restaurant to try, which Christmas gifts to choose, how to design the new University library, where to locate new roads and shopping centres are activities that, although normally facing budgetary restrictions, are not matters of life and death. For a large portion of the world's population, however, many choices *are* matters of life and death. Even in more developed countries, scarcity imposes some cruel dilemmas.

In many underdeveloped countries in the world, the problem of scarcity is stark and striking. Insufficient income is generated to keep people alive for very long: children starve and die; medical services are non-existent; housing and sanitation consist of cardboard boxes and open sewers; life is 'nasty, brutish and short'. Attempts to make life better for future generations by building towns and factories can mean fewer resources allocated to the wants of the current generation. How many people would approve, or be willing to take the decision, of sacrificing the lives, say, of 50 per cent of the children in a village so that those who remain – and their children – could have more of their wants satisfied in the future?

In Britain, for example, the number of available kidney machines is less than the number required for all patients suffering from kidney disease. Were more resources allocated to producing additional kidney machines, more lives could be saved. Should more kidney machines be produced? If so, how many, and what should be given up for them in the National Health Service budget? Should expenditure be reduced on geriatric clinics or on ante-natal clinics, or should resources in cancer research be cut back to facilitate the expansion of kidney-machine production? Or should the National Health Service's budget be increased? If so, how large should it be and what should be given up to permit improved healthcare? Would a good trade-off be fewer policemen or firemen, fewer rock concerts or films, less education and recreation facilities, or more work and less leisure?

All of these problems, which necessitate choices, arise from scarcity. The fact that scarcity is relative, that the bulk of the people living in the developed world are incomparably better off than millions of people existing in abject poverty in the poorer countries, does not diminish the need for choice, though the implications of certain choices have more serious consequences.

Different societies in the world have tackled the scarcity–choice problem in different ways. Some countries have relied on a small group of individuals making the major economic decisions: those are the centrally planned economies. Others have utilised the market system in which the forces of demand and supply impersonally resolve the scarcity–choice issue: those are the capitalist, or free-enterprise, economies. Others, primarily societies in the less developed world, have relied on traditional methods of economic organisation in which the positions of individuals in a society determine primarily their jobs and rewards. No country in the world today provides a pure example of one of the above types of economic systems. In countries such as China, Iran, Syria and Vietnam, central authorities have a much greater influence in determining what and how goods and services are produced than the governments of Japan, Germany, the United Kingdom and the USA. In the latter group, however, the governments are more active in tax/transfers policies to redistribute income from the better off to the worse off.

The primary focus of this book is on the functioning of the market or free-enterprise type of economies. The principal reason for this is that about 80 per cent of the world's output is produced by nations that are primarily free-enterprise economies even though they constitute less than 20 per cent of the world's population. The Eastern bloc countries, which under communism adhered to a planning

type of economy, moved towards the market system after the fall of the Soviet Union.

The approach is to develop answers to questions such as: How would a completely free-enterprise system work? Would the outcomes for such an economy be desirable for anyone, for a favoured few or for everyone? Are there areas of economic activity where a free-enterprise system will not provide the goods and services people want most? Can government interference in the economy make it function more effectively? Is there reason to expect the government to interfere more than is desirable? Who gains and who loses when the government interferes? In the remainder of this module a number of basic concepts are developed that must be understood to answer these questions.

1.2 Scarcity and Choice

All living creatures have wants, which they attempt to satisfy. The great white shark, for example, wants food for survival. It attempts to satisfy this want by preying on most creatures that swim in the ocean. Some shark hunters, in turn, kill sharks as a means of livelihood, made possible by the wants of others for shark meat, oil, fertilisers and shark's fin soup. Big-game fishermen hunt sharks to satisfy their wants for a dangerous chase or the mounting of a trophy. From this example, it is obvious that wants are not limited to basic subsistence items. Similarly, people's wants for housing, clothing, food, transportation, recreation and art exceed what is needed just to sustain human life. Not many decades ago, large families in what are now high-income countries were raised, as they are today in many poor countries, in houses consisting of a room and kitchen with outside toilet facilities. For most families today in developed countries, houses are spacious and convenient and meet much more than basic shelter requirements. Over time the wants of a society change; fortunately, so does the ability to satisfy them.

Whether human wants are determined by the need to survive (bread and water), the desire for pleasure (caviar and champagne), or gluttony (Roman-style eating orgies) is not a primary concern of an economist. Economists take human wants as given and do not, as economists, pass value judgements about whether people should want the things they do want. (My son believes that hitting a golf ball over 300 metres gives a meaning to life, but *as an economist* I do not question that belief!) The main focus of economics is on how societies can satisfy their wants as fully as possible, given their limited resources for providing the items that satisfy such wants. So, the economist is concerned primarily with how society can best use its available means to achieve its given wants.

It is possible to conceptualise a world in which all of society's wants are fully satisfied, but such a paradise has never been observed. Consider only the materialistic side of such a world. Not only would there have to be a sufficient (infinite?) supply of all the goods and services that each and every person wanted but also sufficient time to consume and enjoy them. The richest person in today's world faces scarcity, for example, in the form of a limited number of years in a lifetime and the unwillingness of owners of unique assets to part with them. Bill Gates has only

24 hours in every day and it is not clear that the Louvre in Paris would be willing to part with the *Mona Lisa* no matter how much he wanted this painting and no matter how much he was willing to pay for it. From a practical viewpoint, it does not matter whether we envisage a world in which human wants are infinite or one in which human wants are finite but greater than resources can satisfy; in both cases we finish up with a world of scarcity. It is only in such a world that economics has any meaning.

Items that satisfy some wants are provided by nature without human effort. Air, rain, beautiful scenery and sunsets can increase human well-being without human effort. They are known as ‘free goods’. Other items which increase well-being, however, require considerable coordination of effort on the part of many thousands of individuals. Producing a car or sending a satellite around Mars is not a gift of nature. Thus, with the exception of the free goods provided by nature, the ability of individuals or nations to provide the goods and services that help satisfy wants is limited by the resources under their command. Not all students can earn A grades in every subject because of resource constraints – time and ability. Similarly, life expectancy is low in many parts of the world because of inadequate supplies of food, shelter and medicines.

A ‘resource’ is defined as anything that helps produce the goods and services people want. The wheat farmer’s fields are resources, as are his tractors, fertiliser and seed, all of which are required to produce the wheat that people want. Similarly, the manager of a professional football team requires resources to produce football games that people pay to attend. These resources include a playing field, uniforms, trainers, administrative staff and football players, including the reserves who may only play occasionally during the season. To provide students with a traditional college education requires buildings, professors, computers, textbooks, and a significant input of students’ time – another resource. Studying by distance learning renders some of those resources obsolete!

It is the dual existence of insatiable wants and limited resources that produces what economists call the fundamental fact of scarcity. Because of scarcity, all individuals and nations face the same problem, namely the allocation of limited resources among the goods and services that are desired. Students have to decide how to allocate their time among study, drinking, sports, and sleeping activities. Households have to decide how to allocate their incomes among food, clothing, health services, education, transportation, and leisure activities. A nation has to decide how to allocate its labour force, lands, factories, and other resources to produce national defence (jets, nuclear submarines, army, navy and airforce personnel), health services (medical schools, hospitals, kidney machines, AIDS clinics), educational services (pre-school playgroups, university campuses, audio-visual equipment, computers, teachers), transportation services (motorways, aircraft, private cars, railways) and food and drink (wheat, soya beans, steak, beer, whisky).

Economics is the study of how individuals and nations use resources under their command to satisfy their wants as fully as possible or to maximise their welfare (or *utility*) given their resource constraints. Economics, therefore, is concerned with scarcity and choice. Scarcity exists because there are insufficient resources to satisfy

all wants fully. The need for choice arises because resources allocated to the satisfaction of one want cannot, by definition, be available to satisfy other wants simultaneously. A child with only \$1.00 to spend in a sweet shop has a resource constraint, i.e. \$1.00. Given that the child wants many different types of sweets, that child has a choice problem. A dollar spent on jelly babies means no chocolate bar. Similarly, every hour the President of the United States allocates to dealing with foreign policy is one hour less for domestic policy, electioneering, spending with his family, or sleeping.

Some wants can be satisfied without the need for choice. This is possible only when the resources required to produce continuously those goods that satisfy such wants are not scarce. Water and fresh air used to be regarded as free goods. This is no longer true in many parts of the world. These bounties of nature are required at different times, in different locations and in differing amounts. Even if there were enough air and water in the aggregate, resources may be required to obtain the right amounts in the right place at the right time. For example, in many parts of the world the rainfall is sufficient to provide for agricultural wants without human effort. In other parts, such conditions do not hold and water is often stored, piped and sprinkled in fields. In other words, water in such locations is not a free good: the use of the resources required to transport water to the right place at the right time in the right quantities is the price that must be paid for irrigation. Similarly, fresh air in the Alps is a free good; fresh air in Los Angeles often is not. To obtain fresh air in Los Angeles on a smoggy day requires the use of scarce resources to provide for air-conditioning. To condition the air of the entire city of Los Angeles is regarded, currently, as unacceptably expensive.

1.3 Preferences, Resources and Economic Efficiency

To satisfy wants as fully as possible, given limited resources, nations must make choices. No matter how a nation is organised, no matter which political philosophy is followed, the choices all nations face are common. The economic decisions to be made involving choices are:

- (a) what goods and services to produce;
- (b) how to produce the selected goods and services; and
- (c) what share of these goods and services are to be given to each individual or household.

These are the ‘what’, ‘how’ and ‘for whom’ problems. Although common to all nations, they are tackled in a wide variety of ways.

Education provides a striking example involving the above three problems. How much education should be provided in a nation and of what should it consist? How should educational services be produced? Should there be more teachers and smaller classes, a greater use of videoconferencing and computer-assisted learning, or should students study distance-learning courses at home? Who should receive higher education – anyone who wishes, only the most intelligent members of society, or only those who are prepared to pay? In some countries, over 50 per cent of the college-age population participate in the higher-education process. In other

nations the proportion of the college-age population going to universities is less than 1 per cent. Some countries do not have universities, and in some areas of the less developed countries no elementary schools exist.

To use a nation's resources as effectively as possible implies producing the goods and services that will satisfy the people's wants as fully as possible, which in turn implies taking account of the people's preferences. Thus to achieve the highest possible level of utility in a society from given resources means assigning priorities to the potential sets of goods and services that could be made available. Families do this continuously. In deciding how to spend the weekly budget, a household will try to choose that set of goods and services (from the many possible sets that could be purchased with that budget) that will provide the highest possible level of utility. The set it hopes to choose is the affordable combination of food, drink, clothing, recreation, etc., compared with all of the sets rejected, that is best suited to the preferences of the household.

If a given amount of goods were allocated randomly among a group of individuals, it might be possible to increase utility levels without increasing the amount of goods, through voluntary exchange. For example, during World War II prisoners in camps sometimes received Red Cross parcels containing tinned milk, jam, butter, tinned meat, chocolate and cigarettes. Each prisoner received an identical package but had his own individual preferences. Prisoners who did not smoke but liked chocolate could raise their utility levels by exchanging cigarettes for chocolate with prisoners who smoked but did not like chocolate. Both groups could become better off through exchange without any increase in the total amount of chocolate and cigarettes. We can see from this example that by exchanging a good with a low level of utility for a good with a high level of utility, an individual can increase his total utility level. The voluntary exchange is possible only if such a condition holds for at least two individuals, so both will benefit. A point will be reached ultimately where all possible exchanges that can increase utility will have been made. Then utility can be increased only if additional goods or resources become available.

This system of exchange is vital to the welfare of most countries in the world today. In the field of international trade, Scotland exports whisky to France, which in turn exports wine to Scotland. The bulk of the world is dependent on the oil-exporting nations to provide fuel for transport, heating and industrial needs. Russia, one of the world's major caviar producers and exporters, buys food from the USA, Canada and Europe. Such exchanges among nations increase people's utilities by accommodating differences in preferences.

It is in the interest of a nation to use as few resources as possible in the production of any one good. The fewer the resources employed in producing a good, the greater will be the resources available for the production of other goods and, consequently, the more fully a nation's wants can be satisfied. The term 'engineering efficiency' (or 'technical efficiency') describes a situation in which a good of stated quality is produced using the fewest possible resources. For building a bridge over a river, there is a minimum amount of steel necessary to ensure that the bridge will not collapse when fully utilised. However, it would be a complete waste of steel to keep adding support structures to a bridge in order for it to bear, say, several 100-

ton trucks if no such vehicles will ever use the bridge. It would be a waste – technical inefficiency – since steel has many alternative uses.

The concept of *economic efficiency* is more complex than the concept of engineering efficiency. For economic efficiency to prevail in the allocation of a nation’s resources, not only must the least amount of resources be used in the production of each good and service but that set of goods and services that is produced must be the set that satisfies wants as fully as possible. A country could build 100 bridges in a manner that was efficient from an engineering viewpoint but could be using resources poorly from the viewpoint of economic efficiency. This would be the case if the bridges, despite being engineering-efficient, yielded less satisfaction to the society than the other goods that could have been produced with the resources used to produce some or all of the bridges. If building 100 bridges, however, did constitute an economically efficient allocation of resources (think of Venice!) it would mean that not only was each bridge constructed in an engineering-efficient fashion but the alternative goods forgone would have yielded less satisfaction than 100 bridges.

1.4 Marginal Analysis and Opportunity Cost

One possible way to solve problems in which economic efficiency is the goal is to consider the potential welfare from every possible resources allocation and choose that allocation that yields the highest welfare. Consider Table 1.1, which shows the scores a student will achieve in a two-hour economics final examination for different allocations of time between objective questions (maximum score 33 points) and essay questions (maximum score 60 points). The limited resource is two hours of examination time, the goal is score maximisation, and the choices are different allocations of time to objective and essay questions.

Total score is at a maximum when 40 minutes are allocated to objective questions and the remaining 80 minutes allocated to essays. Since no other allocation yields a higher total, this is the most efficient use of the two hours of examination time.

Table 1.1 Examination scores

Objective questions		Essay questions		Total score
Time spent (minutes)	Score	Time spent (minutes)	Score	
120	33	0	0	33
100	32	20	23	55
80	29	40	38	67
60	25	60	48	73
40	20	80	55	75
20	11	100	58	69
0	0	120	60	60

The disadvantages of such an approach are that, first, it may not be feasible always to consider every possible allocation of resources and, second, the calculations could be very time-consuming. As the number of options considered increases, the number of possible permutations approaches infinity. An alternative way to find the optimal allocation of a limited resource is to start with a particular allocation and to determine how total utility or welfare changes as the allocation of resources changes. If total utility increases because of the reallocation, then the change should be made; if there is no change in the allocation of resources that will result in an increase of utility, then the optimal allocation already exists.

In Table 1.1 consider the allocation of time of 80 minutes on objective questions, yielding 29 marks, and the remaining 40 minutes on essay questions, yielding 38 marks. A decrease in time of 20 minutes on objective questions costs the student 4 marks on these questions, but 20 minutes more allocated to essays gains the student 10 marks. The net gain in marks (utility) of 6 ($10 - 4$) is positive, indicating that the change is worthwhile, i.e. the new allocation of 60 minutes to objective questions and 60 minutes to essay questions is superior to the former 80–40 allocation. But is it optimal? Consider a further reallocation of 20 minutes, i.e. 40 minutes on objective and 80 minutes on essay questions. The net gain is 2 marks ($7 - 5$). A further change of 20 minutes results in a decrease of 6 marks ($-9 + 3$). Thus 40 minutes to objective questions and 80 minutes to essays is the optimal time allocations. Making an incremental or small change in that allocation causes benefits and costs (gains and losses) to occur. The gain from the incremental change is called the marginal benefit. The loss from the change is called the marginal cost. Any action or activity in which the marginal benefits exceed the marginal costs will, if undertaken, result in an increase in total utility or well-being.

The technique of considering incremental changes in resource allocation and weighing the marginal benefits and marginal costs is known as *marginal analysis*. Marginal analysis, therefore, is a useful technique for solving problems involving optimisation. Because optimisation problems in economics contain constraints, e.g. income, time, labour or materials, they are called *constrained maximisation problems*. In the analysis of such problems, marginal analysis is used widely by economists, business people and other decision makers, and it can be important in avoiding costly and common mistakes.

In searching for a partner or mate, an individual uses marginal analysis. How? What are the chief characteristics of your ideal partner? He/she should be generous, sensitive, intelligent, healthy, industrious, good-looking, athletic, etc., etc. You start searching for the ideal mate; the longer your search, the greater is the probability you will find a more suitable partner, just as the more often you go fishing the higher the chance you will catch a world-record fish. But searching is not costless; it consumes one of your valuable resources – time. A point will be reached when you will decide that the benefit of additional searching (i.e. an even more suitable partner) is not worth the extra cost (i.e. the time required). Indeed, there will be many countries with a vast supply of potential partners that you will ignore. You will then turn to the ‘best’ partner you have found to date and, rather than explain the principle of marginal analysis, you will state you have fallen in love.

If you don't like that example, try a motorway. Table 1.2 contains hypothetical data on the benefits and costs of different lengths of a motorway extension.

Table 1.2 Extension of motorway

	1 mile	2 miles	3 miles	4 miles	5 miles
Total benefit (\$m)	2	5	9	12	13
Total cost (\$m)	1	2.5	4	6	8

One might conclude that the five-mile extension should be built because total benefits (\$13 million) exceed total costs (\$8 million) and this, therefore, must be an efficient way to allocate resources. The marginal analysis approach shows the error in the logic: for the first mile, total and marginal benefits are equal (\$2 million), as are total and marginal costs (\$1 million) and so, since marginal benefits exceed marginal costs, the first mile should be built. In adding a second mile, the marginal benefits are \$3 million (\$5 million – \$2 million) and the corresponding costs are \$1.5 million (\$2.5 million – \$1 million). Thus the second mile is worth adding as are, by similar reasoning, the third and fourth miles. However, for the fifth mile the marginal benefit is \$1 million (\$13 million – \$12 million) and the marginal cost is \$2 million (\$8 million – \$6 million). Since the marginal cost exceeds the marginal benefit, the activity – the building of the fifth mile – should not take place despite the fact that the total benefit of five additional miles of motorway exceeds the total cost. Only four miles of additional motorway should be built.

When considering the best use of resources the alternative goods or outputs that could have been produced must be considered, since in allocating a resource to any one activity all alternative uses of that specific resource are sacrificed. Two hours spent in playing tennis are no longer available for watching television, eating or studying. The real cost to society of any activity undertaken is the best alternative forgone. Economists call the best alternative forgone the *opportunity cost* of the activity undertaken. Imagine an economy with adequate natural water supplies that has resources to build an additional school or an additional hospital but not both. It decides to build the school since it concludes that the marginal benefits from a school exceed the marginal benefits from a hospital. The opportunity cost of the school is not the money required to finance the building for the school or the resources themselves; the opportunity cost of the school is the hospital – the best alternative forgone. Assume that the same resources could be used to build a reservoir. The reservoir is a distinctly inferior alternative to the hospital since the country has an ample water supply. Thus the opportunity cost of the school is not the reservoir because the reservoir would provide too low an assessment of the opportunity cost of building the school. Similarly, in the previous example of the allocation of time between objective and essay questions (*see* Table 1.1), the opportunity cost of time allocated to objective questions was time allocated to essay questions, not day-dreaming during the examination, which would have had low marginal benefits in terms of final score.

I.5 Different Economics Systems

There are three methods of solving the scarcity–choice problem: by tradition, by command, and by markets. All societies today utilise each of the methods; what distinguishes different nations is the relative weights or reliance placed on each of the methods.

In traditional economies, the set of goods and services to be produced and the methods of production typically are determined by social custom and habits established over time. The traditional method of resource allocation, common in feudal times, is the principal solution to the economic problem in many underdeveloped societies; it is also prevalent in certain rural and agricultural communities in developing nations. Under this system, most economic activity is concerned with eating, clothing and housing wants. Many of the societies are largely self-sufficient at a relatively low standard of living, with some trade taking place with the ‘outside’ world. Since there is a heavy reliance on nature for much of the output produced, changes in output are caused chiefly by the vagaries of weather. Too little or too much rain can significantly affect crops and, consequently, the standard of living. Methods of production in agriculture and fishing, for example, are often primitive, with specific tasks being assigned to different members of the community.

How the output is distributed within such societies is often determined by birth-rights and other social factors, and changes in the social order occur infrequently and slowly. Examples of traditional organisation are found in the animal kingdom. The tundra wolves, to cite one case, normally lay claim to a certain territory within which they hunt caribou. Only certain wolves hunt and, within the hunting pack, individual wolves perform specific tasks such as herding the prey or killing it. The distribution of the kill is determined by the status of individual wolves. Some have first choice and others are detailed to carry meat to the pregnant females.

While not often recognised as a significant factor in developed nations, the traditional method does still exist, especially in economic organisation within the home. In the last century, economic organisation within the home has undergone significant change. The tradition of men being the primary wage-earner and wives doing the cooking, housekeeping and dressmaking has altered as participation of women in the labour force has approached that of men. Despite dramatic changes, however, the responsibility of weekly shopping and cooking in many homes still lies in the female domain. Many children are assigned certain tasks such as room tidying and setting and clearing the table. The willingness of children to ‘volunteer for extra duties’ has been noted to increase markedly, albeit briefly, when they pass their driving tests. The male in the home typically takes care of minor repairs and has the responsibility of making sure cars are functioning. In some households the female is in charge of the accounts, in others the male. The pattern varies significantly over households, but whatever the pattern much of the household economy functions along traditional organisational lines.

In the command solution to the scarcity–choice problem, the set of goods and services to be produced is determined by a central ruling body or bodies. Once the set has been determined, it is treated as a target. A plan, often of five years in duration, is drawn up to implement the choice decision. Drawing up such a plan for an economy is an extremely complex problem. Suppose 5000 tractors are assigned a high priority

in the plan. The resource requirements for them of machine tools, steel, rubber, paint and labour have to be specified – as they do for all other goods and services in the plan – and matched against available resources. If resources appear insufficient, choices as to what should be omitted or reduced have to be made; if surplus resources exist, the plan has to be revised in the opposite direction. Errors in planning can be extremely costly: if sufficient spare parts for machine tools, for example, are not fully planned for, tractor output could be reduced, food output in turn could be less than planned, which in turn could have repercussions throughout the whole economy. Because of unforeseen elements, a degree of slack, or flexibility, must be built in to every plan. Some allowance is made normally for individuals and managers to adjust the deployment of resources; incentives are often provided to utilise resources more effectively and increase output above the level stipulated in the plan.

The problem of the distribution of goods and services is solved basically by stipulating wage and salary levels for different types of workers and income allowances for people not in the labour force, and also by fixing the prices of goods and services. When the plans ‘go wrong’, two things happen. First, since there is no compulsion for people to spend all of their incomes, some goods produced and available in the stores may not find buyers, i.e. such goods are not in accordance with consumers’ wishes. The prices may be reduced; the goods may be withdrawn. Conversely, consumers may not be able to buy the goods they want because they may not be available in sufficient quantities at the fixed price to satisfy all the consumers’ demands. Thus queues are not uncommon in planned economies. When information circulates that a store has a specific good that consumers want, ‘first come, first served’ becomes the distribution method superimposed upon the price mechanism. *Black markets*, many of which are prohibited in planned economies, form. Penalties can be levied on people dealing in such markets. In a similar vein, foreign travellers to certain planned economies are warned in advance of their trip that foreign-currency dealings with residents are prohibited and subject to fines, confiscation of property, and imprisonment.

In most planned economies significant economic activities, especially in agriculture, are conducted through free markets. Farmers are permitted to sell part of their output in local towns and villages, and are allowed to keep the income earned.

In the market (capitalist/free-enterprise) solution to the scarcity–choice problem, which sets of goods and services are produced is determined by the interaction of consumers who are willing to pay for them and producers who are willing to supply them in response to market prices. Consumers wishing to maximise their welfare bid for the goods that most satisfy their wants. Producers wishing to maximise their welfare (profits) produce the goods and services that they believe consumers most want.

Markets are the places where consumers and producers ‘meet’ and where prices are determined and exchange of goods and services takes place. Some markets are highly localised – babysitting, window cleaning and everyday shopping are examples. Other markets are international – oil, wheat and gold, for instance.

Competition for resources to produce goods and services determines the prices of these resources and, consequently, the distribution of income among resource owners in capitalist societies. Those people with resources in greatest demand will receive the largest incomes and consequently will be able to buy more goods and services than

individuals with fewer resources or those who earn a lower return in resource markets. People with higher incomes will have more 'money votes' and consequently a greater say in the set of goods and services produced. Thus the capitalist system is one in which every money vote, not every person, is equal. It is one that permits concentration of income and wealth. It is one that rewards individuals not according to their needs but according to the value of the contribution of their resources to production. It is one in which individuals have freedom to own resources, to offer them or withhold them from the market, and to choose where such resources will be employed. Those individuals who have no resources that can command a return, or meagre resources that earn for them a low income, have to rely on the charity of upper-income groups or, through government action, a transfer of income to purchase the goods and services they want.

The capitalist system also has to rely on government or some other form of collective action to produce certain goods (such as national defence) that are unlikely to be forthcoming in the correct quantities through individual action. Similarly, collective action is necessary to deal with national or international problems such as pollution. Thus all economies today that fall in the capitalist camp still have significant sectors of government control or planning.

Although there are few, if any, examples of *purely* traditional, planned or market economies in the world today, societies or nations are so classified according to the type of solution predominantly used to allocate resources. A concomitant of how resources are allocated is resource ownership. In market economies, resources are owned by individuals or private groups of individuals, in command economies by the state, and in traditional economies by both the state, or collectively, and by individuals. Again, in the real world the sharp dividing lines are blurred. In all capitalist countries, the national government and state or local governments own resources; in planned economies some private property and resources are owned by individuals.

Furthermore, as time passes, the classification of a society does not necessarily remain fixed. It changes as the solutions to the problem of what to produce, how to produce it, and how to distribute production alter in response to developments in the overall economic, political and historical context within which the nation exists. For example, in the thirteenth century Britain had a feudal type of economic system operating largely in the traditional mode. The Industrial Revolution of the eighteenth century enabled Britain to become the 'workshop of the world' and to emerge as the first and most advanced of the market economies.

From the end of World War II up to 1978 a larger proportion of allocative decisions were made through the command mode as a result of the Labour Party policies. This trend was reversed, however, as a result of the 1979 and subsequent Conservative Party election victories. Many state-owned resources were privatised and market forces played an ever increasing role in resource allocation. There was no reversal of this role when the 1997 UK general election witnessed the return of the Labour Party. Interestingly, however, the Labour government's attempts to market everyone 'where equal' had efficiency impacts on industries controlled by central authorities, especially the National Health Service and Education. The decline in quality led to many higher-income individuals abandoning state provision of medical service and education for the private sector. Recent governments have pursued a policy of cutting back on

public spending, the outcome of which is a vastly reduced role for government in the allocation of resources.

The last three decades also have witnessed a greater market element operating in the command economies of China, Russia, other Eastern Bloc countries, and many of the emerging nations of the world, this trend culminating in the break-up of the communist trading bloc and the commitment of the old command economies to the market system.

1.6 Production Possibilities Curve

A useful tool for capturing many of the issues in this module is the *production possibilities curve*, which forms a production *frontier*.

Imagine a two-good (guns and butter) economy with a given supply of resources. Assuming all resources are employed in an engineering-efficient fashion, there will be an upper limit to the amounts of guns and butter that can be produced. Suppose Table 1.3 and Figure 1.1 represent the upper limit. If all resources are allocated to butter production, the economy's output will be 210 tons of butter and no guns. Conversely, if all resources are allocated to gun production, the output will be 175 guns and zero tons of butter. Clearly, it will not be in society's interest to produce any output within the production frontier, for example at point *z* in Figure 1.1, either through adopting inefficient production techniques or through having some resources unemployed. The reason is simple: more output could be produced and consequently wants could be more fully satisfied. Points *x* or *y* or any intermediate point on the frontier are preferable to point *z* because at least as much of each good will be available compared with the 80 guns/144 tons of butter at point *z*. More generally, for any point *within* the frontier there is at least one point on the frontier that would be preferable.

Table 1.3 Production possibilities

Guns	Butter (tons)
0	210
20	207
40	198
60	186
80	168
100	144
120	119
140	82
160	42
175	0

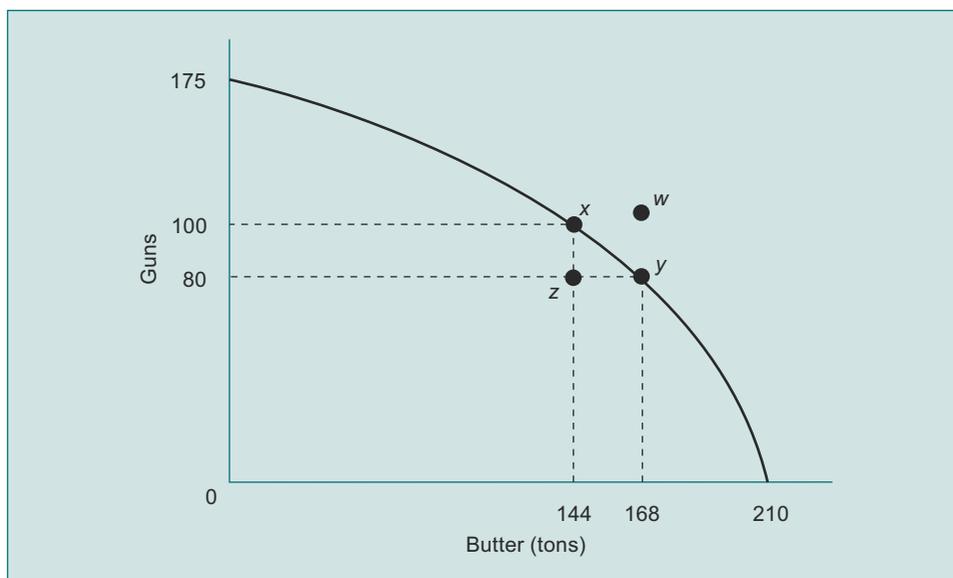


Figure 1.1 Production possibilities curve

Where should society produce on the frontier – at x or at y or at some other point? If the economy starts off at point x , the production of more butter as would occur at point y involves sacrificing some guns. In moving from x to y butter output increases from 144 to 168 tons, a gain of 24 tons, at the expense of 20 guns (100 down to 80). In other words, when the economy is at x the opportunity cost of 24 tons of butter is the best alternative forgone, namely 20 guns. Is such a trade-off worthwhile? The answer depends on whether society values the 24 additional tons of butter more than the 20 guns sacrificed. This is therefore a problem involving marginal analysis: the marginal cost of the move from x to y is 20 guns; the marginal benefit is 24 tons of butter. If the marginal benefit exceeds the marginal cost in society's eyes, the change is worthwhile. Note that the opportunity cost of butter is not constant but varies over the frontier. The more butter there is, the higher is its opportunity cost.

It can be seen from Figure 1.1 that point w , which is preferable to points x or y , is unattainable because insufficient resources or technology exist to make such an output possible. The same figure can be used to illustrate another economic issue, namely *the sacrificing of present consumption for future consumption*.

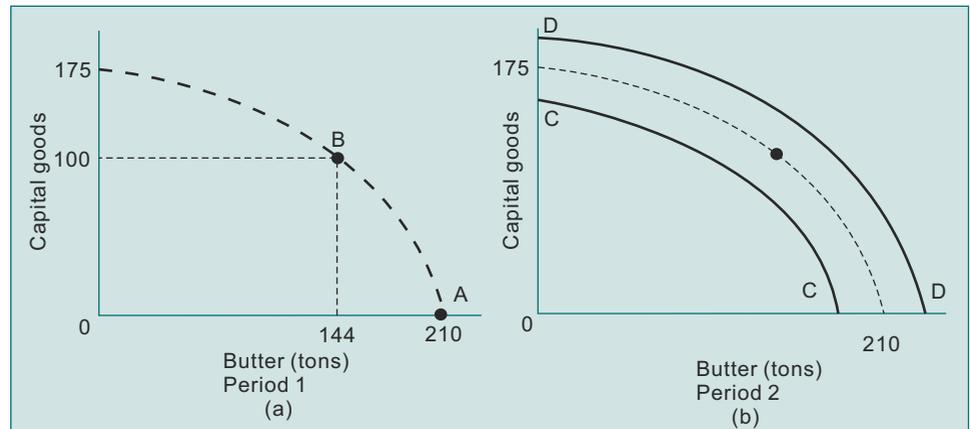


Figure 1.2 Production possibilities over two time periods

In time Period 1 (*see* Figure 1.2a), a new good is introduced – capital goods, consisting of, say, tractors and machine tools. No guns are produced in Period 1. Point A represents no capital goods being produced, only 210 tons of butter. Point B represents 144 tons of butter and 100 capital goods. Is the movement from A to B worthwhile? For the answer, consider Period 2's production possibilities curves (*see* Figure 1.2b). Curve CC represents the situation in which no capital goods were produced in the previous period. Indeed CC represents less output than the curve in Period 1 because some resources depreciated in the production process and were not replenished. Curve DD represents the production possibilities in Period 2 given that point B was chosen in Period 1, i.e. given that 66 tons of butter ($210 - 144$) were sacrificed in Period 1 to produce 100 machine tools. Whether such a sacrifice is worthwhile will depend upon how society evaluates the loss of 66 tons of butter in Period 1 against the enhanced production possibilities in Period 2.

The measurement of the respective marginal costs and marginal benefits may not be simple. They may involve value judgements, and certain issues are liable to be keenly debated and sometimes even fought over because the burden of the costs that emerge from the choice made may be borne disproportionately by different groups within the society. For example, a family deprived of butter if option B is chosen in Period 1 may see their children die, and that family could argue that such a cost was not worth the benefit that would be enjoyed by others in Period 2.

Economists are no better qualified than doctors, rock stars or students in making such value judgements – these are normative issues. What economists can do is present the options available with their concomitant benefits and costs – these are positive issues. Individuals and society as a whole must make the decisions of their choice.

Learning Summary

This module has taught you that it is the dual existence of insatiable wants and limited resources that produces for all societies the fundamental fact of scarcity, and consequently the need for choice. Resources used to satisfy one want are no longer

available to satisfy others. The decisions to be faced by all societies are the ‘what’, ‘how’ and ‘for whom’ decisions.

A useful tool for analysing problems involving maximisation is marginal analysis – a technique that pervades all aspects of economics so that it is important that you master the concept at this stage.

You are now aware that not all societies solve the ‘what’, ‘how’ and ‘for whom’ problems in the same way and you know the differences among them.

One useful tool for analysing output decisions facing an economy at a point in time and also over time is the production possibilities curve. You are now reasonably familiar with this tool – you will meet it again.

Review Questions

Multiple Choice Questions

- 1.1 Which of the following is correct?
The concept of scarcity means that resources:
- A. are not available in sufficient quantities to satisfy any individual’s wants.
 - B. are not available in sufficient quantities to satisfy all wants for them.
 - C. cannot be increased in quantity to any significant extent.
 - D. are of primary importance in satisfying the wants of society.
- 1.2 It has been said that the fundamental fact of scarcity is no longer applicable to the US economy. Which of the following is correct?
This statement is:
- A. true, because the US is one of the richest countries in the world.
 - B. true, because the resources that are scarce in the US can be imported from abroad.
 - C. false, because not all the wants of all US citizens are fully satisfied.
 - D. false, because a significant number of families in the US have incomes below what is known as the poverty level.
- 1.3 Examples of free goods are
- I. a free tyre with every four purchased.
 - II. a crystal drinking glass with every 20 litres of petrol.
 - III. fresh air in an air-conditioned building in Oxford Street.
- Which of the following is correct?
- A. II only.
 - B. II and III only.
 - C. I, II and III.
 - D. Not I, not II and not III.

- 1.4 Which of the following is correct?
 The fact that individuals' tastes and preferences differ implies that:
- no two individuals ever buy the same quantities of any given good in a given time period.
 - free exchange of goods and services can increase society's welfare without an increase in the quantities of goods and services available.
 - an individual's wants can never be fully satisfied until all of a nation's resources are efficiently utilised.
 - a nation's wants can never be fully satisfied.
- 1.5 A given quantity of goods can be produced in a variety of ways using different amounts of two resources, A and B.
 Which of the following statements is correct regarding engineering efficiency?
- Method 1 uses 5 units of A and 10 units of B.
 - Method 2 uses 10 units of A and 4 units of B.
 - Method 3 uses 6 units of A and 4 units of B.
- Method 2 is more efficient than method 1.
 - Method 3 is more efficient than method 2.
 - Method 3 is more efficient than method 2 and method 1.
 - Insufficient information exists to determine whether one method is more efficient than any other.
- 1.6 An economically efficient society that is capable of producing more goods and services in year 2 than in year 1 must
- have access to superior productive techniques in year 2.
 - have more resources available in year 2.
- Which of the following is correct?
- I only.
 - II only.
 - I or II or both I and II.
 - Neither I nor II.
- 1.7 A government has completed a cost–benefit study showing that the annual value of the services from an additional 100 miles of motorway would be £4 million and the annual value of the services from an additional airport would be £3 million. To achieve the most efficient use of resources, what should the government do?
- Construct only 75 miles of motorway (that is three-quarters of 100).
 - Construct only the 100 miles of motorway.
 - Construct both the 100 miles of motorway and the airport.
 - Not necessarily construct either any additional motorway or the airport.

- 1.8 'The problem facing the government is whether to build a new motorway system or to improve public transport throughout the country during the next three years. Resources for both projects are not available. It must be one or the other.' Which of the following is correct?

The opportunity cost of the new motorway system mentioned in the preceding paragraph is:

- A. greater than the economy can afford.
- B. an improved public transport system.
- C. the money required to pay for it.
- D. the resources required to build it.

- 1.9 The following table shows the extra daily benefit and costs that would be derived from adding successive terminals at an airport in order to increase passenger-handling capacity.

	Additional capacity (passengers)	Additional bene- fits (£)	Additional costs (£)
First terminal	1 000	45 000	40 000
Second terminal	1 000	35 000	25 000
Third terminal	1 000	25 000	20 000
Fourth terminal	1 000	15 000	18 000

How large an expansion programme should the airport undertake to maximise net benefit (total benefit minus total cost) and why?

- A. Build one terminal since that provides the greatest marginal benefit.
- B. Build two terminals since that is the level of expansion where the difference between marginal benefit and marginal cost is greatest.
- C. Build three terminals since that is the largest number of new terminals for which marginal benefit exceeds marginal cost.
- D. Build four terminals since the programme would involve the largest total benefit and the lowest marginal cost.

- 1.10 Consider the following statements:

- I. For centrally planned economies, since all members of the labour force are allocated jobs, scarcity is not a problem.
- II. For capitalist economies, since workers occasionally become unemployed, scarcity is not always a problem.
- III. For both centrally planned and market economies, since resources are insufficient to satisfy all wants, scarcity is a problem.

Which of the following is correct?

- A. I only.
- B. II and III.
- C. III only.
- D. Not I, not II and not III.

1.11 In the present programme of a National Health Service (medical services provided by the government at zero cost to patients), the total benefits exceed total cost. The government's goal is efficient allocation of resources. Which of the following is correct?

It should undertake an increase in expenditure on medical services only if:

- A. the total benefit derived from all medical services would still exceed the total cost.
- B. the total benefit derived from all medical services would exceed that of any other good.
- C. the benefit from the extra medical services would outweigh the cost of doing with less of other goods.
- D. such expenditures improve people's health independently of the costs.

1.12 Consider the following statements:

- I. The opportunity cost of a unit of land is the value it would create when put to its best alternative use.
- II. The opportunity cost of a good is the value of all other goods that must be forgone in order to produce it.

Which of the following is correct?

- A. I only.
- B. II only.
- C. Both I and II.
- D. Neither I nor II.

Questions 1.13 and 1.14 are based on Figure 1.3.

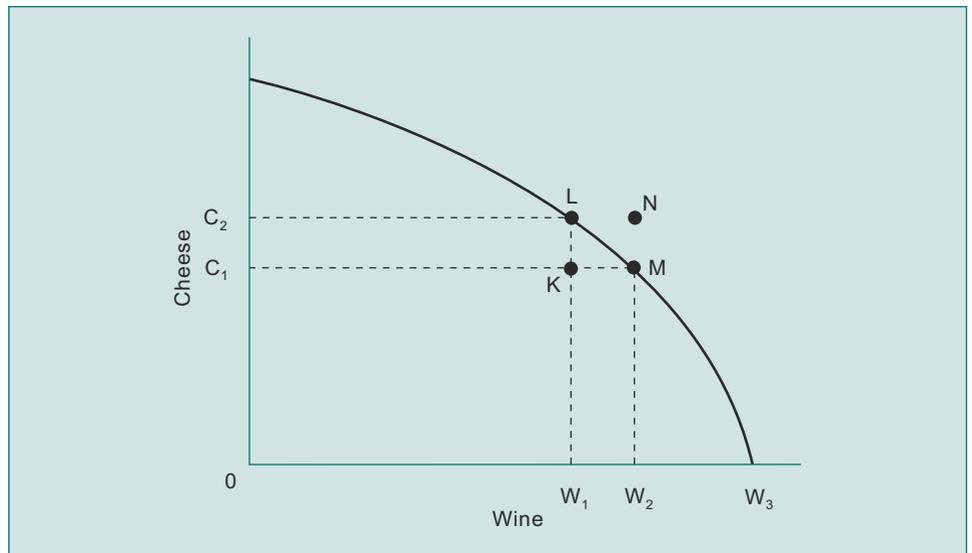


Figure 1.3 Production possibilities curve

- 1.13 Which of the following is correct?
- I. The opportunity cost of cheese when production is taking place at point L in Figure 1.3 is W_1W_2 of wine.
 - II. At point M in Figure 1.3 a bottle of wine is of equal value to 1lb of cheese.
- A. I only.
 - B. II only.
 - C. Both I and II.
 - D. Neither I nor II.
- 1.14 Of the outputs K, L and N in Figure 1.3, which of the following statements is correct?
- A. Only L is attainable.
 - B. K and L are attainable.
 - C. Only K is attainable.
 - D. K, L and N are attainable.
- 1.15 Which of the following is correct? To satisfy wants as fully as possible, a society must
- A. choose the best set of goods and services from all feasible sets.
 - B. produce various sets of goods and services then choose one set.
 - C. ensure that free goods are available to all members of society.
 - D. ensure that luxury goods are produced only when necessities are freely available to all.
- 1.16 Two individuals who both had baskets containing oranges and apples were observed exchanging voluntarily three apples for two oranges. Which of the following are correct?
- A. There were more apples than oranges before the exchange in one individual's basket.
 - B. Both individuals benefited from the exchange.
 - C. One individual benefited more than the other from the exchange.
 - D. One individual prefers oranges to apples and the other prefers apples to oranges.
- 1.17 Which of the following is correct? An economy is operating in an economically efficient manner when
- I. goods and services are being produced using the least amount of resources.
 - II. no individual's utility could be increased.
 - III. society's wants are being satisfied as fully as possible.
- A. I and II only.
 - B. I and III only.
 - C. II and III only.
 - D. I, II and III.

I.18 Which of the following statements is correct?

- I. What, how and for whom goods and services are produced are problems common to traditional, command and market economies.
 - II. In traditional, command and market economies all land is owned privately but other resources may be privately and/or collectively owned.
 - III. In traditional and command economies each individual receives the same amount of goods and services, whereas in market economies individuals receive an amount of goods and services equivalent to the resources each owns.
- A. I only.
 - B. I and II only.
 - C. I and III only.
 - D. I, II and III.

Case Study I.I: Marginal Analysis and Noise Pollution

This case is an application of the concept of marginal analysis. Before you tackle it you should understand:

- total benefit;
- total cost;
- marginal benefit;
- marginal cost; and
- the rule for efficient resources allocation.

The case shows that the application of the basic economic concept of marginal analysis can demonstrate the error in an apparently common-sense conclusion.

How to Deal with Noise Pollution

There are certain sounds or noises that give some people pleasure – the disco in full swing, or the grand opera chorus. There are other noises, equally loud, that cause displeasure – motorcycles without silencers, and jet aircraft. The traffic on many motorways passing through built-up areas causes noise levels that result in residents' complaints. Often action is taken to reduce such noise to tolerable levels.

How can marginal analysis help a society make sensible decisions in reducing noise pollution? Noise can be measured on a decibel (dB(A)) scale. For noise levels below 68 on the scale, people seldom complain, whereas permanent ear damage can result at levels above 90 decibels if an individual is exposed to such levels over a period of time. (You might think about this if you are a rock music fan, and you might also note the earmuffs worn by ground personnel at airports.)

Suppose that the residents of a housing estate decide to investigate reducing the noise level from the motorway passing near their housing estate. The average noise level is 85 on the dB(A) scale. The options shown in the table below are available to the residents to reduce motorway noise. They may choose one or more.

Options	Marginal change in noise level (db(A))	Cost (\$)*
1 (a) Build concrete wall 2 metres high	-10	160 000
1 (b) Build concrete wall 3 metres high	-12	190 000
1 (c) Build concrete wall 4 metres high	-13	230 000
2 Reduce speed limit by 10 mph and enforce new limit through police control	-3	90 000
3 Resurface Road	-2	70 000
4 Rebuild the road 4 metres below its existing level	-10	2 500 000

*Total cost divided by estimated number of years of useful life.

The residents decide that they are prepared to pay, collectively, \$31 000 annually for each dB(A) that noise is reduced until a level of 68 is reached, and nothing thereafter for further noise reduction.

The local council, conducting its own investigation, proposes that a 4-metre wall be built (Option 1(c)) but that no other option be considered. Its reasoning is that the annual

total cost of the 4-metre wall would be \$230 000 and the annual total benefit \$403 000, and it points out that no other option yields such a large total benefit.

- I In light of all this information, assess the following questions.
1. What is the difference in monetary terms between the total benefit and the total cost of each option?
 2. Which options should be excluded on the basis that total cost is higher than total benefits?
 3. For which options does marginal benefit exceed marginal cost?
 4. Which options should be chosen to reduce noise pollution in an economically efficient manner?
 5. What is the mistake the Council made in arriving at its decision?
 6. Does the economic solution to the problem mean that the residents will suffer no noise pollution?

