

Dr. Barry Haworth
University of Louisville
Department of Economics
Economics 201

Demand and Supply

Demand and Supply is likely the best known phrase in all of economics. The goal of this handout is to formalize that phrase into something we can use to explain or predict changes in the quantity of some good or service exchanged in a specific market, along with the price of that good or service. Our starting point is to establish a functional relationship between the two variables we observe within every demand and supply model, quantity and price.

Let's define the price-quantity relationship within the context of a demand and supply curve:

Demand Curve: represents the quantity demanded at each possible price

Supply Curve: represents the quantity supplied at each possible price

The context for our discussion will be the market for a specific good or service, which means we are interpreting the definitions above as quantity demand or supplied of a specific good or service at each possible price within the market for that good or service. Who gets included in the market? That depends (in turn) on how we define the market. E.g., if we define the market for restaurants as the Louisville market for restaurants, then we include everyone who's interested in buying a restaurant meal in Louisville at any type of restaurant (since we're not specific about types here) and every firm willing to sell restaurant meals in Louisville. If we adapt our market definition by calling this the Louisville market for fast food restaurants, then we narrow the focus on both the demand and supply side to individuals interested in buying or selling fast food meals only. Non-fast food restaurants would no longer be included in this market, and so if demanders saw at least some non-fast food restaurants as viable alternatives to what's sold in a fast food restaurant, our change in market definition would create a new set of substitutes for demanders. E.g., the price of non-fast food meals would still affect demanders in the fast food market, even though non-fast food meals would no longer be a part of the market.

Our ultimate goal is to put the demand and supply curve on a graph, but to do that, we need to understand how the price of something relates to the quantity demanded or supplied of that good or service. Note that, as we discussed above with the definition of a market, there are a number of variables that may influence the quantity demanded or quantity supplied of a good or service, but we'll get into that elsewhere. For now, we will focus on the relationship between price and quantity demanded or quantity supplied, depending on the curve we are discussing.

We begin our discussion by first developing the demand curve relationship within a fictitious market that we'll create, followed by the supply curve relationship in that market. Once we have both curves, we will put the curves together on the same graph and ask about the actual market price and quantity exchanged that would arise in this fictitious market.

The Market

Let's assume there's a market for street vendor popsicles here in Louisville. The demand side of this market includes every individual who's interested in buying a popsicle from a street vendors. The supply side of the market includes suppliers who transport their popsicles around in a small, mobile freezer, selling popsicles at local parks or in areas with lots of people. E.g., in some Hispanic communities, these popsicles are called "paletas" and you'll find vendors who walk around with a small freezer on wheels, selling paletas to people in the high-traffic pedestrian areas of town. Of course, popsicles can also be sold in stores, but let's assume that store-bought popsicles are a different market. Given that this market probably only exists in the Summer months, we can assume that on really hot days, people are unlikely to venture out to the park unless they have sufficient shade, which could come in the form of tree cover, buildings or even umbrellas.

The Demand Curve

To understand what the demand curve in this market would look like, let's assume that we obtain this demand curve by surveying every individual here in Louisville. E.g., although it's not likely we'd have this information, let's assume that a survey is sent out to all individuals who plan to visit areas where these popsicles would be sold. The survey provides a set of possible prices, and the survey recipients are asked how many popsicles they would buy during the Summer at each possible price on the survey. Once we collect the surveys and sum up the responses, we have what amounts to a demand curve relationship. Let's assume the results of our survey are summarized by the table below (where Price = price of street vendor popsicles, and Quantity demanded = the quantity of street vendor popsicles in the hundreds, that people would be willing to buy during the Summer at each price).

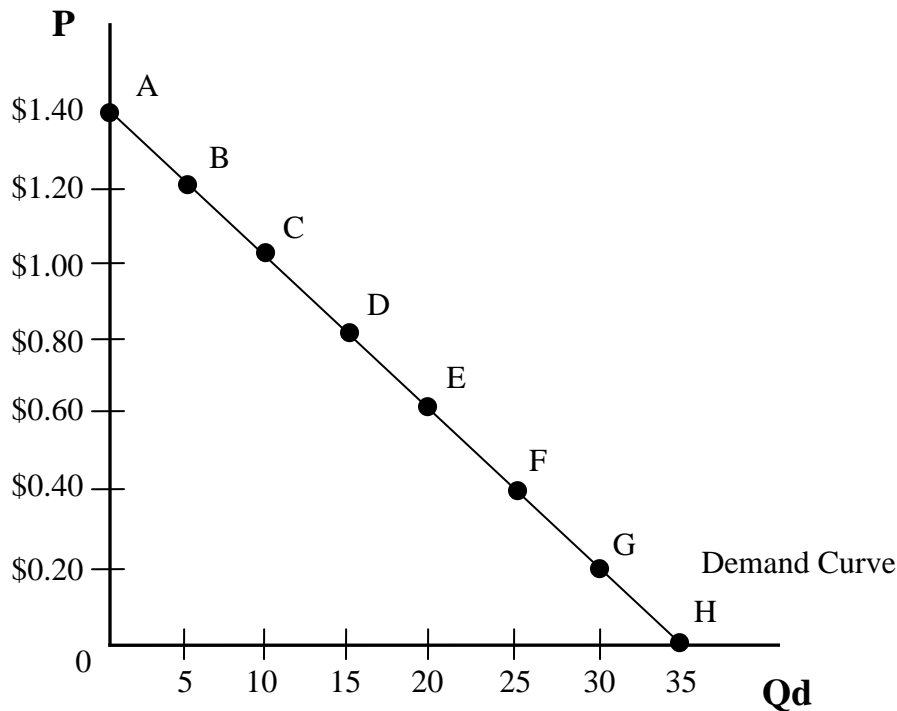
Market Demand for Street Vendor Popsicles

	A	B	C	D	E	F	G	H
Price	\$1.40	\$1.20	\$1	80¢	60¢	40¢	20¢	0¢
Quantity demanded	0	5	10	15	20	25	30	35

Note that as the price of street vendor popsicles increases, and nothing else changes during that time, then demanders will buy fewer street vendor popsicles. If the happiness derived from eating popsicles during the summer is the same, then we'd be less likely to buy as many popsicles during the Summer if the popsicles become more expensive. This implies a negative relationship between price and the quantity demanded of a good, which we call the Law of Demand. What this law tells us is that we can expect the demand curve to have a negative slope.

Of course, there are always exceptions to this law, where the main exceptions are simply that we don't always give demanders enough time to adjust to those higher prices. E.g., if we only considered the demand for street vendor popsicles on a given day, not the entire Summer, then an increase in price may not affect how many popsicles a person would buy from a street vendor (i.e., you'd still be willing to buy one popsicle on any given day, whether the price of that popsicle was 20 cents or \$1.20).

We can graph the information from our survey as follows:



The Supply Curve

Once again, let's assume that a survey is sent out to all street vendors who are interested in selling popsicles within Louisville. Survey recipients are asked how many popsicles they would be willing to sell during the Summer at each possible price provided within the survey. We similarly sum up the responses at each price to get a supply curve relationship and the table below (where Quantity supplied = the quantity of street vendor popsicles in the hundreds, that street vendors would be willing to sell during the Summer at each price).

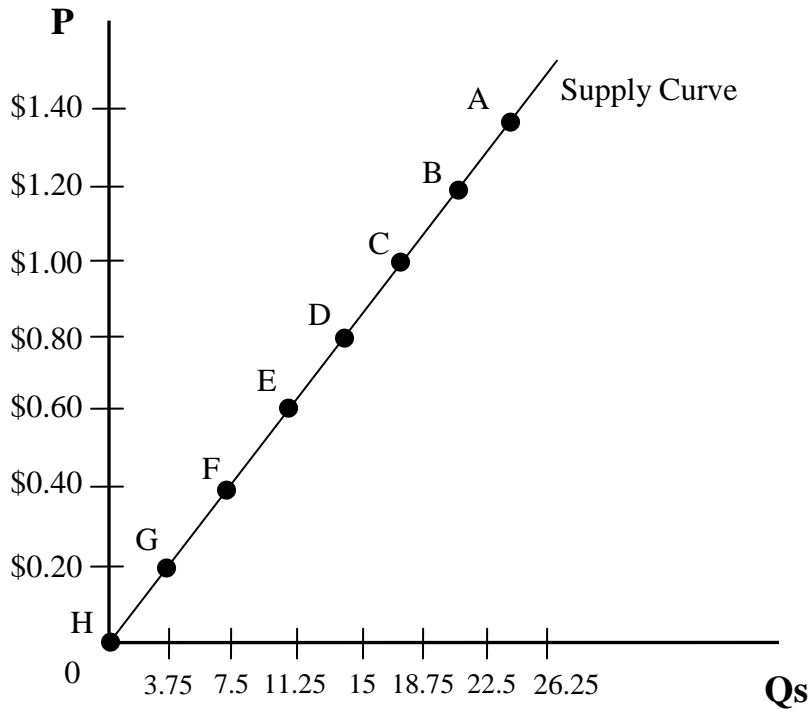
Market Supply of Street Vendor Popsicles

	A	B	C	D	E	F	G	H
Price	\$1.40	\$1.20	\$1	80¢	60¢	40¢	20¢	0¢
Quantity supplied	26.25	22.5	18.75	15	11.25	7.5	3.75	0

Once again, note that as the price of street vendor popsicles increases, and nothing else changes during that time, then suppliers will want to sell more popsicles. If the cost of selling each popsicle during the summer remains the same, then street vendors would want to sell more popsicles as the price rises. This implies a positive relationship between price and the quantity supplied of a good, called the Law of Supply, which tells us is that we can expect the supply curve to have a positive slope.

As discussed above, there are always exceptions to this law, and the main exceptions are simply that we don't always give suppliers enough time to adjust to changes in price. E.g., if we only consider the supply of street vendor popsicles on any given day, not the entire Summer, then an increase in price may not have much of an effect on the number of popsicles a street vendor can sell that day because individual suppliers probably make these popsicles the night before and leave home with a set amount to sell (i.e. once you sell out, you can't just produce more popsicles in a short period of time).

We can graph the information from our supplier survey as follows:



Demand and Supply together

When the choices of both suppliers and demanders are accounted for, we have a market and exchange can occur. Although we don't have a mechanism for determining the price, let's consider the effect of setting different prices.

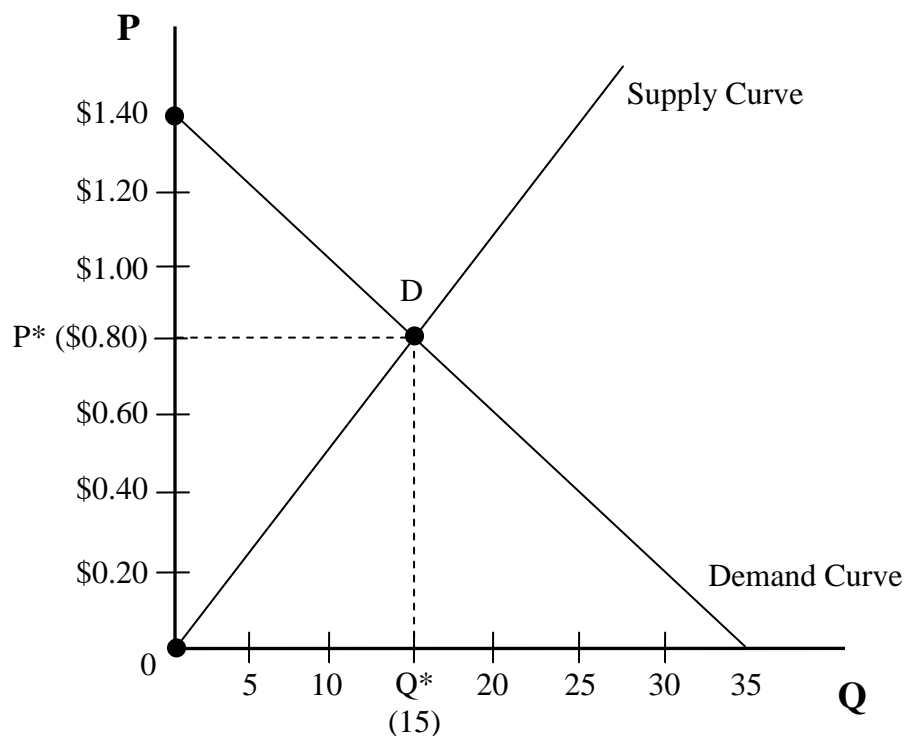
To help with our discussion, here is the information from our two tables:

	A	B	C	D	E	F	G	H
Price	\$1.40	\$1.20	\$1	80¢	60¢	40¢	20¢	0¢
Quantity demanded	0	5	10	15	20	25	30	35
Quantity supplied	26.25	22.5	18.75	15	11.25	7.5	3.75	0

If we set a price of \$1 for these street vendor popsicles, then what happens? Demanders are interested in buying 10 (hundred) units of popsicles from street vendors and these vendors are

willing to sell 18.75 (hundred) units. There would be a surplus of popsicles in this market, because the quantity supplied is greater than the quantity demanded. That would obviously not help street vendors, who would prefer to sell every unit they produce. There would be pressure for that price to fall, so if we assume the price goes down, what would happen if the price was 60 cents instead? Now, we would have 20 (hundred) units of popsicles demanded and 11.25 (hundred) units of popsicles supplied, giving us a shortage since the quantity demanded is greater than the quantity supplied. This would just as obviously not be good for demanders, because even though they are willing to pay the 60 cent price, some of them cannot buy a popsicle. This puts pressure on prices to rise.

In the end, we must arrive at a price that does not give us a shortage or surplus, a price where the result involves a situation where there is no pressure on prices to rise or fall. That result exists when the price is 80 cents, because in this situation, the quantity demanded and quantity supplied are both equal to 15 (hundred) units. Consequently, the price of 80 cents is called an equilibrium price because equilibrium implies a sense of balance. Similarly, the quantity of 15 (hundred) units is the equilibrium quantity. On a graph, it's typical to denote these equilibrium values as P^* and Q^* respectively, which we do on the graph below.



Although we have no reason to assume that this price and quantity will instantaneously arise within this market when we're talking about the "real world", in the simplified world we address in class, it is typical to assume that these values do occur instantaneously. In other words, we assume that demanders and suppliers have enough information that they can determine what the equilibrium price will be, and correspondingly react to that price in a way that automatically gives us P^* and Q^* every time.