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Key points

- There is a four-step process that allows us to predict how an event will affect the equilibrium price and quantity using the supply and demand framework.
- Step one of this process is to draw a demand and supply model representing the situation before the economic event took place.
- Step two of this process is to decide whether the economic event being analyzed affects demand or supply.
- Step three of this process is to decide whether the effect on demand or supply causes the curve to shift to the right or to the left and to sketch the new demand or supply curve on the diagram.
- Step four of this process is to identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

Changes in equilibrium price and quantity: the four-step process

Let's start thinking about changes in equilibrium price and quantity by imagining a single event has happened. It might be an event that affects demand—like a change in income, population, tastes, prices of substitutes or complements, or expectations about future prices. Or, it might be an event that affects supply—like a change in natural conditions, input prices, technology, or government policies that affect production.

How do we know how an economic event will affect equilibrium price and quantity? Luckily, there's a four-step process that can help us figure it out!

Step 1. Draw a demand and supply model representing the situation before the economic event took place.

Establishing this model requires four standard pieces of information:

- The law of demand, which tells us the slope of the demand curve
- The law of supply, which gives us the slope of the supply curve
- The shift variables for demand
- The shift variables for supply.

Once you create your demand and supply model, you can use it to find the initial equilibrium values for price and quantity.

Step 2. Decide whether the economic event being analyzed affects demand or supply.

In other words, does the event refer to something in the list of demand factors or supply factors?

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram.

You can think about it this way: Does the event change the amount consumers want to buy or the amount producers want to sell?

Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

The best way to get at this process is to try it out a couple of times! Let's first consider an example that involves a shift in supply, then we'll move on to one that involves a shift in demand. Finally, we'll consider an example where both supply and demand shift.

Shift in supply: good weather for salmon fishing

In the summer of 2000, weather conditions were excellent for commercial salmon fishing off the California coast. Heavy rains meant higher than normal levels of water in the rivers, which helped the salmon to breed. Slightly cooler ocean temperatures stimulated the growth of plankton—the microscopic organisms at the bottom of the ocean food chain—providing everything in the ocean with a hearty food supply. The ocean stayed calm during fishing season, so commercial fishing operations did not lose many days to bad weather.

How did these climate conditions affect the quantity and price of salmon? We can get to the answer by working our way through the four-step process you learned above.

The demand and supply model and table below provide the information we need to get started!



The graph represents the four-step approach to determining shifts in the new equilibrium price and quantity in response to good weather for salmon fishing.

Image credit: *Figure 1* in "[Changes in Equilibrium Price and Quantity: The Four-Step Process](#)" by OpenStaxCollege, [CC BY 4.0](#)

Salmon Fishing

Price per pound	Quantity supplied in 1999	Quantity supplied in 2000	Quantity demanded
\$2.00	80	400	840
\$2.25	120	480	680
\$2.50	160	550	550
\$2.75	200	600	450
\$3.00	230	640	350
\$3.25	250	670	250
\$3.50	270	700	200

Step 1. Draw a demand and supply model representing the situation before the economic event took place.

In this example, our demand and supply model will illustrate the market for salmon in the year before the good weather conditions began—you can see it above. The demand curve D_0 and the supply curve S_0 show that the original equilibrium price was \$3.25 per pound and the original equilibrium quantity was 250,000 fish. This price per pound is what commercial buyers pay at the fishing docks; what consumers pay at the grocery is higher.

Step 2. Decide whether the economic event being analyzed affects demand or supply.

In our fishing example, good weather is an example of a natural condition that affects *supply*.

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram.

We need to determine if the effect on supply in our example was an increase or a decrease.

Good weather is a change in natural conditions that *increases* the quantity supplied at any given price. Because of this, the supply curve shifts to the right, moving from the original supply curve S_0 to the new supply curve S_1 . You can see the shift in both the demand and supply model and in the table.

Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

At the new equilibrium E_1 the equilibrium price falls from \$3.25 to \$2.50, but the equilibrium quantity increases from 250,000 to 550,000 salmon. Notice that the equilibrium quantity demanded increased, even though the demand curve did not move.

What do those numbers mean exactly? In short, good weather conditions increased supply of the California commercial salmon. The result was a higher equilibrium quantity of salmon bought and sold in the market at a lower price.

Shift in demand: newspapers and the internet

According to the Pew Research Center for People and the Press, more and more people—especially younger people—are getting their news from online and digital sources. The majority of US adults now own smartphones or tablets, and most of those Americans say they use these devices in part to get the news. From 2004 to 2012, the share of Americans who reported getting their news from digital sources increased from 24% to 39%.

How has this shift in behavior affected consumption of print news media and radio and television news?

Let's use our four-step process again to figure it out. You'll find all the info you need in the demand and supply model below.



The graph represents the four-step approach to determining changes in equilibrium price and quantity of print news.

Image credit: *Figure 2* in "[Changes in Equilibrium Price and Quantity: The Four-Step Process](#)" by OpenStaxCollege, [CC BY 4.0](#)

Step 1. Draw a demand and supply model representing the situation before the economic event took place.

In this case, we want our demand and supply model to represent the time before many Americans began using digital and online sources for their news. You'll notice in this demand and supply model—above—that the analysis was performed without specific numbers on the price and quantity axes.

Step 2. Decide whether the economic event being analyzed affects demand or supply.

A change in tastes from traditional news sources—print, radio, and television—to digital sources caused a change in *demand* for the former.

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram.

A shift to digital news sources will tend to mean a lower quantity demanded of traditional news sources at every given price, causing the demand curve for print and other traditional news sources to shift to the left, from $D0$ to $D1$.

Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

The new equilibrium— $E1$ —occurs at a lower quantity and a lower price than the original equilibrium— $E0$.

So, what do we know now about the effect of the increased use of digital news sources? We know—based on our four-step analysis—that fewer people desire traditional news sources, and that these traditional news sources are being bought and sold at a lower price.

A combined example: the US Postal Service

In the real world, many factors affecting demand and supply can change all at once. For example, more and more people are using email, text, and other digital message forms such as Facebook and Twitter to communicate with friends and others, and at the same time, compensation for postal workers tends to increase most years due to cost-of-living increases.

Additionally, an increase in the use of digital forms of communication will affect many markets, not just the postal service. How can an economist sort out all these interconnected events? The answer lies in the *ceteris paribus*—Latin for "other things equal"—assumption. We must look at how each economic event affects each market, one event at a time, holding all else constant. Then, we combine the analyses to see the net effect.

Let's use our four-step analysis to determine how the increased use of digital communication and the increase in postal worker compensation will affect the viability of the Postal Service.



This image has two panels—model A on the left and model B on the right. Model A shows the four-step analysis of higher compensation for postal workers. Model B shows the four-step analysis of a change in tastes away from postal services.

In model A, higher labor compensation causes a leftward shift in the supply curve, a decrease in the equilibrium quantity, and an increase in the equilibrium price. In model B, a change in tastes away from postal services causes a leftward shift in the demand curve, a decrease in the equilibrium quantity, and a decrease in the equilibrium price.

Image credit: *Figure 3* in "[Changes in Equilibrium Price and Quantity: The Four-Step Process](#)" by OpenStaxCollege, [CC BY 4.0](#)

Since this problem involves two disturbances, we need two four-step analyses—the first to analyze the effects of higher compensation for postal workers and the second to analyze the effects of many people switching from "snail mail" to email and other digital messages.

Analysis of increase in postal worker compensation

Step 1. Draw a demand and supply model representing the situation before the economic event took place.

In this example, we want our demand and supply model to illustrate what the market looked like before US postal worker compensation increased. The demand curve D_0 and the supply curve S_0 in demand and supply model A—above left—show the original relationships.

Step 2. Decide whether the economic event being analyzed affects demand or supply.

Labor compensation is a cost of production. A change in production cost causes a change in *supply* for the postal services.

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram.

Higher labor compensation leads to a lower quantity supplied of postal services at every given price, causing the supply curve for postal services to shift to the left, from S_0 to S_1 .

Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

The new equilibrium— E_1 —occurs at a lower quantity and a higher price than the original equilibrium— E_0 .

Analysis of increase in use of digital communication

Step 1. Draw a demand and supply model representing the situation before the economic event took place.

In this example, we want our demand and supply model to illustrate what the market looked like before the use of digital communication increased. The demand curve D_0 and the supply curve S_0 in demand and supply model B—above right—show the original relationships. Note that demand and supply model B is independent from demand and supply model A.

Step 2. Decide whether the economic event being analyzed affects demand or supply.

A change in tastes away from "snail mail" toward digital messages will cause a change in *demand* for the Postal Service.

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram.

A shift to digital communication will tend to mean a lower quantity demanded of traditional postal services at every given price, causing the demand curve for print and other traditional news sources to shift to the left, from D_0 to D_1 .

Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity. The new equilibrium— E_2 —occurs at a

lower quantity and a lower price than the original equilibrium—E0E

The final step in a scenario where both supply and demand shift is to combine the two individual analyses to determine what happens to the equilibrium quantity and price. One way to do this is to graphically superimpose the two diagrams one on top of the other, as we've done below.



The graph shows a leftward supply shift as well as a leftward demand shift.

Image credit: *Figure 4* in "[Changes in Equilibrium Price and Quantity: The Four-Step Process](#)" by OpenStaxCollege, [CC BY 4.0](#)

By examining the combined demand and supply model, we can come to the following conclusions. Effect on quantity: Higher postal worker labor compensation raises the cost of production of postal services, which decreases the equilibrium quantity. A change in tastes away from "snail mail" also decreases the equilibrium quantity. Since both shifts are to the left, the overall impact is a decrease in the equilibrium quantity of postal services—Q3Q. We can see this graphically since Q3Q is to the left of Q0Q.

Effect on price: The overall effect on price is more complicated. Higher postal worker labor compensation raises the cost of production, increasing the equilibrium price. But, a change in tastes away from "snail mail" decreases the equilibrium price. Since the two effects are in opposite directions, the overall effect is unclear, *unless* we know the magnitudes of the two effects. But don't worry; we haven't done anything wrong! When both curves shift, typically we can determine the overall effect on price or on quantity, but not on both. In this case, we determined the overall effect on the equilibrium quantity but not on the equilibrium price. In other cases, it might be the opposite. It's also important to keep in mind that economic events that affect equilibrium price and quantity may seem to cause immediate change when examining them using the four-step analysis. As a practical matter, however, prices and quantities often do not zoom straight to equilibrium. More realistically, when an economic event causes demand or supply to shift, prices and quantities set off in the general direction of equilibrium. Indeed, even as they are moving toward one new equilibrium, prices are often then pushed by another change in demand or supply toward another equilibrium.

And finally, a word of caution—one common mistake when analyzing the affects of an economic event using the four-step system is to confuse *shifts* of demand or supply with *movements along* a demand or supply curve.

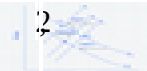
[\[Learn how to avoid this common mistake.\]](#)

Let's sit alongside Lee, a student in an introductory economics class. Lee has been given a problem that asks whether a drought will increase or decrease the equilibrium quantity and equilibrium price of wheat. We can follow his logic as he attempts to solve the problem in the demand and supply model below.

Lee starts by reasoning that a drought reduces supply. He shifts the original supply curve back from S0 to S1 labeled Shift 1 in our model. The equilibrium moves from E0 to E1. The equilibrium quantity is lower, and the equilibrium price is higher.

He then decides a higher price will make farmers more likely to supply the good. He shifts the supply curve right from S1 to S2 labeled Shift 2 on our model. The equilibrium moves from E1 to E2.

But wait, thinks Lee. The higher price will reduce demand! He shifts the demand curve from D0 to D1 labeled Shift 3 on our model. The equilibrium moves from E2 to E3.



The graph shows the difference between shifts of demand and supply, and movement of demand and supply. A shift in one curve never causes a shift in the other curve. Rather, a shift in one curve causes a movement along the second curve.

Image credit: *Figure 5* in "[Changes in Equilibrium Price and Quantity: The Four-Step Process](#)" by OpenStaxCollege, [CC BY 4.0](#)

At about this point, Lee suspects that his answer is headed down the wrong path—and you've probably begun to think so too!

What's wrong with Lee's logic?

Choose 1 answer:

- A
Lee has mixed up shifts in supply with quantity supplied and shifts in demand with quantity demanded.
- B
Nothing, Lee's logic is correct.
- C
Lee has confused shifts in supply with shifts in demand.

Let's walk through Lee's logic step by step and see if we can help him out.

Lee's first thought was correct—a drought does shift back the supply curve of wheat, leading to a lower equilibrium quantity and a higher equilibrium price. This corresponds to a movement along the original demand curve D_0 from E_0 to E_1 .

The rest of Lee's argument, however, is wrong. He has mixed up shifts in supply with quantity supplied and shifts in demand with quantity demanded. A higher or lower price never shifts the supply curve. Instead, a price change leads to a movement along a given supply curve.

Similarly, a higher or lower price never shifts a demand curve. Instead, a price change leads to a movement along a given demand curve. Remember, a change in the price of a good never causes the demand or supply curve for that good to shift.

When solving problems like the one Lee was given, think carefully about the timeline of events.

What happens first; what happens next? What is cause; what is effect? If you keep the order right, you are more likely to get the analysis correct.

Summary

When using the supply and demand framework to think about how an event will affect the equilibrium price and quantity, proceed through four steps:

Step 1. Draw a demand and supply model representing the situation before the economic event took place.

Step 2. Decide whether the economic event being analyzed affects demand or supply.

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram.

Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

Self-check questions

From August 2014 to January 2015, the price of jet fuel decreased roughly 47%. Using the four-step analysis, how do you think this fuel price decrease affected the equilibrium price and quantity of air travel?

[\[Show solution.\]](#)

Step 1. Draw a demand and supply model representing the situation before the economic event took place.

Step 2. Decide whether the economic event being analyzed affects demand or supply. Jet fuel is a cost of producing air travel, so a decrease in jet fuel price affects *supply*.

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram. An decrease in the price of jet fuel causes a decrease in the cost of air travel. We show this as a downward or rightward shift in supply.

Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity. A rightward shift in supply causes a movement down the demand curve, lowering the equilibrium price of air travel and increasing the equilibrium quantity.

A tariff is a tax on imported goods. Suppose the US government cuts the tariff on imported flatscreen televisions. Using the four-step analysis, how do you think the tariff reduction will affect the equilibrium price and quantity of flatscreen TVs?

[\[Show solution.\]](#)

Step 1. Draw a demand and supply model representing the situation before the economic event took place.

Step 2. Decide whether the economic event being analyzed affects demand or supply. A tariff is treated like a cost of production, so it affects *supply*.

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram. A tariff reduction is equivalent to a decrease in the cost of production, which we can show as a rightward—or downward—shift in supply.

Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity. A rightward shift in supply causes a movement down the demand curve, lowering the equilibrium price and raising the equilibrium quantity.

Review questions

- How can you analyze a market where both demand and supply shift?
- What causes a movement along the demand curve? What causes a movement along the supply curve?

Critical-thinking questions

- Use the four-step process to analyze the impact of the advent of the iPod and other portable digital music players on the equilibrium price and quantity of the Sony Walkman and other portable audio cassette players.
- Use the four-step process to analyze the impact of a reduction in tariffs on imports of iPods on the equilibrium price and quantity of Sony Walkman-type products.
- Suppose both of these events took place at the same time. Combine your analyses of the impact of the iPod and the impact of the tariff reduction to determine the likely combined impact on the equilibrium price and quantity of Sony Walkman-type products. Show your answer graphically.

Practice problems

Problem 1: cheese

Demand and supply in the market for cheddar cheese is illustrated in the table below. Graph the data and find the equilibrium.

Next, create a table showing the change in quantity demanded or quantity supplied and a graph of the new equilibrium in each of the following situations:

- The price of milk, a key input for cheese production, rises so that the supply decreases by 80 pounds at every price.
- A new study says that eating cheese is good for your health, so demand increases by 20% at every price.

Price per pound	Qd	Qs
\$3.00	750	540
\$3.20	700	600
\$3.40	650	650
\$3.60	620	700
\$3.80	600	720
\$4.00	590	730

Problem 2: movie tickets

Supply and demand for movie tickets in a city are shown in the table below. Graph demand and supply and identify the equilibrium. Then, calculate in a table and graph the effect of the following two changes:

- Three new nightclubs open. They all offer decent bands and have no cover charge, but they make their money by selling food and drink. As a result, demand for movie tickets falls by 6 units at every price.
- The city eliminates a tax that it had been placing on all local entertainment businesses. The result is that the quantity supplied of movies at any given price increases by 10%.

Price per ticket	Qd	Qs
\$5.00	26	16
\$6.00	24	18
\$7.00	22	20
\$8.00	21	21
\$9.00	20	22