Microeconomics with Ethics

by Steven Suranovic (2022) – George Washington University

Chapter 14
Theory of Market Supply

Almost everyone has the general knowledge that economics is about supply and demand. Indeed, in every economics course you'll ever take, supply and demand will play a role.

Supply and demand encompasses the key aspects of every economy. An economic system consists of markets where producers of goods and services sell their products to consumers of goods and services. Sometimes the market is like a farmer's market where bread and honey are sold. Sometimes the market is for services as when workers make contracts with firms to offer their time and effort in exchange for a wage. Sometimes the market is between businesses as when a firm buys intermediate goods or services from another firm to facilitate its own production. And sometimes the market is virtual, as when two people communicate with each other over the internet and a seller agrees to ship a product via a mail service, or deliver a service virtually, to a willing buyer.

No one can go very long in this world without participating in a market of some sort and most people on the planet are participating numerous times every day. It is unquestionably a key aspect of human existence and so an understanding of supply and demand in markets is critical to understanding human life itself.

In the last chapter we illustrated how a market supply function is derived from the decisions of individual firms. In this chapter we'll look more carefully at the fundamental determinants of market supply that will assist later with supply and demand dynamics. We will also consider the notion of an equilibrium price and quantity in a market and how economists expect an equilibrium to arise.

14.1 Market Supply Determinants

Learning Objectives

1. Identify the key variables that affect market supply of a good
2. Learn the expected effect on supply when the value of each supply determinant variable changes

One thing all students need to know about the market supply function used is economics courses is that its derivation is based on the assumption of perfect competition. In other words, when we draw a supply and demand curve to analyze a market situation, we are assuming that the assumptions of perfect competition prevail. This also means that all results that we obtain in any supply and demand analysis can only be assured if the assumptions of perfect competition are valid.

We have already noted that market outcomes will differ if firms have market power, as in cases of monopoly and oligopoly. In those two cases, market supply functions do not exist because firms have the ability to adjust their prices at will, rather than taking a price as given and using that to decide output.

To build a simpler workable model of supply, it is best to identify the main variables that influence the cost of producing a good and then to illustrate how changes in each variable will affect first, the position of a firm's marginal cost curve, and second, the position of the market supply function.

We imagine that there are four key variables affecting supply: the price of the product itself (its own price), P, the prices of inputs used to produce the product, IP, the technology used to produce the product, T, the number of firms supplying the product to the market, NS, and finally, a variable that is only sometimes included, the future expected price of the product, FP.

We can write a simple general supply function as follows:

$$Q_S = g(P+, IP-, Tech+, NS+ \mid FP-)$$

where Q_S is the quantity of the product supplied, g(.) is a general unspecified functional form, and each variable is followed by a + or – sign indicating the expected effect a change in each variable will have on market supply.

Own Price: The own price, P, affects the market supply positively because the representative firm's marginal cost curve is upward sloping in the relevant range of prices. Recall from Chapter 13 that the market supply curve is the horizontal summation of the firms' MC curves. Firms will increase their supply to the market when the price increases because the marginal cost of producing additional quantities is also increasing. If we step back and ask why the MC curve slopes upward, the key determinant is the presence of decreasing returns to scale at higher levels of production. In other words, it becomes more costly to produce each additional unit because the productiveness of additional inputs begins to fall. This implies the need to add extra inputs (at additional cost) to get additional units of output.

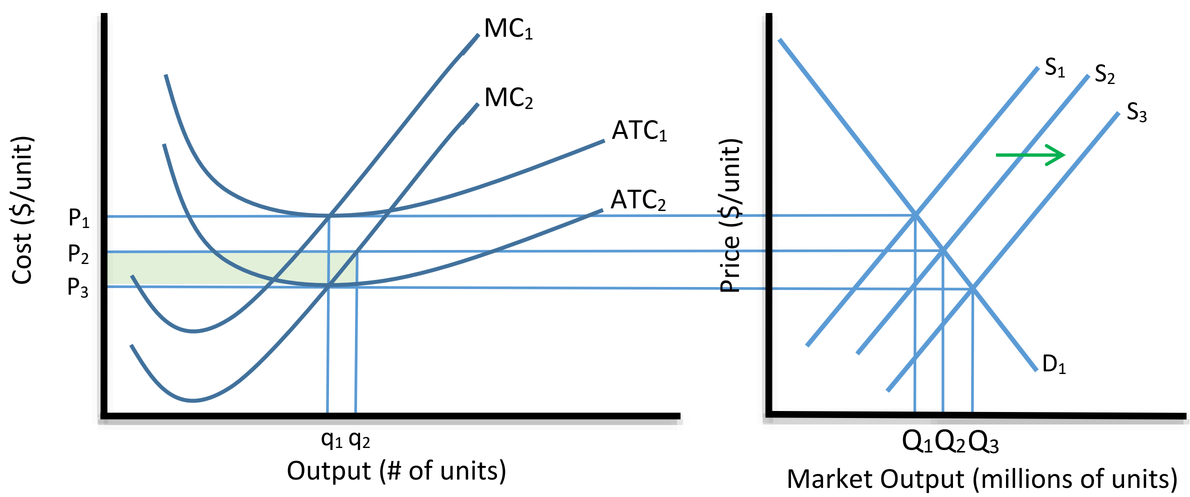
Input Prices: Input prices, IP, refer to the prices paid to hire workers and the prices of intermediate goods and services used in the production of a product. When these prices increase, the cost of producing every quantity of the product will increase as well, and vice versa. Hence there is a positive relationship between IP changes and the quantity supplied.

We illustrate this effect more formally in Figure 14.1 for a reduction in the price of some input used in production. Suppose the initial cost functions for a representative firm in an industry are given by MC_1 and ATC_1 in the diagram on the left. Suppose further that market supply and demand are S_1 and D_1 on the right-side diagram generating the market price of P_1. On the firm diagram on the left we can see that P1 happens to be at the minimum average cost for the firm and so it is initially in a long-run equilibrium with zero profit.

Now suppose an input price falls. For example, if this were ground coffee production, then the price of coffee beans purchased at wholesale could be the input price that falls. The effect for the firm is shown as a downward shift of its marginal cost and average cost curves to MC_2 and ATC_2, respectively. Because the MC curve shifts down, the summation of the curves also shifts down as shown in the shift from S_1 to S_2 on the right-side diagram. We can also think of this as a rightward shift, as indicated by the green arrow. These shifts are equivalent so we can refer to them either way.

Let's go one step further and illustrate how further adjustments will now occur in the long-run. The intersection of S_2 and D_1 in the aggregate market generates a new short-run equilibrium price of P_2. However, at P_2 profit for the representative firm is positive as shown with the green area in the diagram on the left. Positive profit will inspire entry by new firms causing the market supply function to shift right. (See Chapter 13 for more details). It will continue its rightward shift until profits are driven to zero which will occur with the supply function S_3 and a market price of P_3. Notice that at P_3, the representative firm's average cost is minimized on ATC_2 at output q_1. The fact that minimum ATC occurs at the same value with both sets of costs functions is not a necessary requirement, but is done only to make the presentation simpler.

Figure 14.1 Long-Run Market Adjustment to a Production Cost Reduction



In Chapter 13, Section 2, we constructed a long-run supply function, noting that it would be a horizontal line drawn at the level of minimum average cost. Recall, that the long-run supply function can be used to assess the effects of market changes on equilibrium price and quantity after the complete long-run adjustments have been realized.

In the exercise above, because lower input prices causes the ATC curve to shift downward, it also implies that minimum average cost is lower. That means that *the long-run supply function also shifts downward* to P_3, *after the reduction in input prices*. In contrast, *an increase in input prices will cause the long-run supply function to shift upward* to the higher minimum average cost.

Technology: We include technology as a variable affecting supply because the way in which production is arranged and the sophistication of the equipment used, also affects the cost of producing a product. An early example of a technological improvement is the arrangement of production into an assembly line as Adam Smith discussed in his story of a pin maker (See Chapter 1). He explained that by assigning different production tasks to each worker along an assembly line, the sum of the workers could produce many more pins than could ever be produced by the same number of workers each producing pins entirely on their own. The inclusion of an assembly line represents a technology improvement that will reduce both the average and marginal costs of production.

Workers and managers regularly adjust their production processes in numerous ways, that cannot be easily quantified and measured, in an attempt to lower their production costs. When they are successful, the average and marginal cost curves shift downward and the effects will be identical to those shown above with a reduction in input costs. Thus, we can say that *technology improvements will cause the MC and ATC curves to shift down, and* since minimum ATC also falls, *will cause the long-run supply function to shift down*, as well. Also, even though we cannot measure technology explicitly, we can still represent its effects in a very general way.

Although it is perhaps rare for technology to worsen in an industry, some stories of such an effect are possible. For example, if production in an industry were to cease for a period of time, as occurred in many service industries during the Covid-19 pandemic, then when these industries reopened it might have done so with a different workforce because some workers found different occupations during the shutdown. If the new workforce is less familiar with the work procedures upon reopening then their productivity may be lower. This would suggest that average and marginal costs of production would be higher due to the staff changes. Another way to describe this change is to say that the technology worsened due to the pandemic shutdowns. Thus, while technology reductions may be rare, it is possible to imagine some situations where it may occur.

Number of Sellers: The next variable affecting supply is the total number of producers, or sellers, in the market, NS. This variable is much easier to measure than technology and the cause and effect is obvious. If there is an increase in the number of sellers of a good, or an increase in the number of firms in the industry, ceteris paribus, then there will be an increase in the total supply of the product, and vice versa. This is a positive relationship and not much more needs to be said.

Future Price: The final variable is sometimes included in a supply function specification, and sometimes not; namely, the future price of the good, FP. By including it, one recognizes that time may be an important component of present supply because of the way that expectations can affect behavior. Suffice it to say that introducing time greatly complicates the model, so much so, that most traditional economic analysis is called "static," which means that time does not play a role. Time and expectations does have a large literature in economics, but because of its complexity it is usually only introduced in this simple way in microeconomics principles courses.

Expectations of the future price of a product can affect today's decision about how much to sell in the following way. Suppose firms learn that the price of the product being supplied is likely to rise in the near future. Perhaps a war is about to break out elsewhere in the world which will disrupt global supplies and result in a higher future price. In order to raise your overall profit over time, you might choose to store your supplies in inventory, or save them today, to sell later at a higher price. In other words, sell less today when the price is lower and sell more when the price rises later. Recall from Chapter 7 that if many coffee consumers hear the news and react in the same way, then when the expected future price rises, current demand for coffee also rises, and vice versa. Thus the future price, FP, is the one variable whose change affects both supply and demand.

Key Takeaways

1. Market supply in a perfectly competitive market is affected by the price of the good itself, the prices of production inputs, the technology used in the production process, the total number of firms supplying the market, and, in some versions of the model, the expected future price of the good itself.
2. Market supply rises with increases in the price and the number of firms and with technology improvements, and vice versa.
3. Market supply falls with increases in the prices of production inputs and an increase in the expected future price of the good, and vice versa.
4. A decrease in input prices or an improvement in technology causes the long-run supply curve to shift downward, and vice versa.

14.2 Graphing a Market Supply Curve

Learning Objectives

1. Learn how to graph a supply function using a simplified linear form.
2. Learn what variable changes cause a shift in the supply curve and in what direction.

Now that we have specified the variables that can affect supply for a product in the market, it will be useful to display this relationship in a graph. However we have the same problem as with the demand function in Chapter 7, namely, the supply function specified above is a function with one dependent variable and five independent variables. To graph this relationship completely we would need a six-dimensional graph. A graph on paper though, only has two dimensions, and at best we can only imagine and draw a three-dimensional relationship. So what to do?

The answer is to draw a graph in two dimensions by choosing the most important cause and effect relationship we care to display. But to do this, we need to make some additional assumptions.

First, of all the most important relationship is between the own price of the good and the quantity supplied of that good. Again, repeating from Chapter 7, although it is typical in mathematics to display the independent variable on the horizontal axis and the dependent variable on the vertical axis, in economics the tradition has been to reverse this. Hence the dependent variable in a supply function, the quantity supplied Q^S, is plotted on the horizontal axis and the dependent variable, the price P is plotted on the vertical axis.

From the model description and the explanation given in section 14.1, we know that these two variables are positively related to each other. That means that a graph of the supply function must be a curve that has a positive slope.

A Linear Supply Function

The best way to simplify the supply curve so as to preserve its key characteristic (the positive relationship between price and quantity) but make it easy to work with, is to assume that supply is linear, i.e., described by a straight line. The second thing we must do is explain what happened to all the other supply determinants.

Suppose the demand for coffee can be written as the following linear equation.

$Q^S = Q_S = +1P - (1/2)IP + 5$

On the left side is the dependent variable Q^S, measured in pounds and on the right side is one of the independent variables described in the general supply function in section 14.1. Some things to note:

1) Each variable appears with a parameter value in front of it. The P has a +1 and IP has -(1/2). This form means the equation is linear with respect to these independent variable.
2) The sign of the parameter indicates the relationship between the variable and Q^S. Thus, because P has a +1 parameter value, it means that as P rises, Q^S rises. Also, since IP has a negative parameter value it means as input prices rise, the quantity supplied falls.
3) The parameter values, and the values of the independent variables, may or may not correspond to the values these might take in the real world.
    a. The parameter values must be measured in units which, when multiplied by the independent variable, will convert it to the units of the dependent variable. Thus, since an input price is measured in say \$/lb and quantity supplied is measured in lbs, then the parameter value –(1/2) is measured in units ($lbs^2/\$$).
    b. We only care here about the direction of changes, not so much if the values used are realistic. However, in some examples and for some models in economics courses, we do try to make the values at least partially realistic.
    c. Unrealistic values are used primarily to make computations easier.
4) Since there is only one IP entry, it means we are assuming only one input. If there were many inputs we could list IP1, IP2, IP3, etc. and each input price would have a different parameter value.
5) The +5 parameter value at the end of the equation is meant to incorporate the realized values of the remaining unspecified independent variables. In other words, the values for technology, the number of suppliers, and the future price all combine to generate the value +5.

Next let's graph the equation. However, there remains a problem. We cannot graph the demand curve on a two-dimensional diagram unless we specify values for the variables that do not appear on the axes of the graph. In other words, to proceed we must assume some value for IP. So, let's assume IP = 10. Also, I am not specifying the units of each variable mainly to keep the presentation simple.

Plugging these values into the equation above yields,

$Q_S = +P - (1/2)*10 + 5$

$= P – 5 + 5$

$= P + 0$

$Q_S = P$

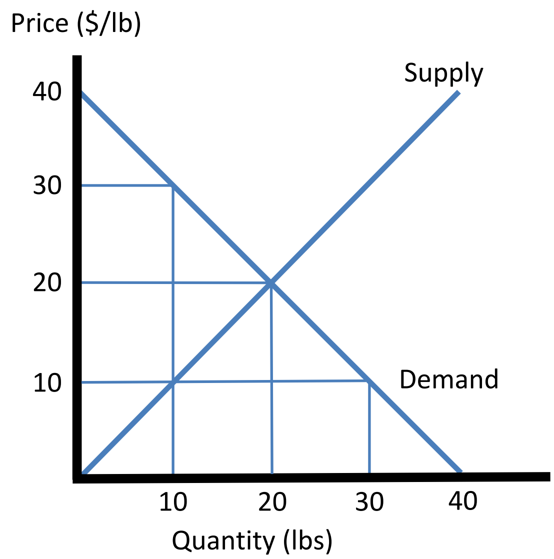
Notice that this equation is now written as a function with only two variables. However, the values of all the other variables combine implicitly to generate the value of 0 in the equation. The zero can from the -5 effect from input prices and the +5 effect from the other unspecified variables. This equation tells us how Q^S will respond to changes in P, but it does so while assuming ceteris paribus, meaning that the values of all the other independent variables are remaining fixed, or constant, at their original values.

The supply curve can be displayed in several ways. One way is to create a demand schedule by plugging in various prices and indicated what demand would be, as shown in the following Table

Price ($/lb)	Quantity Supplied (lbs)
$0	0
$10	10
$20	20
$30	30
$40	40

We can also plot the supply schedule as shown in Figure 14.2, along with the simple linear demand curve from Chapter 7. Note that an increase in the price of the good raises supply by moving along the curve (no shift occurs because the price is plotted on the axis)

Figure 14.2 A Simply Supply (and Demand) Function



Key Takeaways

1. A linear supply function is an easy way to specify a mathematical relationship between the independent variables that affect the quantity supplied in a market.
2. This section illustrates how to interpret and plot a simple linear supply function.

14.3 Solving for a Market Equilibrium Price and Quantity

Learning Objectives

1. Learn how to solve for the market equilibrium price and quantity when the supply and demand curves are specified with explicit functional forms.
2. Learn what economic forces cause the price and quantity to move to their equilibrium values.

The market equilibrium price and quantity is found at the intersection of the supply and demand curve. In Figure 14.2, the supply and demand curves are linear and have the following functional forms:

$$Q_S = P$$

$$Q_D = 40 - P$$

To solve for the equilibrium price simply set $Q_S = Q_D$ and solve for P.

$$P = 40 - P$$

$$2P = 40$$

$P = \$20$ per lb

Be sure to include the units for the price at the end of the exercise.

To solve for the equilibrium market supply and demand, which must be equal to each other, simply plug in the equilibrium price to either the supply or demand equation. For example,

$Q_S = P \rightarrow Q_S = 20$ lbs

$Q_D = 40 - P \rightarrow Q_D = 40 - 20 = 20$ lbs

Again be sure to include the quantity units at the end of the exercise.

Side Note: In the equation $Q_S = P$ it is worth remembering that there is a parameter before the P whose value is 1 but which has units given by $lbs^2/\$$. The same is true before the P in the equation $QD = 40 - P$. Without the parameter the equation makes no sense because the variable on the left is measured in lbs and the variable on the right is measured in \$/lb. These two cannot be equal to each other. Thus, the complete supply equation is Q_S (lbs) = 1 ($lbs^2/\$$) * P (\$/lb). The units of the product on the right (lbs2/\$)*(\$/lb) simplify to lbs and thus the value can be equal to the variable on the left.

The market equilibrium price and quantity is shown graphically in Figure 14.2 above. Note that the simple linear supply and demand curves intersect at the price \$20/lb, read off the vertical axis, and a quantity 20 lbs, read off the horizontal axis.

Equilibrium Stories

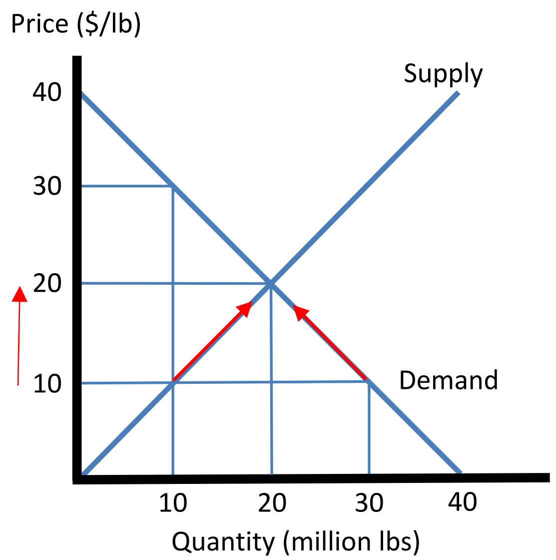
The intersection of the supply curve and the demand curve determines the equilibrium price and quantity traded in the market for a good or service. It is worth asking, though, why the market price should adjust so that supply equals demand. It turns out that answering this question is harder than one might think, especially because there is a logical inconsistency in the story told so far. We assumed earlier that a perfectly competitive firm takes the market price as given and then decides how much to produce by setting P = MC. But if all the firms are doing the same, then who is it that is setting the price. Often people will say the market sets the price. But who is that exactly? And if we knew who it was, how would they know what price is the right one to set?

We'll try to answer these questions by telling, what I like to call, equilibrium stories. An equilibrium, in general, is the final resting point for a variable. Forces push something in a direction until it comes to a stop and there is no longer any reason for the variable to change further. To begin an equilibrium story you must assume the variable is not in equilibrium and then discuss the reasons we expect the variable to adjust to the equilibrium value. In the case of the market price there are two equilibrium stories that can be told: one in which the price is lower than the equilibrium value and one where the price is higher.

Price too Low Equilibrium Story

Consider the simple supply and demand curves as shown in Figure 14.3. The equilibrium price is \$20 per unit and the quantity supplied and demanded at that price is 20 units. Now it will be useful to introduce a price setter and call this person an auctioneer. Imagine an auctioneer calling out prices and receiving buy and sell intentions at each price. When the auctioneer calls out \$10, she learns that sellers will only bring 10 units to the market to sell, whereas market buyers would be willing to purchase 30 units. This would mean there is excess demand in the market. Without the auctioneer, the 10 units would be sold quickly and the remaining consumers would go home empty-handed and unsatisfied.   The auctioneer would respond to this situation by raising the suggested price, because as the price rises above $10, as shown in Figure 14.3, sellers would wish to increase their supply, moving up and to the right along the supply curve, while consumers would desire to buy less, moving up and to the left along the demand curve. Once the auctioneer reaches the price $20, the amount supplied will be equal to the quantity demanded, at 20 units, and the price can be set at that level.   In this way, sellers can sell all of their product and all consumers willing to purchase the product at $20 go home happy.

Figure 14.3 Adjusting to a Market Equilibrium when the Price is too Low

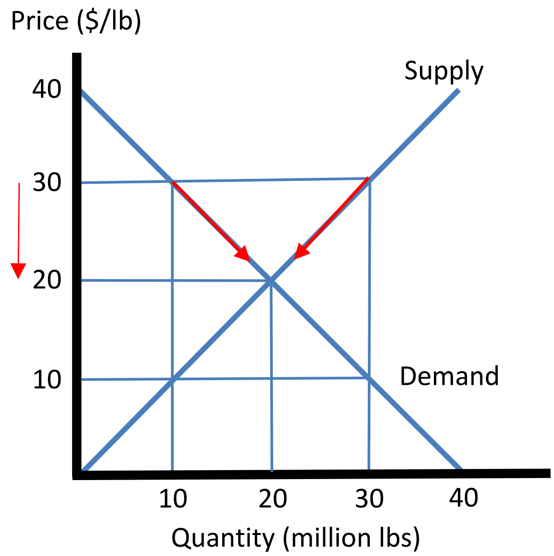


Price too High Equilibrium Story

This time consider the market depicted in Figure 14.4. Suppose the auctioneer calls out a price of $30. In this case, she learns that sellers will want to bring 30 units to the market to sell, whereas market buyers would only be willing to purchase 10 units. This would mean there is excess supply in the market. Without the auctioneer, 10 units would be sold quickly but the remaining 20 units would not be sold by the end of the day. We could say there is an accumulation of inventories in this case with unsold goods piling up on the shelves. The auctioneer would respond to this situation by lowering the suggested price, because as the price falls below $30, as shown in Figure 14.4, sellers would wish to decrease their supply, moving down and to the left along the supply curve, while consumers would desire to buy more, moving down and to the right along the demand curve. Once the auctioneer reaches the price $20, the amount supplied will be equal to the quantity demanded, at 20 units, and the price can be set at that level.   Again, sellers can sell all of their product and all consumers willing to purchase the product at $20 go home happy.

We should also note that the maximum amount of the product is distributed to consumers at the equilibrium price. In the case when the price is lower than the equilibrium price, while demand exceeds the equilibrium value of 20 units, less than 20 is sold because supply is below the equilibrium value. In the case when the price is higher than the equilibrium value, supply exceeds the equilibrium level of 20 units, but less than 20 units are sold because demand is curtailed. That means that the only way to maximize consumption of the product is to set the equilibrium price. We will also see later that this is why market efficiency is maximized when the product is priced at the equilibrium value.

Figure 14.4 Adjusting to a Market Equilibrium when the Price is too High



Reality Check

When using a model, we can imagine simple scenarios in a market and work out the effects in those scenarios. For example, we can assume that all of the variables are fixed at particular levels while the market adjusts to an equilibrium. Once the equilibrium is achieved, whether in the short-run or the long-run, we can assume the price and quantities will remain at the equilibrium values indefinitely.

In the real world, things will not work out so easily because it is unreasonable to think that all of the variables affecting supply and demand are unchanging over time. Instead we should expect that some variables are probably changing slowly, such as the price of production inputs or average household income on the demand side. Other variables may be changing more rapidly, such as the price of substitutes, or the number of firms selling in the market. As these variables change in value over time, the supply and demand curves shift in response, implying that the equilibrium prices and quantities are also shifting. In the real world, a change in one variable will induce a gradual adjustment to a new equilibrium. However, as that adjustment is occurring, other variables may be changing causing the equilibrium to shift to a new position.

This means that in the real world, a fixed equilibrium price and quantity may never be realized. Instead, a market may be in constant flux, with prices and quantities continually trying to catch up to the latest equilibrium values.

Despite the complexity in the dynamic real world, this does not undermine the conclusions reached in the model exercises which only say that if one variable were to change, ceteris paribus, then the new equilibrium price and quantity could be identified using the model.

Key Takeaways

1. The market equilibrium price and quantity is found at the intersection of the supply and demand curve.
2. With mathematical equations for the supply and demand functions, one can solve for the equilibrium price and quantities by solving for the values where the two equations intersect.
3. A market equilibrium can best be achieved by imagining an auctioneer calling out prices until the quantity supplied equals the quantity demanded.

14.4 Shifts in the Market Supply Function

Learning Objectives

1. Learn how changes in the independent variables cause a shift in the supply function.

The supply function as graphed above will shift its position whenever one of the other independent variables, i.e., those not drawn on the axes, changes. To illustrate, suppose the other determinants parameter changes in value from 5 to 10. This may occur because of an improvement in technology, or if the number of firms rises. To adjust the curve, we first must go back to the more general linear supply function, plug in the new value, and calculate the new supply function equation.

$$Q_S = +P - (1/2)*10 + 10$$

$$= P - 5 + 10$$

$$= P + 5$$

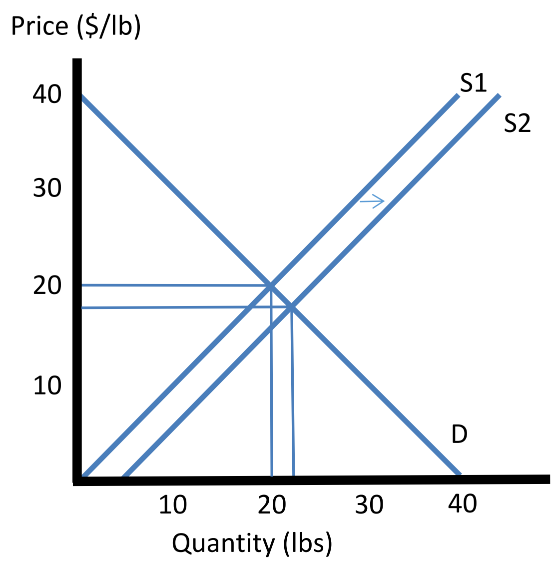
$$Q_S = P + 5$$

The red values indicate the values that have changed from the original exercise. The new demand schedule can now be written alongside the original as,

Price ($/lb)	Quantity Supplied (other = 5) (lbs)	Quantity Supplied (other = 10) (lbs)
$0	0	5
$10	10	15
$20	20	25
$30	30	35
$40	40	45

The new supply curve graph, labeled S2, is shown below in Figure 14.5, also alongside the original supply curve, labeled S1. Notice that the effect of the change in the other parameters, such as an improvement in technology, is to shift the supply curve to the right.

Figure 14.5 A Supply Curve Shift



Here are some things to note:

1) The plot of the original supply function S1 assumes the other parameter has the value 5, while the new supply function assumes the other parameter has a value of 10.
2) Any change in the price of the good, P, changes the quantity supplied along the supply curve and assumes ceteris paribus, meaning that input prices remain fixed.
3) A change in the other determinants shifts the entire supply curve in a positive direction.
4) The exercise generalizes for all the other independent variables
    a. If IP falls, ceteris paribus, then because IP has a negative relationship with the quantity supplied, the supply curve will shift to the right.

b. If NS, the number of supplier firms increases, ceteris paribus, then because NS has a positive relationship with the quantity demanded, the supply curve will shift to the right.
c. Ditto, for the remaining variables.

It should now be clear how a supply function with multiple independent variables can be represented in a diagram with only two dimensions. The two most important dimensions are plotted explicitly (P and Q), while the remaining variables implicitly define the position of the curve on the diagram. Whenever there is a change in one of the implicit variable values, it must cause a shift of the plotted supply relationship.

Supply Shift Summary

We summarize all of the possible shifts that may occur below. However, before doing so, it is worth commenting on the distinction between specific supply functions and general ones. In the previous exercise we wrote down a specific linear supply function with specific parameter values and then worked with it to illustrate how a supply curve is drawn and how it may shift. Such an exercise is useful because one can see the mechanics of the model more clearly.

However most of the time we will not need that level of detail, because it will quickly become cumbersome. Instead what we will need to illustrate most of the principles in economics is a graph that displays the directions of the cause and effect relationships rather than the magnitudes. In other words, we need only draw a positively-sloped line, or curve, to keep track of the fact that supply increases with increases in the price. What the actual values being measured are, will be immaterial. We can call this a conceptual model because it focuses on the general principles rather than specific values.

For example, we need not use an explicit function to illustrate the effects of a decrease in input prices on supply for a good. Instead, we just need to know that the negative relationship implies that a decrease in input prices will cause the supply curve to shift down, or to the right. Later, when we combine demand with supply, we will only seek to learn how changes in supply affects the direction of the market price change (does it rise or fall) and will not ask by how much does the price rise or fall.

As we did above, occasionally we'll illustrate the mechanics of the models by using specific functions and we'll ask students to work with these functions to learn the underlying relationships. But, most of the key results can be illustrated merely by displaying the general relationships and that is how we'll conduct much of the analysis that follows.

In Table 14.1, we summarize the variables that will cause shifts in a market supply curve. In the left column is shown the variable changes that will cause a downward, or rightward, shift in supply. In the right column is shown the variable changes that will cause an upward, or leftward, shift in supply.

Supply shifts down or up when input prices or technology changes because these variables affect the cost of production which is measured along the vertical axis in $/unit. Supply shifts right, or left, when the number of suppliers or the expected future prices change because these affect the quantity supplied which is measured horizontally in units such as pounds.

Table 14.1 Supply Shift Summary

Supply Down(Right)-Shifters	**Supply Up(Left)-Shifters**
A change in the following variables in the direction indicted would cause the supply curve to shift down, or to the right. ↓ IP input price decrease ↑ Tech technology improvement ↑NS number of firms supplying rises ↓ FP expected future price decreases	A change in the following variables in the direction indicted would cause the supply curve to shift up, or to the left. ↑ IP input price increase ↓ Tech technology worsens ↓ NS number of firms supplying rises ↑ FP expected future price increases

Key Takeaways

1. A change in the market price of a good does not shift the supply curve, but rather causes a movement along the supply curve.
2. The supply curve will shift down, or to the right, if input prices decrease, technology improves, the number of firms supplying the product increases, or if the expected future price decreases.
3. The supply curve will shift up, or to the left, if input prices increase, technology worsens, the number of firms supplying the product decreases, or if the expected future price increases.