

tn10

Efficiency

Learning objective

- To understand productive and allocative efficiency and their significance.

Lesson notes

The notion of minimising unit cost to achieve productive efficiency is relatively straightforward. However, x-inefficiency might require a little more explaining.

The passing mention in IS10 of the climate shift from management and workers as enemies to positive collaboration in many businesses raises a possible issue for discussion.

The concept of allocative efficiency stretches some students and might need careful explanation. IS10 does not use opportunity cost, but this approach could help understanding for those who might be struggling.

The limitations of Pareto optimum (e.g. distribution issues) could be explored.

WS10 is particularly rich in potential discussion points, e.g. developing countries, trade and distribution issues, impact of transnational corporations (TNCs). Question 5 is very open and might inspire valuable discussion.

Mark allocations

If you choose to use WS10 as a data-response exercise, the appropriate balance of marks might be: Q1 – 8, Q2 – 6, Q3 – 6, Q4 – 8, Q5 – 12.

Suggested timing

Introduction	10 minutes
IS10	10 minutes
Discussion of related topics	As long as is available
WS10	40 minutes (if students write answers)

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Efficiency

Common sense could lead to a notion of efficiency that combines elements of effectiveness (getting a result) with some idea of being economical (or low cost). Economists go further and identify two quite distinct types of efficiency: *productive* and *allocative*.

Productive efficiency

Productive efficiency is about *minimising the unit cost* of any quantity of output. Some books use the terms *cost efficiency* or *technical efficiency* to convey the same meaning, though technical efficiency is strictly a little different. For example, in a rich country where capital is relatively plentiful and cheap, high-tech machines are often used to change car tyres. This machinery can be technically efficient, but transporting the same machines to a poorer, capital-starved country might be productively inefficient. Lower wages could make more labour-intensive methods (even just crowbars) cheaper in the second country.

As resources are scarce, productive efficiency is attractive because minimising costs implies *minimum resources are used up* in production, leaving more for other uses. The profit motive will also stimulate productive efficiency, since profit is revenue minus costs. Adding in cut-throat competition makes productive efficiency essential for survival. Inefficiency could bring inability to compete on price and so force business losses and eventual closure.

One of the great criticisms of public sector monopolies has been the risk of *x-inefficiency*, which arises from the notion that without competition there is less pressure to minimise resource use and costs. (X-inefficiency is defined as a tendency to operate at above minimum average cost in a non-competitive environment.) Sometimes, public sector managers have had their salaries based on the size of their departments — a direct incentive to be inefficient. The UK privatisations late in the last century seemed to expose earlier x-inefficiency in cases where many jobs were shed with little apparent decline in service (e.g. British Telecom and British Gas).

A simplistic view of productive efficiency might envisage the cheapest acceptable inputs, least-cost techniques and workers kept under pressure. One change in emphasis in recent years has been towards positive worker motivation rather than rule by fear. For example, at the Sunderland Nissan plant, workers are proud of their high labour *productivity* (about 100 cars per worker/year compared to 30–40 in some other British car plants).

A continuing trend in many sectors has been for internal economies of scale to increase the *optimum size of plant*. The car market is again a good example. Nissan is expanding the Sunderland plant to produce 500,000 cars a year. Small car firms can only compete in small specialist markets. Economies of scale are central to globalisation and the growth of transnational corporations (TNCs). One of the best features of such developments is the potential for productive efficiency.

Another development linked to productive efficiency is *outsourcing* — contracting out non-core activities to specialist providers.

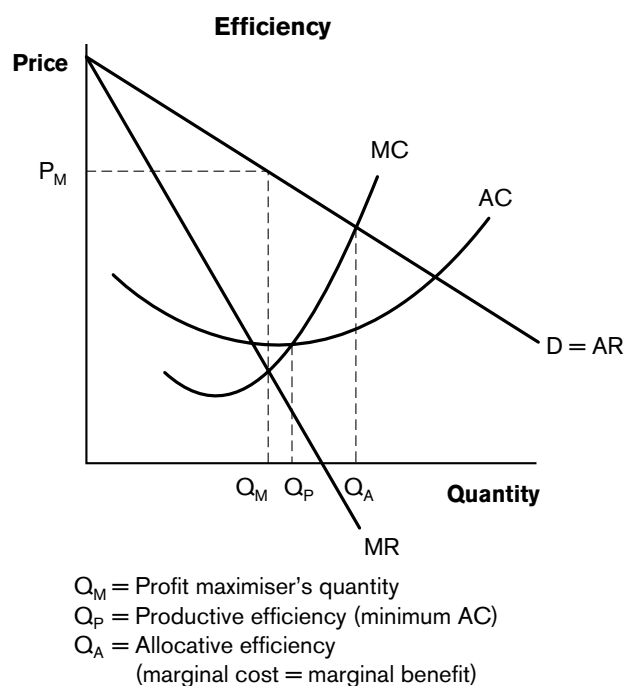
Allocative efficiency

Allocative efficiency is concerned with making *choices* between alternative resource uses. There is a case for theoretical allocative efficiency resulting from the operation of market forces. In brief, the prices that consumers will pay reflect the benefits (satisfaction, utility) they expect from consumption. Taking consumer surplus as a ‘bonus’, we can focus on the marginal consumer who just derives enough benefits to justify paying the price. If the price that the customer pays covers the marginal cost of the product, the benefit justifies incurring the cost of resources used. In a perfectly competitive model, *price is equal to marginal cost* (as well as marginal revenue and average cost).

The theoretical *Pareto optimum* that market forces can reach is a situation where the switching of resources to alternative uses cannot increase welfare (benefits) for one person or group without reducing welfare elsewhere.

There are a number of problems with this theory, however.

- It sidesteps distribution issues, ignoring uneven incomes and therefore uneven ‘voting power’ in spending choices — which underpin resource use.
- It ignores market failure (e.g. public goods and merit/demerit goods).
- There is an implicit assumption that resources are ‘mobile’, i.e. able to switch between uses.
- It also relies on price being equal to marginal cost. In imperfect competition or monopoly, price will frequently not be equal to marginal cost. If price is above marginal cost (e.g. where there are abnormal profits), quantity sold will fall below the allocatively efficient level. The graph below shows such a situation.



Trade-offs

There is an evident potential conflict between productive efficiency and allocative efficiency, where economies of scale can bring productive efficiency but the market is only sufficient to support a few large firms. The risk here is that cutting competition will ultimately result in the loss of allocative efficiency.

Lowest cost can be seen as cheap and nasty, and therefore undesirable (and a poor allocation of resources). Skoda, for example, has been struggling to throw off a poor image based on assumed inferiority, using advertisements deliberately challenging the notion that Skodas are not to be taken seriously and are almost a joke. There seems to have been some success in shifting the brand image to one of better quality and therefore good value for money.

Choices in the allocation of scarce resources between alternative uses are central to economics. The standard of living depends on how productive resources are and how well we allocate them. The limitations of market forces lead governments to intervene, sometimes to build large public sectors. However, unless governments are exceptionally well informed and organised, there is no guarantee that their interventions will actually improve allocative efficiency, whatever their intentions.

WS10

Efficiency

Coconuts in the shade

The tall, graceful coconut palm thrives in tropical climates, particularly in sandy and deep soils close to sea level. It can be found in most parts of the tropical world, but grows most profusely in southeast Asia and the Pacific.

The coconut is exported in five different forms. It may be exported whole or desiccated. It may be exported as copra (the dried white flesh), as coconut oil (which is derived from the copra), or as copra cake, a by-product of coconut oil. The most important of these is coconut oil, which, by value, accounts for around 65% of all coconut product exports. The Philippines is the world's major supplier of coconut products. In 1988, it accounted for 57% of world coconut oil exports and about half of the copra cake and desiccated coconut market.

Besides providing the country with about 6% of its total export earnings, the coconut directly or indirectly provides a livelihood for a third of the Philippines' population, nearly 20 million people. There are a few large coconut plantations but production is predominantly on a small scale, with three-quarters of all holdings devoted to coconut trees covering less than 5 hectares.

Domingo and Christita Sendini hold one of the Philippines' $\frac{1}{2}$ million coconut tenancies – a hectare of land with 100 trees on it. The setting looks like a tropical paradise: low, steep, wooded hills, covered with elegant 70 ft coconut palms, and the sun dappling thatched roof houses on stilts. The Sendinis harvest their trees every 40–45 days. Each harvest sells for around £9, from which the Sendinis get around £3. The rest goes to the landlord, as is common in the Philippines.

The coconut is a particularly vulnerable commodity. In nearly all its uses, another source of vegetable oil could be substituted for it. If this should happen, the Philippines would lose an export earner and a third of the population would lose its main source of livelihood.

As synthetic rubber began to displace natural rubber, Malaysia switched its attention from rubber trees to oil palm. Malaysia now dominates the palm oil market, accounting for nearly 70% of exports. Oil palm is principally a plantation crop. The oil palm has a higher production potential per hectare than any other oil-seed crop and production has been increasing steadily. Unilever has used tissue culture to speed up new variety development and has succeeded in increasing yields from new trees by 30%. The company expects that before long oil palm yields will be two to six times greater than those of the older varieties, a development seen by experts as threatening the position of traditional oil palm producers and the producers of rival vegetable oil crops such as coconuts.

Source: data from *The Trade Trap* by Belinda Coote

Questions

1 Unilever has improved productive efficiency in its Malaysian palm oil plantations. Using supply and demand diagrams, show and explain the potential impact of this on:

(a) the palm oil market

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(b) the coconut oil market

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2 Would you expect palm oil plantations to thrive indefinitely? Explain your answer.

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WS10 Efficiency

3 Suggest reasons why Domingo and Christita Sendini have a low income.

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4 Explain the ways in which the Sendinis could improve (a) their productive efficiency and (b) their allocative efficiency.

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5 Assess the difficulties likely to inhibit such improvements in efficiency.

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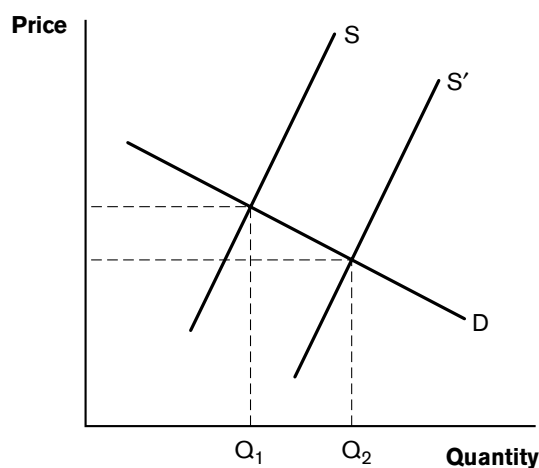
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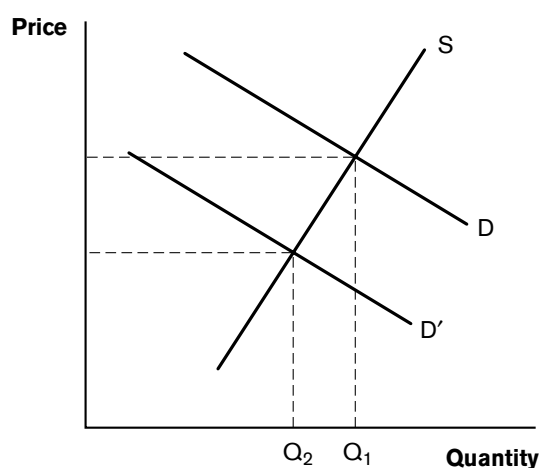
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Efficiency

- 1 (a) The supply curve for palm oil will move to the right, reflecting falling unit costs and increasing supply. Price should fall and quantity traded should increase.



- (b) As a close substitute for coconut oil has become cheaper, so demand for coconut oil will fall — the demand curve will shift down/left. As a result, both the market price and the quantity sold should be expected to fall.



- 2 The economic system is dynamic. The success of palm oil plantations could be undermined by a variety of developments such as:
- technological change cutting costs of alternative vegetable oils
 - the introduction of new natural or artificial substitutes
 - a disease damaging oil palms
 - a shift in future demand away from vegetable oil to completely different products

However productively efficient the palm oil plantations become, they will always remain vulnerable to any fall in market demand.

- 3 Income is derived from use of the factors of production. The factors controlled by the Sendinis have very low productivity, generating a low-value crop every 40 days or so. In addition to this, relatively large payments to the landlord raise income distribution issues.

- 4** Productive efficiency could possibly be improved by introducing better trees (e.g. trees growing larger coconuts). Alternatively, harvesting more trees with the same labour would improve productivity and lower 'costs' per nut. It might be allocatively more efficient to switch to an alternative crop. Market prices might be the best guide to which crops are most in demand, but chasing short-term price variations when agricultural products have long lead times would be dangerous.
- 5** As small producers, the Sendinis have very limited access to resources. The probability that they have funds for developments such as improvement in coconut technology or investment to expand is low. If there were more profitable alternative crops, they and many others would presumably have switched already, despite the sunk costs entailed in having raised coconut palms. Poor resource mobility is often an issue ignored by theoretical reallocation. Poverty is often linked to poor and immobile resources.