Module 7
Supply and Demand: Changes in Equilibrium

Changes in Supply and Demand

The emergence of Vietnam as a major coffee-producing country came as a surprise, but the subsequent fall in the price of coffee beans was no surprise at all. Suddenly, the quantity of coffee beans available at any given price rose—that is, there was an increase in supply. Predictably, the increase in supply lowered the equilibrium price.

The entry of Vietnamese producers into the coffee bean business was an example of an event that shifted the supply curve for a good without affecting the demand curve. There are many such events. There are also events that shift the demand curve without shifting the supply curve. For example, a medical report that chocolate is good for you increases the demand for chocolate but does not affect the supply. That is, events often shift either the supply curve or the demand curve, but not both; it is therefore useful to ask what happens in each case.

We have seen that when a curve shifts, the equilibrium price and quantity change. We will now concentrate on exactly how the shift of a curve alters the equilibrium price and quantity.

What Happens When the Demand Curve Shifts

Coffee and tea are substitutes: if the price of tea rises, the demand for coffee will increase, and if the price of tea falls, the demand for coffee will decrease. But how does the price of tea affect the market equilibrium for coffee?

Figure 7.1 on the next page shows the effect of a rise in the price of tea on the market for coffee. The rise in the price of tea increases the demand for coffee. Point $E_1$ shows the original equilibrium, with $P_1$ the equilibrium price and $Q_1$ the equilibrium quantity bought and sold.

An increase in demand is indicated by a rightward shift of the demand curve from $D_1$ to $D_2$. At the original market price, $P_1$, this market is no longer in equilibrium: a shortage occurs because the quantity demanded exceeds the quantity supplied. So the price of coffee rises and generates an increase in the quantity supplied, an upward
movement along the supply curve. A new equilibrium is established at point $E_2$, with a higher equilibrium price, $P_2$, and higher equilibrium quantity, $Q_2$. When demand for a good or service increases, the equilibrium price and the equilibrium quantity of the good or service both rise.

What would happen in the reverse case, a fall in the price of tea? A fall in the price of tea reduces the demand for coffee, shifting the demand curve to the left. At the original price, a surplus occurs as quantity supplied exceeds quantity demanded. The price falls and leads to a decrease in the quantity supplied, resulting in a lower equilibrium price and a lower equilibrium quantity. This illustrates another general principle: When demand for a good or service decreases, the equilibrium price and the equilibrium quantity of the good or service both fall.

To summarize how a market responds to a change in demand: An increase in demand leads to a rise in both the equilibrium price and the equilibrium quantity. A decrease in demand leads to a fall in both the equilibrium price and the equilibrium quantity.

**What Happens When the Supply Curve Shifts**

In the real world, it is a bit easier to predict changes in supply than changes in demand. Physical factors that affect supply, like the availability of inputs, are easier to get a handle on than the fickle tastes that affect demand. Still, with supply as with demand, what we can best predict are the effects of shifts of the supply curve.

As we mentioned earlier, a prolonged drought in Vietnam sharply reduced its production of coffee beans. Figure 7.2 shows how this shift affected the market equilibrium. The original equilibrium is at $E_1$, the point of intersection of the original supply curve, $S_1$, and the demand curve, with an equilibrium price, $P_1$, and equilibrium quantity, $Q_1$. As a result of the drought, supply falls and $S_1$ shifts leftward to $S_2$. At the original price, $P_1$, a shortage of coffee beans now exists and the market is no longer in equilibrium. The shortage causes a rise in price and a fall in quantity demanded, an upward movement along the demand curve. The new equilibrium is at $E_2$, with an equilibrium price, $P_2$, and an equilibrium quantity, $Q_2$. In the new equilibrium, $E_2$, the price
is higher and the equilibrium quantity is lower than before. This may be stated as a general principle: When supply of a good or service decreases, the equilibrium price of the good or service rises and the equilibrium quantity of the good or service falls.

What happens to the market when supply increases? An increase in supply leads to a rightward shift of the supply curve. At the original price, a surplus now exists; as a result, the equilibrium price falls and the quantity demanded rises. This describes what happened to the market for coffee beans when Vietnam entered the field. We can formulate a general principle: When supply of a good or service increases, the equilibrium price of the good or service falls and the equilibrium quantity of the good or service rises.

To summarize how a market responds to a change in supply: An increase in supply leads to a fall in the equilibrium price and a rise in the equilibrium quantity. A decrease in supply leads to a rise in the equilibrium price and a fall in the equilibrium quantity.

Simultaneous Shifts of Supply and Demand Curves

Finally, it sometimes happens that events shift both the demand and supply curves at the same time. This is not unusual; in real life, supply curves and demand curves for many goods and services typically shift quite often because the economic environment continually changes. Figure 7.3 on the next page illustrates two examples of simultaneous shifts. In both panels there is an increase in demand—that is, a rightward shift of the demand curve, from $D_1$ to $D_2$—say, for example, representing the increase in the demand for coffee due to changing tastes. Notice that the rightward shift in panel (a) is larger than the one in panel (b): we can suppose that panel (a) represents a year in which many more people than usual choose to drink double lattes and panel (b) represents a year with only a small increase in coffee demand. Both panels also show a decrease in supply—that is, a leftward shift of the supply curve from $S_1$ to $S_2$. Also notice that the leftward shift in panel (b) is large relative to the one in panel (a); we can suppose that panel (b) represents the effect of a particularly extreme drought in Vietnam and panel (a) represents the effect of a much less severe weather event.

In both cases, the equilibrium price rises from $P_1$ to $P_2$ as the equilibrium moves from $E_1$ to $E_2$. But what happens to the equilibrium quantity, the quantity of coffee bought and sold? In panel (a), the increase in demand is large relative to the decrease in supply,
and the equilibrium quantity rises as a result. In panel (b), the decrease in supply is large relative to the increase in demand, and the equilibrium quantity falls as a result. That is, when demand increases and supply decreases, the actual quantity bought and sold can go either way, depending on how much the demand and supply curves have shifted.

In general, when supply and demand shift in opposite directions, we can’t predict what the ultimate effect will be on the quantity bought and sold. What we can say is that a curve that shifts a disproportionately greater distance than the other curve will have a disproportionately greater effect on the quantity bought and sold. That said, we can make the following prediction about the outcome when the supply and demand curves shift in opposite directions:

- When demand increases and supply decreases, the equilibrium price rises but the change in equilibrium quantity is ambiguous.
- When demand decreases and supply increases, the equilibrium price falls but the change in equilibrium quantity is ambiguous.

But suppose that the demand and supply curves shift in the same direction. This was the case in the global market for coffee beans, in which both supply and demand increased over the past decade. Can we safely make any predictions about the changes in price and quantity? In this situation, the change in quantity bought and sold can be predicted but the change in price is ambiguous. The two possible outcomes when the supply and demand curves shift in the same direction (which you should check for yourself) are as follows:

- When both demand and supply increase, the equilibrium quantity increases but the change in equilibrium price is ambiguous.
- When both demand and supply decrease, the equilibrium quantity decreases but the change in equilibrium price is ambiguous.
Supply and Demand: Changes in Equilibrium

The Great Tortilla Crisis

“Thousands in Mexico City protest rising food prices.” So read a recent headline in the New York Times. Specifically, the demonstrators were protesting a sharp rise in the price of tortillas, a staple food of Mexico’s poor, which had gone from 25 cents a pound to between 35 and 45 cents a pound in just a few months.

Why were tortilla prices soaring? It was a classic example of what happens to equilibrium prices when supply falls. Tortillas are made from corn; much of Mexico’s corn is imported from the United States, with the price of corn in both countries basically set in the U.S. corn market. And U.S. corn prices were rising rapidly thanks to surging demand in a new market: the market for ethanol.

Ethanol’s big break came with the Energy Policy Act of 2005, which mandated the use of a large quantity of “renewable” fuels starting in 2006, and rising steadily thereafter. In practice, that meant increased use of ethanol. Ethanol producers rushed to build new production facilities and quickly began buying lots of corn. The result was a rightward shift of the demand curve for corn, leading to a sharp rise in the price of corn. And since corn is an input in the production of tortillas, a sharp rise in the price of corn led to a fall in the supply of tortillas and higher prices for tortilla consumers.

The increase in the price of corn was good news in Iowa, where farmers began planting more corn than ever before. But it was bad news for Mexican consumers, who found themselves paying more for their tortillas.

A cook prepares tortillas made with four different types of corn in a restaurant in Mexico City.

Module 7 AP Review

Check Your Understanding

1. For each of the following examples, explain how the indicated change affects supply or demand for the good in question and how the shift you describe affects equilibrium price and quantity.
   a. As the price of gasoline fell in the United States during the 1990s, more people bought large cars.
   b. As technological innovation has lowered the cost of recycling used paper, fresh paper made from recycled stock is used more frequently.
   c. When a local cable company offers cheaper pay-per-view films, local movie theaters have more unfilled seats.

2. Periodically, a computer chip maker like Intel introduces a new chip that is faster than the previous one. In response, demand for computers using the earlier chip decreases as customers put off purchases in anticipation of machines containing the new chip. Simultaneously, computer makers increase their production of computers containing the earlier chip in order to clear out their stocks of those chips.

   Draw two diagrams of the market for computers containing the earlier chip: (a) one in which the equilibrium quantity falls in response to these events and (b) one in which the equilibrium quantity rises. What happens to the equilibrium price in each diagram?

Tackle the Test: Multiple-Choice Questions

1. Which of the following describes what will happen in the market for tomatoes if a salmonella outbreak is attributed to tainted tomatoes?
   a. Supply will decrease and price will increase.
   b. Supply will decrease and price will decrease.
   c. Demand will decrease and price will increase.
   d. Demand will decrease and price will decrease.
   e. Supply and demand will both decrease.

2. Which of the following will lead to an increase in the equilibrium price of product “X”? A(n)
   a. increase in consumer incomes if product “X” is an inferior good
   b. increase in the price of machinery used to produce product “X”
   c. technological advance in the production of good “X”
   d. decrease in the price of good “Y” (a substitute for good “X”)
   e. expectation by consumers that the price of good “X” is going to fall