Allocative efficiency: P=MC

Under the conditions of perfect competition, a market will be allocatively efficient as long as the firms in that market produce at the P=MC level of output. Price is a signal from buyers to sellers, and the price seen by firms signals the marginal benefit of consumers in the market. If the price consumers pay for a product is greater than the marginal cost to firms of producing it, then the message being sent to producers is that more output is demanded. In the pursuit of profits, more resources will be allocated towards the production of the product until the marginal cost and the price are equal. At the P=MC point firms maximize their profits and resources are said to be *efficiently allocated*.

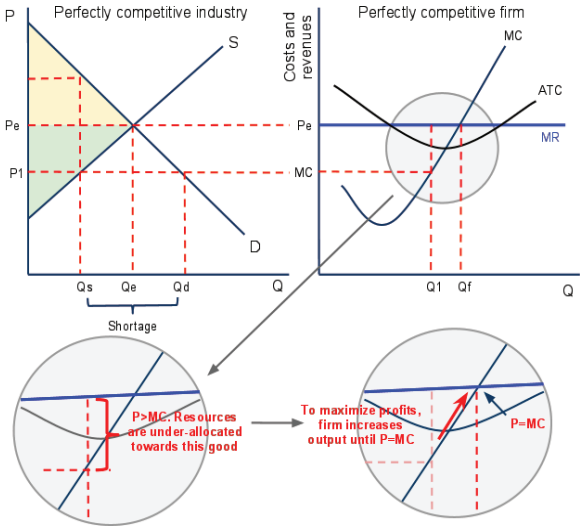

Figure 8.18
Profit-maximizing behaviour results in allocative efficiency.

Assume that the firm on the right represents the typical firm in a perfectly competitive market. When firms produce at Q1 level of output, resources are under-allocated towards this good, since the price consumers are willing to pay (Pe, determined by market supply and demand) is greater than firms' marginal cost of production. Notice that when individual firms produce Q1 units, the market supply of Qs is less than the market demand of Qd; there is a shortage in the industry as long as firms produce only Q1 units.

However, firms are unlikely to produce at this socially undesirable level for long because in their pursuit of profits they will increase their output to the quantity at which marginal cost equals the price. When they increase their output to Qf, firms maximize their profits and as a result the shortage in the market that existed when firms produced at Q1 is eliminated, improving social welfare and maximizing the total amount of consumer and producer surplus (the combined areas of the shaded triangles in the industry graph).

Because of the profit-maximizing behaviour of self-interested business managers in the competitive market in Figure 8.18, resources are more efficiently allocated than they would be otherwise. The price determined by supply and demand in the market signals the benefit society derives from this good, and as long as the price is greater than the marginal cost, the message sent from buyers to seller is 'we want more!'. On the other hand, if at a given level of output marginal cost exceeds the price, resources are over-allocated towards the good. The message sent in such a market is that consumers value the product less than it costs firms to produce, so firms will reduce their output to maximize profits, correcting the over-allocation of resources and restoring a socially optimal level of output.

Allocative efficiency is achieved in a perfectly competitive market precisely because firms will always wish to maximize their profits by producing the quantity of goods at which their marginal cost equals the price.

Perfect competition in the news

Farmers May Switch Crops Due to Labor Shortage

by Ted Robbins

October 22, 2007

Farmers may change their crops due to the shortage of immigrant labor. Of all crops, fresh fruits and vegetables are the most labor intensive. Lettuce, strawberries and broccoli all have to be picked by hand. In Arizona, farmers are passing on chili peppers to plant corn, which is harvested by machine.

After 37 years, Ed Curry is not planting green chili anymore because corn can be harvested by machines; green chili can't.

Curry explains, "It would take about 250 people to pick this year's chili crop. With immigration tightened up the way it is, well, number one, we just can't get the labor."

About seven years ago, Ed Curry was busted for using illegal labor. Today his workers are legal. They go back and forth from Mexico each day, making $7 to $8 an hour. Most are in their 50s and 60s. One man is 72 years old. Younger workers can't get visas or don't want the jobs. So as his workers age and his workforce dwindles, Ed Curry says he's thinking about moving some of his operation to Mexico.

"We're down to survival. Am I going to stay in this or not? And if I'm going to stay in it, I've got to do it where there's plenty of labor and we can be competitive."

That's one farmer's plight. The Western Growers Association based in California represents 3,000 farmers across the region. Its president, Tom Nassif, says farmers need Congress to pass legislation that will allow more workers in, something he says it should have done already.

Nassif says his association polled a dozen members and found more than 40,000 acres had moved to Mexico in the last year or so.

Source: NPR News, October 22, 2007.
http://www.npr.org/templates/story/story.php?storyId=15503698&ft=2&f=1095

In their pursuit of economic profits, firms in a competitive market will, through their collective pursuit of self-interest, inadvertently achieve an allocation of society's scarce resources that is socially optimal.

1 Discuss the view that *allocative efficiency* as defined in this chapter is a socially desirable outcome.
2 Is it accurate to say that goodness can be achieved through greediness in a market economic system?

EXERCISES

1 Illustrate the effects of the shortage of immigrant workers on the short-run production costs and profits in the competitive chili pepper market.

2 Explain how the chili market will adapt to higher labour costs in the long run.

3 Assume the US chili pepper market reaches a new long-run equilibrium following the shortage of immigrant labor, and demand for chili peppers increases. Illustrate how the profit-maximizing behaviour of chili pepper farmers assures that enough resources will be allocated towards chili peppers in the long run.

PRACTICE QUESTIONS

1 Explain the difference between short-run equilibrium and long-run equilibrium in perfect competition. [Total 10 marks]

2 **a** Using a diagram, explain how allocative and productive efficiency will be achieved in long-run equilibrium in perfect competition.

b Evaluate the view that consumers, not producers, are the main beneficiaries of perfectly competitive market structures. [Total 15 marks]

Supply shocks

'Events, my dear boy, events.'
– former UK Prime Minister, Harold Macmillan, upon being asked what posed the greatest challenges to a statesman.

Supply shocks are the random events that can disrupt the normal supply of goods and services. More rarely, these kinds of events can improve supply situations, but we typically associate random events with natural disasters like floods, earthquakes, and droughts. Clearly, the flooding of a great river like China's Yangtze can destroy significant aspects of a community's wealth – things like crops, homes, and infrastructure. This kind of destruction would dramatically reduce the available stock of food, housing, and many other necessary goods in that area. Even in the mildest sense, bad weather can diminish agricultural production in any given year.

At the same time, many destructive events are man-made. Environmental disasters, such as the Chernobyl nuclear accident in the Ukraine, the Union Carbide explosion in India, as well as the more recent Gulf of Mexico oil spill, can have devastating effects on the supply of a wide range of goods and services, in addition to the deadly effects they have on the lives of those in the disaster zone. Conflict, too, can wreck the everyday business and investment plans of most firms. War may provide a boon to the suppliers of military-related goods, but it reduces the supply of nearly everything else.

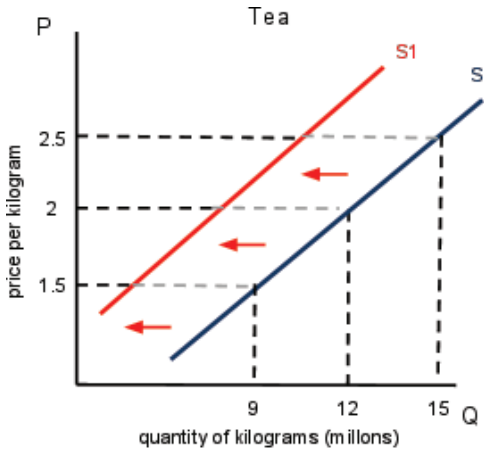

Figure 2.19
Supply shock: tsunami ruins tea-growing land in Sri Lanka.

In Figure 2.19 above, the tea-farming output of Sri Lanka is reduced by the tsunami of 2004. The salt water that washed across the landscape salinized large areas of land, rendering it useless for agriculture.

Of course, random events need not always be negative. Indeed, on a small scale, good weather can dramatically improve crop yields. In extreme cases, a country may discover that it possesses large deposits of minerals or fossil fuels that will improve the supply of those goods.

EXERCISES

Read and interpret the following headlines. Decide the kind of shift that would occur, and create a diagram to demonstrate the shift. Then identify the determinant that caused the shift.

1. Airlines expect more rules in response to increased accident rates.
2. New teacher robots are expected to revolutionize teaching at major universities.
3. A shortage of apples is expected to influence the apple juice industry.
4. To save money, the government eliminates the subsidies going to sugar producers.
5. Cotton growers are relieved that peace talks are successful in their war-torn country.

Linear supply functions

Supply for a good can also be expressed using mathematical functions. These functions will have a positive relationship between price and quantity supplied, and will be shown diagrammatically as upward sloping lines, in accordance with the law of supply. A typical supply function might look like this:

Qs = c + dP

Where:

- Qs represents the specific quantity supplied
- 'c' represents the autonomous element of supply, or the amount of supply if the price were zero
- 'd' is the change in quantity supplied resulting from a change in price. In other words, 'd' is the slope of the supply curve.

In the above function, 'c' represents the non-price factors that determine supply (costs of production, subsidies and taxes, the price of related goods, etc.). Thus, if any of those factors change, the value of 'c' will change. For example, if 'c' increases, the corresponding value of Qs will increase by the same amount. This will thus shift the supply curve outward, or 'down' by that amount as well. In short, changes in 'c' result in shifts of the supply curve.

The value of 'd' affects the degree to which a price change will affect the quantity supplied. If 'd' has a value of .5, for example, this means that any increase in price of $10 will increase the quantity supplied by 5 units. Thus, 'd' is the price coefficient for the linear supply function, determining 'movements along' the supply curve.

Again, using our potato chips example, it is possible to construct a supply schedule for chips using our prices and a plausible supply function:

Qs = 2 + 10P

So, if our price is $1, the value of Qs is equal to 12 bags of chips. This is consistent with our supply schedule in Table 2.4 above. If the price is $3, the value of Qs is 32, and so on. This supply schedule reflects the values that were used to construct the supply curve diagram in Figure 2.8. But let us take a different example of a supply function, one of the supply for dog food:

Qs = 45 + 3P

Let's start with a price of $10 per bag. Therefore Qs = 45 + 3(10), or Qs = 45 + 30. Qs is therefore equal to 75. Again, as price increases the quantity supplied increases by a rate established by the price coefficient 'd' in the original supply function. The 'c' portion with a value of 45 is the amount of dog food supplied at a price of zero. If that number were to change, we would have a new starting point for supply and a new linear supply curve. In other words, supply will have shifted. With this linear supply function, we can construct both a supply schedule and supply curve. Table 2.5 shows a list of possible prices and the corresponding quantities, as computed from the above function.

TABLE 2.5 SUPPLY SCHEDULE FOR DOG FOOD

(P) Price of dog food	(Qs) Quantity supplied, bags of dog food
10	75
9	72
8	69
7	66
6	63