Unit One: Understanding Economics

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#### Unit Summary

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**UNIT INFORMATION**

In this unit we begin by explaining what economics is and introduce some of the methods and techniques of analysis that are used by economists. We set out the rationale for the use of economics in dealing with contemporary agricultural and environmental problems and introduce some of the basic divisions within the subject. In doing so, we trace the historical development of economics from its initial classical roots culminating in the dominant neoclassical paradigm. We then evaluate what economists mean by the terms scarcity and allocation of resources, looking in detail at the resources of land, labour and capital. Finally, we describe a few simple, but extremely useful techniques for economic analysis.

**Unit Aims**

- To introduce the role of economics in analysing agricultural and environmental problems.
- To provide an overview of the historical development of economics, focusing on the dominant neoclassical model.
- To define what resources are and to look in detail at the resources of land, labour and capital.
- To review techniques used in economic analysis.

**Unit Learning Outcomes**

By the end of this unit, students should be able to:

- explain the importance of economics in the allocation of scarce natural resources, in identifying the underlying failures that give rise to agricultural and environmental problems, and possible solutions to these problems
- distinguish between positive and normative economics
- discuss the basic assumptions of neoclassical economics and its role in analysing agricultural and environmental problems
- evaluate what economists mean by the terms ‘scarcity’ and ‘allocation of resources’
- discuss the use of models, functions, equations and calculus in economics

**Unit Interdependencies**

This unit provides an introduction to economics and economic theory, which underpins the economics presented in the rest of the module. It is therefore essential that you study this unit first and that you fully understand the basic concepts presented and the role of economic theory in analysing agricultural and environmental problems, before progressing onto subsequent units.

Of the economic theories presented, the main focus of this unit is on the neoclassical ‘positive’ economic theory of perfect competition. We use this theory throughout Units 2 to 8 to analyse demand (Units 2 to 4), supply (Units 5 to 7) and market
equilibrium (Unit 8) in competitive markets. As you progress through this unit and the rest of the module, you might want to consider whether the assumptions on which the neoclassical model is based are realistic.

In this unit we also distinguish between ‘positive’ and ‘normative’ economics, and briefly introduce the ‘normative’ theory of welfare economics. In Unit 9 we acknowledge that the neoclassical perfectly competitive market is unlikely to be found in reality, and explore the use of welfare economics in analysing agricultural and environmental problems from a ‘normative’ perspective.

When the perfectly competitive market form breaks down, there are a number of imperfectly competitive market possibilities. In this unit we also briefly introduce the theory of monopoly and imperfect competition, which we will explore in greater detail in Unit 10.
KEY READING


As you proceed through this unit, you will be directed to various pages within Chapter 1 of this key text. This chapter looks at economic models.

Chapter 1 examines the general philosophy of how economists build models to explain the economic behaviour of individuals, firms and markets. It begins by outlining some of the conceptual issues that determine the ways in which economists build their models to explain economic behaviour. Such models are paramount to the study of all areas of economics. So as you work through the chapter, ensure that you understand both the need for these models and the basic framework used to develop them.

FURTHER READINGS


These MS PowerPoint slides provide a detailed summary of the key terms and concepts on economic models presented in Chapter 1 of Snyder and Nicholson (2008).


If you are experiencing any difficulties understanding the application of mathematics to the economics presented in this unit, then you might want to refer to this chapter. It provides a brief summary of some of the most important mathematic techniques presented in this unit.
REFERENCES


Lakatos I (1963b) Proofs and refutations II. The British Journal for the Philosophy of Science 14(54)120–139.


1.0 INTRODUCING ECONOMICS

Section Overview
This section explains what economics is and introduces some of the methods and techniques of analysis that are used by economists. Specifically, it sets out the rationale for the use of economics in dealing with contemporary agricultural and environmental problems, and provides a guide to the way economists analyse economics problems.

Section Learning Outcomes
By the end of this section, students should be able to:

- explain the importance of economics in the allocation of scarce natural resources, in identifying the underlying failures that give rise to agricultural and environmental problems, and the solution to these problems
- distinguish between positive and normative economics

1.1 What is economics?
The word ‘economics’ comes from two Greek words, ‘eco’ meaning home and ‘nomos’ meaning accounts. The subject has developed from being about how to keep the family accounts into the wide-ranging subject of today.

Economics has grown in scope, very slowly up to the 19th century, but at an accelerating rate ever since. Today it has many of the features of a language. It has linguistic roots, grammatical rules, good and bad constructions, dialects and a wide vocabulary which grows and changes over time. You may already have studied economics and there is the danger that the language that you learnt has changed, so be careful! Also, there are different ways of learning economics.

Defining economics
One of the founding fathers of economics, Alfred Marshall, advised as follows:

Every short statement about economics is misleading (with the possible exception of my present one).

Nevertheless, definitions are a useful place to begin. A standard definition of economics could describe it as:

a social science directed at the satisfaction of needs and wants through the allocation of scarce resources which have alternative uses
We can go further to state that:

- economics is about the study of scarcity and choice
- economics finds ways of reconciling unlimited wants with limited resources
- economics explains the problems of living in communities in terms of the underlying resource costs and consumer benefits
- economics is about the co-ordination of activities which result from specialisation

By extension of our basic definition, economics as applied to agricultural and environmental issues is concerned with the efficient allocation of natural resources to maximise the welfare of society.

There is an obvious need to understand the economics behind the decisions facing the individual farmer, firm or resource owner, but it is also important to have an appreciation of the bigger picture in terms of agriculture and the environment's impact on the domestic economy as a whole, as well as its impact in an international context. The economics of the individual agent's decisions about resources is referred to as microeconomics, while macroeconomics studies the interactions in the economy as a whole. Our focus here is on microeconomic theory.

The role of economics

Resources are finite, and people and governments must make choices. By studying the way that people make choices, the better choices we make!

Economics has quite an extensive role to play in a multitude of contexts, particularly in solving agricultural and environmental problems. For example, it has much to contribute to improved policies for the efficient targeting of agricultural subsidies, the control of pollution and the depletion of natural resources.

A pervasive view of the role of economics for the environment is that:

> 'The widespread concern over the current state of the environment and the limited success of existing policy have generated renewed interest in the effectiveness of alternative approaches to environmental protection. It is our sense that a wider use of economic incentives can significantly increase the effectiveness of measures for pollution control both in terms of attaining our environmental targets and in doing so with enormous cost-savings relative to current command-and-control policies'


A simplified way of seeing the roles of economists is as: fixers, bean-counters and philosophers. Fixers make a living solving problems – problems faced by government, business, charities, all sorts of organisations. Bean-counters make a living doing just that, calculating costs, comparing them with prices and the values offered to buyers. Philosophers like to play with ideas, and only occasionally enter the fray with a suggested answer to a problem.
How do you see yourself, a fixer, a bean-counter or a philosopher?

Your answer will largely determine which parts economics you will find interesting, and which will irritate you the most!

However, it’s not really that simple. Economists may play more than one role. So no-one is entirely one thing or the other. Just remember, different objectives lead to a different treatment of economics.

1.2 Analysing economic problems

Is economics like a natural science?

Not really. There is a scientific element in economics, but it is not ‘natural’ or physical in any way. For instance, a famous British economist, John Maynard Keynes, preferred to see it as a moral science.

'I (also) want to emphasise strongly the point about economics being a moral science. I mentioned before that it deals with introspection and with values. I might have added that it deals with motives, expectations, psychological uncertainties. One has to be constantly on one’s guard against treating the material as constant and homogeneous. It is as though the fall of the apple to the ground depended on the apple’s motives, on whether it is worthwhile falling to the ground, and whether the ground wants the apple to fall, and on mistaken calculations on the part of the apple as to how far it was from the centre of the earth.‘


Not all economists agree with Keynes. The Nobel Laureate, Robert Lucas sees the role of economists being limited to building predictive models. His models view people as if they are machines, carefully optimising their utility as if they were solving a mathematics problem. Kenneth Boulding on the other hand considers economics in turn as a social, ecological, behavioural, political, mathematical, and moral science.

'Economic man is a clod, heroic man is a fool, but somewhere between the clod and the fool, human man, if the expression may be pardoned, steers his tottering way.’


Can we apply the methods of science to economic problems?

Yes, but we cannot often conduct controlled experiments in economics in the way that some physical sciences can. Economics shares with many scientific disciplines the attributes of ‘self-criticism’ and also tests its propositions by examining how well the predictions of its theories correspond with events in the real world.
The process as applied to economics is as follows:

- Construct a theory (e.g., a high minimum wage level causes unemployment)
- State an hypothesis (e.g., the higher the level of minimum wage, the more unemployment)
- Test it (e.g., look for evidence to support the wage-jobs link in different countries and for different time periods)
- If the evidence supports the hypothesis
  - accept it, and
  - move on to more refined hypotheses
- If the evidence does not support the hypothesis, either
  - modify the hypothesis, or
  - reject it (and seek another explanation for unemployment)

This process of trial and error gradually leads to a theory that fits well with experience. It enables the economist to:

- explain what has happened
- say what will happen in the future when wages change

**Can the theory be tested?**

Theories can be tested but sometimes only in an indirect manner. Theories are not simple things, but complicated sets of ideas linked together. If a theory does not seem to accord to the real world, then it is difficult to see which of its components is at fault. For this reason, some theories survive, even though there appears to be considerable evidence against it. An example is that economists continue to believe that it is relative prices and incomes, not absolute prices and incomes that determine consumption behaviour. This hypothesis has been rejected many times, but economists have not rejected this hypothesis because they do not completely trust the methods used to test it.

**Does everything have to be tested in economics?**

No. All theories have components that are clearly false. Yet they may still be used as simplifications that allow us to construct models which retain some predictive power. For instance, some models assume that people are completely able to anticipate the actions of the government. While we cannot always know what the government will do next, there is considerable evidence that market participants are very good at guessing what the government will do. Therefore a false assumption can be useful. There are those who claim that economics has failed to live up to its responsibility to test its theories. This may be true. But there is progress all the time. Better data, better techniques, and hopefully better theories.

**Positive and normative economics**

Positive economics means testable economics. It is a phrase made famous by Richard G Lipsey, after Milton Friedman (1966) set out the distinction between
positive and normative economics in his article ‘The Methodology of Positive Economics’. Lipsey argues that it must not be seen as too constricting.

‘All that the positive economist asks is that something that is positive and testable should emerge from his theories somewhere – for if it does not, his theories will have no relation to the world around him.’


Normative economics is economics that derives from an opinion or a point of view. Thus the words ‘ought to’ frequently occur. The difference between positive and normative economics is illustrated in the answers to the following questions.

Which of the following is a positive and which a normative statement?
(a) Farmers should work harder
(b) Farmers work harder when crop prices rise
(c) People prefer to own their own land rather than work for someone else
(d) Farm estates should be cut up into smallholdings
(e) Farm mechanisation causes unemployment
(f) Farm mechanisation is a bad thing for employment

Answer.
Positive statements are testable (b, c, e).
Normative statements are based on an opinion and not testable (a, d, f).
Note that you could reword (f) so that it becomes a positive statement: ‘Farm mechanisation in developing countries has been an important factor in raising the incomes of farmers and increasing industrial employment’.

In the study of positive economics, we can rephrase normative ideas into positive ones that can be tested. However, many of the assumptions are normative. In particular, we will frequently assume that ‘the distribution of income’ is given. Now that means that, for our positive analysis, the rich and the poor are assumed to stay relatively the same, even when absolute incomes increase. Another typically normative assumption is to assume that when we are dealing with one market, distortions in another market can be ignored. Such assumptions are essential to allow us to say anything of practical use. What the economist must always do is complete his/her analysis by considering how a relaxation of the normative assumptions affects his/her results. Part of the impact of a subsidy on food, for instance, may be to alter the distribution of income in favour of the poor and against the interest of the better-off taxpayer. Or to take another example, making agricultural markets operate freely will distort the balance between agriculture and industry in the economy, if at the same time manufactured goods markets are not free.
Note also that positive economics is not ‘superior’ to normative economics. A good analysis of an economic problem requires both positive and normative elements with a careful distinction drawn between the two.

Let us revise the points developed so far by reading Snyder and Nicholson (2012), pages 3 to 9, which provides a good introductory overview to economics and the use of economic models.

In particular, note the context within which the terms scarcity, choice and information are used, and write down the three common elements of all economic models.

Are there ‘trends’ in economic thinking?

In the 1960s, two writers, Kuhn (1962) and Lakatos (1963a, b and c and 1964), pointed out that research tends to cluster around ‘big ideas’ called research paradigms. Once a particular paradigm is accepted as dominant, people research into issues adopting the central tenets of it.

In the 1950s and 1960s the dominant economics paradigm regarded markets as prone to failure, and the duty of government was to intervene and correct these failures in an impartial manner. People became disenchanted with this approach as a result of the 1967–1977 decade of inflation and unemployment, leading to the ascendancy of a new paradigm – one which regarded government intervention as more likely to worsen than to improve market failures. In this paradigm, the job of government is limited to the role of ensuring free competition and making companies respond to shareholders.

In recent years, this paradigm has begun to be displaced by one which re-emphasises the need for non-market activities to be sustained by government. The importance of environmental economics as a discipline to address such concerns has increased. The pendulum seems to be swinging back!

Economic ideas exist in, and economic research results emerge from, paradigms. In the case of the market liberalisation paradigm, there are still economists who hold on to the old beliefs in the need for an active interventionist government in the economy, ready to shape industries such as agriculture to their own wishes and unwilling to leave it all up to the market. In this they are supported by like-minded politicians!
Section 1 Self Assessment Questions

Question 1

Fill in the missing words/phrases.
Economics is the study of how _______ resources are allocated among _______ uses.

Question 2

For each of the following statements, classify them as whether they are characteristic of (i) normative economics or (ii) positive economics.

(a) objective explanations of the workings of the economy

(b) economics that is subjective

(c) economics that predicts what might happen when economic factors, like interest rates, change

(d) economics that deals with whether an action is desirable and hence whether or not the decision should be taken

(e) economics based on the value judgements and set of beliefs of the economist

(f) economics where the economist tries to act as a detached scientist

Question 3

True or false?
Positive economics is ‘superior’ to normative economics.
2.0 NEOCLASSICAL ECONOMICS AND ALTERNATIVE APPROACHES

Section Overview
This section provides an overview of neoclassical economics. It begins with a discussion tracing the historical development of economics from its initial classical roots culminating in the dominant neoclassical paradigm. The assumptions of neoclassical economics are then presented and its role in analysing agricultural and environmental problems discussed.

Section Learning Outcome
By the end of this section, students should be able to:
- discuss the basic assumptions of neoclassical economics and its role in analysing agricultural and environmental problems

2.1 A brief history of ideas in economics

Neoclassical economics: antecedents and personalities
Modern economics is generally dated from the classical economics writings of Adam Smith and David Ricardo.

‘If we were to summarise the distinguishing characteristics of the economic analysis contained in the ‘Wealth of Nations’ [written by Smith] or in Ricardo’s ‘Principles’, we should have to put first the insight which it reveals into the economic mechanism of modern society. With extreme rigour the analysis lays bare the principles which underlie the working of the capitalist system, together with the historical development which produced it. To this Ricardo also added an attempt to discover the trend of the system’s future development. Its second claim to distinction lies in the fact that it was the first to recognise explicitly that social phenomena, including history, had laws of their own which could be discovered ... which gives to the work of Smith and Ricardo its scientific imprint.’


Smith, together with disciples such as James Mill and John Stuart Mill, and critics, such as Thomas Malthus, are often referred to as the classical economists. Their view of the world was characterised by an attempt to discover objective truths and laws of capitalism, much as scientists searched for the laws of nature.

Subsequent economists have modified, elaborated and reformulated their ideas, but the general approach has changed surprisingly little.

The second phase in economics introduced what might be termed neoclassical economics and began in Europe around the 1870s. The search for objectivity was
replaced by the consideration of subjective goals (personal satisfaction or utility). By exploring the decisions of individual consumers and producers, it became possible to answer the question that had dogged economics for a century – what is the value of something and how does it relate to its price? The marginal analysis of neoclassical economics was developed by a number of European economists in different countries, most famously by Cournet (France), Jevons (UK), Menger (Austro-Hungary), and Walras (Switzerland). Two other economists shaped neoclassical economics: Marshall (UK) and Pareto (Italy). Marshall produced the coherent framework of supply and demand. Pareto took the argument further in two ways. He adapted an old idea to modify the theory of utility by using an indifference curve and he extended the idea of perfect competition to provide a basis for judgements on economic welfare. (Unfortunately all is not quite as clear as this pretends. For instance, you will sometimes find that the ‘classical’ label is used for all economics before Keynes. Some use the term ‘neoclassical synthesis’ to describe a framework that synthesises classical and Keynesian economics.)

The third phase in economics continues to this day. The economic depression of the 1930s accelerated the search for economic theories that could explain the world of the 20th century. This led to the development of the theory of monopoly and imperfect competition. However, an important advance was made by John Maynard Keynes. Here we note briefly how Keynes relates to the neoclassical framework. Keynes was seeking a general theory that could both explain the slump of the 1930s and show governments how to intervene and regulate their economies. His contribution was so important that since Keynes, economics has been split into two parts: macroeconomics, the study of the economy as a whole; and microeconomics, the study of individual industries and markets. The contribution of Keynes was to illuminate the ways in which macroeconomics worked in the 20th century. Our focus is on microeconomics, where the contribution of Keynes was on analysis of the labour market and the money market that emphasised the behaviour of markets out of equilibrium. Keynes made economists more aware of the uncertainties and unpredictable forces at work in the economy that can cause market failure.

The Keynesian emphasis on uncertainty and how free market forces often fail to provide an efficient and just method of allocating resources and goods is an area of economics. This means that as you read the principles of neoclassical economics, you have to try to be aware of the limitations. Markets are often not characterised by ‘perfect competition’ in the real world. Nevertheless, many economists find it useful to begin their analysis from the standpoint of neoclassical economics. The economics presented in Snyder and Nicholson (2012) is a good example of work which begins with a neoclassical framework.

### 2.2 Other schools in economics

So far these notes have implied that the path from classical to neoclassical to contemporary economics has been the only path along which economic ideas have developed. However, this is far from true.
Marxist economic thought

There are not many economists who still follow the economic ideas that came with Karl Marx. However, they can provide valuable insights. Marx saw economics as a struggle between capitalists (the owners of the means of production) and the proletariat (workers). He adopted an ‘historical’ approach and believed in the inevitable fall of the capitalist system, because it was a mere stage in history. His job, as he saw it was to uncover the ‘capitalist laws of motion’ and to show how there would be falling rate of profit leading to the end of the capitalist ‘mode of production’. Marx did have a theory of value, but he did not study the functioning of markets or think that examining the determination of price was important. Nevertheless Marx was attacked for his analysis of value, and it is fair to say that there were logical inconsistencies in some of what he said, which damaged Marx’s theory in the eyes of many (this was called the transformation problem). To neoclassical economists, markets are the way individuals place their ‘economic vote’ as free individuals. The selling of one’s labour would be seen as an act of utility maximisation. Marx would have viewed such an approach as irrelevant and would have been hostile towards it. In many ways there is no conflict between the approach taken by neoclassical economics and Marxist economics. They simply take different starting points, and seek to emphasise different things. Neoclassical economist view markets as potentially benign though perhaps prone to failure. Marxists often view markets as a mechanism which allows the exploitation of the weak by the strong.

Institutional economics

There are other alternatives to the neoclassical framework besides Marxist economics. A number of American economists attempted to establish a framework that concentrated on neither individuals nor classes but on institutions. Institutional economics has not really survived as a flourishing alternative framework, despite the efforts of Thorstein Veblen, JR Commons and Ashley Mitchell. However, their attention to how institutions work has led to an emphasis on statistics and econometrics amongst US economists that has become very influential. The best known economist today with an institutional bias is probably John K Galbraith. The most famous economist who followed the statistical route is perhaps Simon Kuznets (a Nobel Prize winner for his economic analysis).

The institutionalists attempted to explain the US economy in terms of the way large corporations work and how big business and the state interact. To its supporters, institutionalism is a middle way between the emphasis on individual, small firms and consumers of neoclassical economics on the one hand, and the assumption of class conflict as the main force in capitalism held by Marxist economists on the other.

In the emphasis on the realities of big business the institutionalists put fact-finding above theorising. This is why they encouraged quantitative methods. Their argument was that theory can only be derived from a study of the facts; what is termed the inductive method. Neoclassical economics effectively defeated institutionalism on this ground. In the neoclassical world, theory is tested, rejected, and reformulated on the basis of facts, but the theory comes first (the deductive method, i.e. deducing how the world works on the basis of theory). Marxism is similarly deductive.
New institutional economics

New institutional economics (so called when it originally emerged, becoming more prominent from the late 1980s) takes insights from institutional economics and applies them within what is in many ways a neoclassical framework. In this it rejects the notion of perfect competition as anything other than a ‘thought experiment’, as it postulates that behaviour in and of markets is determined by institutions, which are defined as the rules that govern people’s behaviour and the interactions between them. Thus markets require institutions governing, for example, property rights, the use of money, the sharing of and access to information in exchange, and the rule of law. Key implications of this are that engagement in markets incurs ‘transaction costs’ (for example, in obtaining information about the market and potential buyers and sellers, in enforcing contracts, and in reducing the risks of losses in market engagement). Different transaction costs in different types of exchange and market lead to economic actors crafting and choosing different forms of exchange in different circumstances (for example, using firms rather than markets to organise economic activity – and most economic activity in the world goes on within firms rather than in market transactions between them). Transaction costs and hence economic activity are then crucially determined by institutions governing people’s behaviour, and this has major implications for economic development and outcomes.

Seminal writers in this school include Nobel laureates Douglas North, Oliver Williamson and Elinor Ostrom who wrote respectively on institutions and economic development, contractual arrangements, and common property management. In many ways new institutional economics provides a formalised body of theory addressing issues that economists have always been concerned with – business and government relations and regulations. Analysis of financial markets and regulations now involves, for example, the integration of insights and methods from the neoclassical, new institutional and behavioural schools of microeconomics (where behavioural economics draws on insights from psychology and behavioural experiments regarding the decisions and behaviour of economic actors), as well as the monetarist and Keynesian schools of macroeconomics.

Austrians

The Austrian school dates from the mid-1800s. Its founder Menger, is sometimes also thought of as being part of the neoclassical school. Austrians are also ‘pro-markets’. However their methods of analysis and reasoning are quite different from the neoclassical school. The entrepreneur is at centre stage, taking risks in the face of uncertainty, with the aim of profit, but in ways that benefit the consumer. However, some Austrians are called subjectivists because they view both costs and benefits as subjective things. They do not adopt the ‘rational calculus’ of neoclassical economics, and do not harbour notions as ‘the profit maximising position’. Such behaviour, even if it existed, would be unknowable to a ‘pure Austrian’. Another aspect of Austrian economics is a distaste for using aggregate notions such as ‘capital’ or ‘labour’. They argue that these things are heterogeneous and cannot just be lumped together. Austrians and neoclassical economists agree that markets are important, but for very different reasons.

These brief notes are designed to indicate that neoclassical economics was not, and is not, the only kind of economics. Enough has been said to make the points that:

- you can look at a problem in economics in more ways than one
the neoclassical way is a respectable and well-tried approach, but like all approaches has limitations which need to be recognised and taken into account in neoclassical economic analysis

positive economic statements (ie testable ones of general use) are more likely to emerge from neoclassical economics than from the other approaches discussed

neoclassical economics can be applied to all countries and all cultures, at all stages of history and development, so long as there are markets to study, the use of money and prices is established, and specific contextual influences and the limitations of neoclassical economics are recognised.

Now read Snyder and Nicholson (2012), pages 9 to 17, for a brief history of economic thought and then an elaboration of the Marshallian model before looking at the neoclassical economic model in detail.

2.3 The neoclassical economic model

The neoclassical model rests on a few assumptions which are highlighted in the following passage.

How can the economy allocate resources most efficiently?

Answer.

The neoclassical answer is, through markets, assuming economic agents are rational and have perfect knowledge. In a market, an equilibrium will occur which maximises the benefits to economic agents given the law of diminishing returns, many agents buying and selling, and freedom to enter and leave the market.

We call this a freely competitive market, and a system of such markets is called a market economy. The basic message of neoclassical economics is that economic efficiency and economic progress are maximised by ensuring that markets work freely and competitively.

How is this achieved?

Answer.

Through giving individuals as much economic freedom as possible. The individual is left to decide what to buy, what to produce, and what to sell.

Finally, if markets work badly, the government has a duty to individuals to correct this. In the jargon, governments must intervene to correct market failure, but this is the only justification for such interventions.
Next, we look at each assumption required to produce a freely competitive (or 'perfectly' competitive) market within neoclassical economics:

- rationality
- perfect knowledge
- diminishing returns
- equality of sale and purchases
- unique equilibrium
- many participants, with freedom to enter and leave the market
- independence of demand and supply

**Rationality**

The first assumption made is that people are rational and prefer more valuable goods and services or leisure to less. Remind yourself of what Boulding (1970) said about economic man the clod as against heroic man. Well, rationality means we assume all economic agents are clods! (A clod, in case your dictionary does not say, is a lump of grass and soil!)

Does this sound reasonable?

**Answer.**

*The answer is surely, yes. If you try to invent an economic theory based on mankind the hero, you will have a hard job (refer back to the quote by Boulding (1970) in this unit).*

It is a short step from wanting more rather than less of the good things to wanting to maximise the amount of good things (literally ‘goods’) you can get. Rational economic man has objectives and attempts to maximise them. In neoclassical economics, that tends to get narrowed down to maximising one thing.

- consumers allocate their incomes in order to maximise their satisfaction (or utility)
- producers allocate resources in order to maximise their profits

Does this **still** sound reasonable?

It is at this stage that doubt creeps in, especially with regard to profit maximisation. After all, most producer decisions are taken by managers, not by owners. However, if we put profit maximisation another way, it may seem more plausible.

If managers create more value at lower cost than competitors, their business will prosper, its profits will rise and the managers will be rewarded.
Can you accept this version of profit maximisation as a reasonable assumption? If you cannot, you are not going to enjoy reading Snyder and Nicholson (2012)!

**Perfect knowledge**

More contentious is the second assumption of the neoclassical model

- that economic agents act in the light of perfect knowledge. Buyers and sellers know all the prices of all the goods in the market, know everything they need to know about the quality of goods, the character of the other economic agents, what the government is going to do next, and so on. No doubt, no uncertainty. Like a computer with perfect knowledge, rational economic man can compare prices with what they have or want, and set out to maximise their objective function, be it consumer satisfaction or business profits.

How credible does this sound in the agricultural and environmental context?

It could apply to world commodity markets, where a large number of participants bring information to bear on their actions. However, in local and regional agricultural markets, there are a lot of uncertain factors such as:

- timing and volume of supplies
- quality and storage potential of crops harvested
- consumer demand under specific (for example, weather) conditions
- the extent of international trade, partly related to exchange rate movements

So this assumption is often unrealistic in agricultural markets.

Does this mean the neoclassical model is no use to us?

Luckily no! We handle it by starting with the assumption of perfect knowledge, then relaxing it and trying to think through what happens then. In this way we use a neoclassical model as the basis for a comparison with the real world.

**Diminishing returns**

The third neoclassical assumption is more properly called a behavioural hypothesis, because it can be tested. Since hardly anyone bothers to test it, it is often called an assumption.

The hypothesis is known as the Law of Diminishing Returns. It is essential because it means that on the buyer's side, the more and more they buy the smaller and smaller the increment in satisfaction becomes.
What do you think it means on the seller’s side of the market?

Answer.

*The more and more that is sold, the smaller the increment in extra profits.*

Put together, this gives the likelihood of an equilibrium position. That is, a stable position, from which the market has no reason to depart, other things remaining the same. Without the law, consumers could happily keep buying forever, and suppliers happily supplying forever!

**Equality of sales and purchases**

We must assume that whatever is bought equals whatever is sold. If goods are put into store, we must count them as either being part of what is bought, or exclude them from the market calculation altogether. Otherwise we will never discover an equilibrium.

**Unique equilibrium**

Equilibrium is reached when all economic agents are content with their actions and feel no reason to change them. In the neoclassical model, price changes until sellers are happy to sell what they sell, and buyers are happy to buy what they buy. It is this concept of equilibrium which distinguishes the neoclassical approach and which makes it so useful.

Why could this be useful?

This could be useful because it allows us to forecast where a market will be in the future, after specified changes. We mention in the last section of this unit, a technique called ‘comparative statics’ and ‘partial equilibrium analysis’. Without equilibrium, there is virtually no point in using neoclassical analysis. Therefore, neoclassical economists interested in markets under disequilibrium conditions construct their model to include an eventual, long run equilibrium position towards which the market is moving, even if it never actually arrives!

**Many participants, freedom of entry and exit**

These assumptions ensure that a market is freely competitive. If a few buyers or seller dominate, this means the outcome may be equilibrium, but it may not be the best, or optimal, outcome for the economy as a whole. It is an inefficient equilibrium.

Similarly with freedom of entry and exit. If a market is to be truly competitive, there must be scope for new buyers and sellers to enter a market, and for old participants to leave and find other markets. This of course applies to markets for resources like labour as well as markets for goods and services. If the wages of plumbers are high compared to the wages of water engineers, the latter will leave their job and look for jobs as plumbers. We speak of ‘resource mobility’ in this respect.
Independence of demand and supply

The last assumption could be relaxed but seldom is. We assume that buyers are quite distinct from sellers, so that the act of buying does not affect selling, and selling does not affect buying, except through the mechanism of the market.

The time when it does get relaxed is in the analysis of peasant farms which are partially self-sufficient. In this case the farm is responsible for supplying the household and the market, so the household is both a buyer (from its farm and from the market) and a seller.

2.4 Neoclassical economics and the environment

Assumptions of neoclassical environmental economics

The key assumptions of neoclassical economics that are made to ensure that markets do function 'perfectly' when accounting for environmental consequences are summarised in 2.4.1.

2.4.1 The neoclassical perfect market: the necessary conditions

- many potential buyers and sellers of similar products
- many identical or close substitutes for the product being exchanged
- the quantity of the good/resource exchanged during one transaction does not influence the price at which all other goods are sold
- there is perfect information about the existence, quality and potential performance of the resource and its substitutes
- there is perfect information about the direction of future technological change
- all resources are traded at their real scarcity value
- all resources and environmental functions are privately owned, transferable from one person to another and protected from involuntary seizure or encroachment
- the market transaction does not destroy any attributes of a resource that are valued by others
- production of the good and its exchange does not impose costs on other members of society, nor upon future generations
- the rational economic person satisfies their preferences through willingness to pay bids (constrained by their income)
- the views of those who are ethically opposed to participation in the market are ignored
- the aspirations of those who cannot afford to compete in and express their views through the market are ignored

Several other assumptions need to be mentioned. Most markets discount uncertainty and do not recognise the interdependence of ecological and economic systems and the multifunctional character of any conditionally renewable resources. Thus in order for a market transaction to maintain ecological integrity

- all ecological functions must either be replaced or retained

Work through these assumptions in turn and note down to what extent you are able to assign a relevance to each in terms of your working and social/domestic life.

Neoclassical approach to the environmental

Economics as applied to environmental issues can then be characterised by the application of mainstream neoclassical theory to the environment. The emphasis is on identifying circumstances in which the market is likely to fail in its task of allocating resources efficiently between different uses and in designing policies to enable the government to intervene to 'correct' the market failure. In general, markets will fail when one or more of the conditions outlined in 2.4.2 do not hold.

2.4.2 The neoclassical approach to the environment

Stage 1  Break down the environment into commodities

At the heart of the neoclassical approach to environmental economics is the aim to turn the environment into a commodity which can be analysed like any other commodity. The preliminary exercise is to break down the environment into its constituent goods and services. For example, wetlands provide a range of goods (such as fish, water, wood) and services (water filtration, water transport, climatic regulation). Once defined in commodity terms, the environment can be brought into the market economy by constructing supply and demand curves for environmental goods and services and inputting market prices.

Stage 2  Determine the appropriate level of environmental protection

The level of environmental protection that is considered 'optimal' depends on consumer wants (demands) and the supply costs (costs of protection and opportunity costs). Environmental valuation methods are an essential tool of the environmental economist. They may be used to construct hypothetical demand curves for environmental goods and services when there are no markets for these resources. Constructing demand curves involves estimating willingness to pay for environmental improvement or willingness to accept compensation for environmental losses. Willingness to pay measures are based on consumer preferences and wants, and are constrained by ability to pay (ie incomes). In the theoretical case where a proper demand curve with a range of values can be determined, its intersection with the supply curve will indicate the level of protection for that environmental commodity which represents the most efficient allocation of resources in society.

Stage 3  Achieve the optimal level of environmental protection, optimally

The second stage showed how economic theory and methods can be used to identify the most efficient level of environmental protection. The third stage is concerned with achieving this level in the most efficient way – these concepts provide the foundations for the design of environmental policy. According to this logic, the most efficient way of achieving the desired level of environmental protection is to give environmental costs and benefits 'prices' in the markets where they occur. In this way the value of the environment can be reflected in the real world where decisions are made. This can be done essentially in two ways. One is to change the prices of existing market activities by taxing environmental damage (such as pollution or harmful products) or by subsidising environmental improvement. The other way is to create markets for environmental goods and services.

Source: based on Jacobs (1994)
The main theoretical foundations for the field of environmental economics are found in the theory of externalities due to market failure. Externalities are present when the activities of an economic agent like a firm have external consequences for other agents other than by affecting prices, and these external effects are not compensated for.

**Name an example of a production externality**

*Answer.*

*A classic textbook example of a production externality would include that of pollution from a dirty industry upstream of a fishery, reducing the output of fish.*

*More topical examples might include the impact of highly mechanised and intensive agriculture on climate change.*

**Name an example of a consumption externality**

*Answer.*

*Examples of consumption externalities include the impact of the consumption of fossil fuels on the environment (e.g., climate change and acid rain).*

The usual diagnosis and prescriptions for dealing with externalities come in three types:

- The problem is due to incorrect prices so adjust them by using taxes or subsidies.
- The problem is due to missing markets so create a market for pollution by use of tradable permits.
- The problem arises from imperfect property rights which need to be amended.

These three solutions are the mainstay of neoclassical solutions for most environmental problems. The latter solution is a *laissez-faire* approach of leaving the outcome to the market, while the first two approaches are more interventionist approaches while still harnessing the power of the market. In fact, most environmental problems are externality problems like traffic congestion, dumping of toxic wastes, emission of greenhouse gases, pesticides in food chains, acid rain, and ozone depletion. The list is extensive and so is the scope of economics for environmental management. The role of economic theory is to provide guidance to the practitioner. As Baumol (1991) comments:

> *theory can be helpful to policy makers by pointing out surprising relationships unlikely to be recognised by unaided common sense; by noting significant exceptions to principles widely accepted; and by offering generalizations of its own.*

*Source: Baumol (1991) Abstract*
Three general types of contributions can be identified from the application of the theory to policy:

- counterintuitive observations
- discovery of significant exceptions
- derivation of relationships of general validity

However, to the consternation of the economics profession many of these insights, particularly those on appropriate instrument choice, have not found their way into policy and legislation on pollution control.
Section 2 Self Assessment Questions

Question 4

True or false?
Under the neoclassical economic model, price independently determines market supply and market demand.

Question 5

Which of the following is not an assumption of neoclassical economics?

(a) individuals are rational
(b) all participants are free to enter and leave the market
(c) all participants in the market have imperfect knowledge
(d) supply is independent of demand
(e) law of diminishing returns

Question 6

True or false?
The economics of the individual agent's decisions about resources is referred to as macroeconomics, while microeconomics studies the interactions in the economy as a whole.
3.0 SCARCITY AND ALLOCATION OF RESOURCES

Section Overview
In the preceding sections we have discussed the importance of economics in the allocation of scarce natural resources and in identifying the underlying failures that give rise to agricultural and environmental problems from a misallocation of resources. In this section, we define what resources are and look in detail at the resources of land, labour and capital.

Section Learning Outcome
By the end of this section, students should be able to:

- evaluate what economists mean by the terms ‘scarcity’ and ‘allocation of resources’

3.1 Introduction to resources
Another name for ‘resources’ is ‘factors of production’ or ‘factors’ for short. Resources have the potential to produce goods and services that are valued by society. For example, a nation’s land and population are the basis for determining agricultural output. The accumulation of capital gradually permits output to rise without more land and labour. So the growth of capital explains most of economic growth.

Also often included in capital are human skills, both technical and managerial. This ‘human capital’ can make up for a lack of natural resources. In fact, although the discovery of oil or a mountain of copper should help growth, recent research has indicated such riches can have the opposite effect. Compare the performance in recent years of resource-rich Nigeria (zero or negative per capita growth in GDP) and resource-poor Singapore (over 5% per annum growth in per capita GDP). We define ‘land’ below to include natural resources.

As well as land, labour and capital, there is entrepreneurial ability. This term captures the risk-taking, profit-seeking element in capitalism. The entrepreneur is the individual or group of people who actually bear the cost of bringing resources together in a production function. If they are successful, they reap the rewards. If they fail, theirs is the risk. In one sense entrepreneurship is also a resource, but it is very difficult to measure. Also, whatever else determines the output of a firm, it is not the quantity of its entrepreneurs: it is their quality.

We will not analyse entrepreneurial ability here. However, do not forget that production involves risk; you can always lose your money!

3.2 Land
Land, defined to include mines, national parks, deserts, fisheries and forests as well as agricultural land, has three important characteristics. Let us examine these in turn:
• Firstly, it is fixed in location. This means that capital and labour may be necessary (in the form of roads, railways, houses, etc) before land can be brought into use in a production function.

• Secondly, the supply of land is virtually fixed. Short of embarking on conquest or reclaiming land from the sea-bed as in The Netherlands, a country has only so much land. Again, capital and labour can improve land or make it yield two crops rather than one, but overall, land is given.

• Thirdly, land is not self-sustaining. Natural forces are constantly at work eroding hills and depositing the soil in valleys and deltas. Social, political and economic forces also play a key part in shaping the use of land. The quantity and quality of agricultural land will invariably decline unless society takes steps to counteract the forces at work. In most farming systems, access to land is of paramount importance. Indeed, the complexities of the ownership of land rights (systems of ‘land tenure’) constitute one of the most important limitations on the use of production economics in agriculture. Just as important in many regions of the world is access to water. Natural resource economists try to establish the pattern of property rights over land and water when seeking solutions to problems such as deforestation and erosion, salinity, and groundwater use.

3.3 Labour

People are constantly entering the labour force as they grow up or wish to earn money. Similarly other people are leaving the labour force as they grow old, become sick or decide they no longer need to earn money.

Those people in the labour force are also continuously changing (working longer or shorter hours, changing their skills, moving from one firm to another and migrating, for instance). The supply of labour for farm jobs will also be affected by other considerations like:

• is rural population growing?
• are people moving from the countryside to towns?
• are the returns from labour in farming good (the returns from farming or from wage labour)?

In many countries, women increasingly look for paid work. Their success in finding it depends in part on the social position of women and in part on there being employers ready and able to hire them.

Therefore, the amount of labour willing and able to work at any one time will depend on a number of considerations.

3.4 Capital

Physical capital means capital goods, either stocks of goods or of machinery and equipment. The physical stock of capital tends to wear out over time. It becomes physically worn and also becomes obsolete. This loss of value over time is called depreciation. Therefore to maintain the stock of capital, replacement capital goods are required every year.
As we have seen, land can also wear out. Labour wears out but reproduction ensures that young people are constantly joining the labour force.

A number of terms are used which may be confusing. The term capital is also used to refer to financial capital: the funds and other financial assets available for purchasing physical capital. Our definition of capital is as 'physical capital'.

**Investment** is the flow of new or replacement capital goods per unit time that increases or maintains the stock of physical capital. **Gross investment** includes both elements (new and replacement) whilst **net investment** excludes replacement (so net = new investment).

Finally, **fixed investment** (sometimes called fixed capital formation) is gross investment without any increase in stocks of goods. Incidentally, stocks of goods are called **inventories**.

Unless otherwise stated you should assume that ‘capital’ means gross investment. The same applies to ‘investment’. The various distinctions become more important when we consider how to account for stocks and flows. For example, a balance sheet summarises the value of stocks of equipment, goods, etc, and of financial assets, a trading account summarises the value of the flows of inputs and outputs of all kinds, including changes in stock levels.

You do need to know when something is a **stock** or a **flow**, though. A **stock** is measured at one point in time whereas a **flow** is measured over a period of time.

You have a flow of income per week (month) and this allows you to have a flow of consumption and a flow of savings per week (month) as well. If you are lucky and have a positive flow of savings, over time you will accumulate a stock of wealth in the form of money, or you may purchase physical assets (eg livestock, stocks of food, jewellery). Note that in everyday English we use the term ‘savings’ quite loosely. ‘My savings’ often refers to my stock of wealth. In economics usage ‘savings’ implies a flow and takes place from one point in time to another. (Even more confusing, people call their stock of savings their ‘investments’! Try to avoid this one.)

**What might be a typical stock of resources for a peasant farm?**

**Answer.**

1 man, 1 woman, 4 children, 1 house, 2 cows, 5 chickens, 1 hectare cultivated land, 1 bicycle, past savings of Rs 1000, 15 fruit trees, 1 storage hut half full of grain, etc.
Section 3 Self Assessment Questions

Question 7

Fill in the missing words/phrases.

Resources required for the production of _______are generally classified into four major groups, namely: _______, including all natural resources; _______, including all human resources, _______, including all man-made resources; and _______, which brings all the previous resources together in the production. Entrepreneurship captures the _______ and _______ elements in capitalism.

Question 8

Which of the following statements is not consistent with the economist's definition of capital as a factor of production?

(a) machinery
(b) equipment
(c) money
(d) buildings

Question 9

Look at the following trading account for an individual, and then classify each of the financial entries as either a (i) flow or a (ii) stock.

(a) income
(b) consumption
(c) savings
(d) tax
(e) wealth

<table>
<thead>
<tr>
<th>Beginning week 1</th>
<th>Wealth</th>
<th>Rs 300</th>
</tr>
</thead>
<tbody>
<tr>
<td>During week 1</td>
<td>Income</td>
<td>Rs 1500</td>
</tr>
<tr>
<td></td>
<td>Consumption</td>
<td>Rs 1300</td>
</tr>
<tr>
<td></td>
<td>Tax</td>
<td>−Rs 100</td>
</tr>
<tr>
<td></td>
<td>Savings</td>
<td>+Rs 100</td>
</tr>
<tr>
<td>Beginning week 2</td>
<td>Wealth</td>
<td>Rs 400</td>
</tr>
</tbody>
</table>

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4.0 TECHNIQUES OF ECONOMIC ANALYSIS

Section Overview
In this final section we describe a few simple, but extremely useful, techniques for economic analysis. We begin by looking at the models commonly used by economists before reviewing the types of tools used to describe economic theories and relationships. Finally, we discuss the use of identities and equations in economics.

Section Learning Outcome
By the end of this section, students should be able to:
- discuss the use of models, functions, equations and calculus in economics

4.1 Models in economics
The term ‘model’ is used widely in economics, often without a precise meaning. Generally, a model is a set of theories which, taken together lead one to be able to test certain predictions. Examples of models used in economics include:

- **Static.** This means that dynamic elements are kept to a minimum. (By ‘dynamic’ we mean elements which are changing.) Often we compare one equilibrium position in a market with another equilibrium position in the same market, a procedure called **comparative static analysis**. The alternative to static analysis is dynamic analysis. This concentrates on the behaviour of models out of equilibrium, typically moving from one equilibrium to another.

- **Partial.** A general equilibrium analysis tries to consider all the markets and all the forces that affect the subject under examination. However, it is common for economists to concentrate on **partial equilibrium analysis**, where we assume that other things remain the same beyond the boundaries of the market or area that is our concern. This works quite well for small changes, but becomes an inaccurate method when large important changes are considered. An expanding area of economics is the analysis of several markets simultaneously, called 'multi-market analysis'. Computer power has helped drive this form of analysis.

4.2 Tools of analysis
Economics uses three ways of describing theories. Two are mathematical (using (i) algebra and (ii) graphs and diagrams) and the third is simply in words.

**Algebra** is the most concise. However, we use **words** every day, so if you find this is the best way for you, use them. The trouble is that words can be ambiguous, vague and long-winded!

**Diagrams** are useful, because you can often picture a relationship and do not need to understand calculus to see when the slopes of curves are changing. However, diagrams have their limitations and much of economics can be expressed in a few pages using calculus, but extends to dozens of separate diagrams, many of which are similar mathematically.
4.3 Identities and equations

The use of 'identities' in economics is common. The symbol for an identity is '='; meaning two expressions are the same. For instance, we could state that in a market:

\[ \text{the quantity sold} = \text{the quantity bought} \]

This means that the quantity demanded is the same as the quantity supplied. This is an example of how neoclassical economics often sets out to solve questions such as:

- Why is the price of oranges rising?
- Why is the volume of oranges bought and sold rising? (Assume constant stocks and no waste.)

Suppose our initial research tells us that last week 10 tonnes of oranges were bought and sold at a price of Rs 30 whereas this week it was 12 tonnes at a price of Rs 40.

- we hypothesise that the amount of oranges exchanged per week and the price of oranges can be looked at in two ways and that each way is a separate set of forces operating on the identity
- you devise a theory for demand, that you express as an equation, eg \( Q_d = f \) (Price, Incomes)
- you do the same for supply, eg \( Q_s = f \) (Price, Costs)
- we assume that when these two are equal, there is no reason for the quantity bought and sold to vary. Thus, in equilibrium \( Q_d = Q_s \)
- we use this theory to explain
  - why price is rising
  - why the quantity bought and sold is rising

The explanation might be that there is a stronger demand for oranges this week because consumers have obtained higher incomes. They are encouraging suppliers to sell more oranges by bidding up the price to Rs 40. Thus, the identity purchases = sales (given stocks and waste per unit time) is used as a starting point for developing a theory that does not use the identity, but is consistent with it. The theory requires that people’s plans or wishes to buy and sell are brought into equality by the movement of price. Even if those plans are not equal, the identity still holds, since what one person buys, another sells. In this way, the economist conjures up two sets of invisible forces to explain the fact that an extra two tonnes of oranges are bought and sold this week at a price Rs 10 above last week’s price.

An elegant statement of this use of an identity in creating an economic model (of which more later) that explains trade patterns is the following. In the quotation ‘ex ante’ means before the event and ‘ex post’ after the event.
‘... we can, as in most economic models, start with an identity, add some behavioural equations, establish an equilibrium position where ex ante behaviour is consistent with the ex post identity, and then express the set of equations in the form of relationships among variables. First, we need the identities.’


This way of using an identity as a starting point for an economic theory is also used in National Income analysis.
Section 4 Self Assessment Questions

Question 10

True or false?
The market supply-demand model is an example of a general equilibrium model.

Question 11

Fill in the missing words/phrases.
Comparative static analysis is a technique that compares one _______ condition with another. A popular example of this technique is found in the study of markets, whereby comparative static analysis is used to analyse how the equilibrium _______ and equilibrium _______ are affected by changes in the _______ and _______ determinants.

Question 12

True or false?
The Marshallian model is an example of a partial equilibrium model.
UNIT SUMMARY

In this unit we have considered a number of methods of economic analysis, specifically focusing on the neoclassical model and the assumptions of perfect competition. However, this unit has tried to make clear that this is not the only way of looking at economic problems and it is important to remember the limitations of economics as well as the power of its analysis.

To conclude this introductory unit, read the section on modern developments as well as the chapter summary in Snyder and Nicholson (2012), pages 17 to 18.
UNIT SELF ASSESSMENT QUESTIONS

Question 1

Discuss the use of positive and normative economic approaches in the implementation of agricultural and environmental policy.

Question 2

(a) Draw a supply and demand diagram showing the market equilibrium position for a perfectly competitive market, commenting on the relationships between market price, quantity supplied, and quantity demanded.

(b) Explain whether the market equilibrium analysis shown in your diagram to part (a) is an example of a partial equilibrium analysis or a general equilibrium analysis.

(c) Briefly discuss the assumptions of neoclassical economics which must be present if the relationships shown in your diagram to part (a) are to hold true.

Question 3

What do you understand by the term 'scarce resource'? Discuss examples of resources that are scarce and ones that are not.
# Key Terms and Concepts

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>capital</td>
<td>In economics, capital is a factor of production (i.e., a physical resource) used to produce a good or service (e.g., machinery, buildings and tools). It does not include money.</td>
</tr>
<tr>
<td>classical economics</td>
<td>A school of economics strongly associated with the work of Adam Smith and early attempts to understand the workings of the market economy.</td>
</tr>
<tr>
<td>comparative dynamic analysis</td>
<td>In contrast to comparative static analysis where dynamic elements are kept to a minimum, this procedure introduces a time element by comparing the relationship between variables moving from one equilibrium position to another over a given time period.</td>
</tr>
<tr>
<td>comparative static analysis</td>
<td>The procedure used to compare one equilibrium position in a market with another equilibrium position in the same market at the same point in time.</td>
</tr>
<tr>
<td>depreciation</td>
<td>The loss in value of a capital resource over a given time period.</td>
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<tr>
<td>equilibrium</td>
<td>See market equilibrium.</td>
</tr>
<tr>
<td>externalities</td>
<td>Negative externalities are associated with activities in which the private costs are less than the social costs. Positive externalities are associated with activities in which the private benefits are less than the social benefits.</td>
</tr>
<tr>
<td>factors or factors of production</td>
<td>Resources used in the production of goods and services, namely land, labour, capital and entrepreneurship.</td>
</tr>
<tr>
<td>flow</td>
<td>A variable which is measured over a period of time.</td>
</tr>
<tr>
<td>general equilibrium analysis</td>
<td>A general equilibrium analysis tries to consider all the markets and all the forces that affect the subject under examination.</td>
</tr>
<tr>
<td>imperfect competition</td>
<td>Any market structure that is not perfect competition.</td>
</tr>
<tr>
<td>institutional economics</td>
<td>A school of economics focusing on the role of institutions in shaping economic activity and performance.</td>
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<tr>
<td>labour</td>
<td>A factor of production.</td>
</tr>
<tr>
<td>land</td>
<td>A factor of production, including all natural resources.</td>
</tr>
<tr>
<td>law of diminishing returns</td>
<td>The law of diminishing returns states that in all productive processes, adding more of one factor of production, while holding all others constant, will at some point yield lower per-unit returns.</td>
</tr>
<tr>
<td>macroeconomics</td>
<td>The study of the economy as a whole.</td>
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<tr>
<td>marginal analysis</td>
<td>Central to the neoclassical approach, it involves analysing changes at the margin (e.g., the marginal benefits or marginal costs of incremental changes).</td>
</tr>
</tbody>
</table>
market economy: an economy where resource allocation and exchange are conducted primarily (theoretically exclusively) through competitive markets with market determined prices (not as a result of (a) state or government intervention, action or regulation in a command and control system or (b) markets with state controlled prices).

market equilibrium: the equilibrium price and quantity resulting from the intersection of supply and demand curves.

market failure: in neoclassical economics this is when markets fail to meet the conditions of perfect competition.

microeconomics: the study of individual industries and markets and of the behaviour of players within them.

model: a set of theories which, taken together lead one to be able to test certain predictions.

monopoly: a market dominated by a single participant who has the power to determine what the market price will be (in national legislations the term may also refer to situations where a company, or companies, have excessive market power, even if they are not the sole player).

neoclassical analysis: the school of economics which serves as the foundation of modern microeconomics, which focuses on marginal analysis, equilibrium and the study of markets.

normative economics: concerned with subjective preferences or values that cannot be empirically tested.

partial equilibrium analysis: a partial equilibrium analysis considers a single market at a time and assumes that all other things remain the same beyond the boundaries of the market or area that is our concern.

perfect competition: an economic model in which markets are assumed to have certain characteristics, principally no single actor is able to affect market prices, and participants do not face information constraints and can freely enter and exit markets. Acts as a benchmark in the neoclassical analysis of markets.

positive economics: concerned with the development and testing of positive statements about the world as it is or might be (not about how it ought to be or should be).

production economics: the study of the fundamental relationships between the levels of resources used in the production process and the level of output itself.

production function: a function showing the physical relationship between inputs and output.
<table>
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<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>property rights</td>
<td>the exclusive authority to determine how a resource is used, whether owned by government, collective bodies, or by individuals. All economic goods have a property rights attribute, consisting of the right to: use the good, earn income from the good; transfer the good to others; and enforcement</td>
</tr>
<tr>
<td>rationality</td>
<td>an assumption in neoclassical economics that producers seek to maximise their profits and that consumers seek to maximise their utility</td>
</tr>
<tr>
<td>resources</td>
<td>see production factors</td>
</tr>
<tr>
<td>stock</td>
<td>a variable which is measured at a point in time</td>
</tr>
<tr>
<td>supply and demand</td>
<td>a model depicting the relationship between market price, market supply, and market demand</td>
</tr>
<tr>
<td>utility (satisfaction)</td>
<td>the potential satisfaction that is inherent in goods and services</td>
</tr>
<tr>
<td>welfare economics</td>
<td>a school of economics that analyses what is in the ‘best interests’ of society as a whole</td>
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