Demand, Supply, and Surpluses

Demand

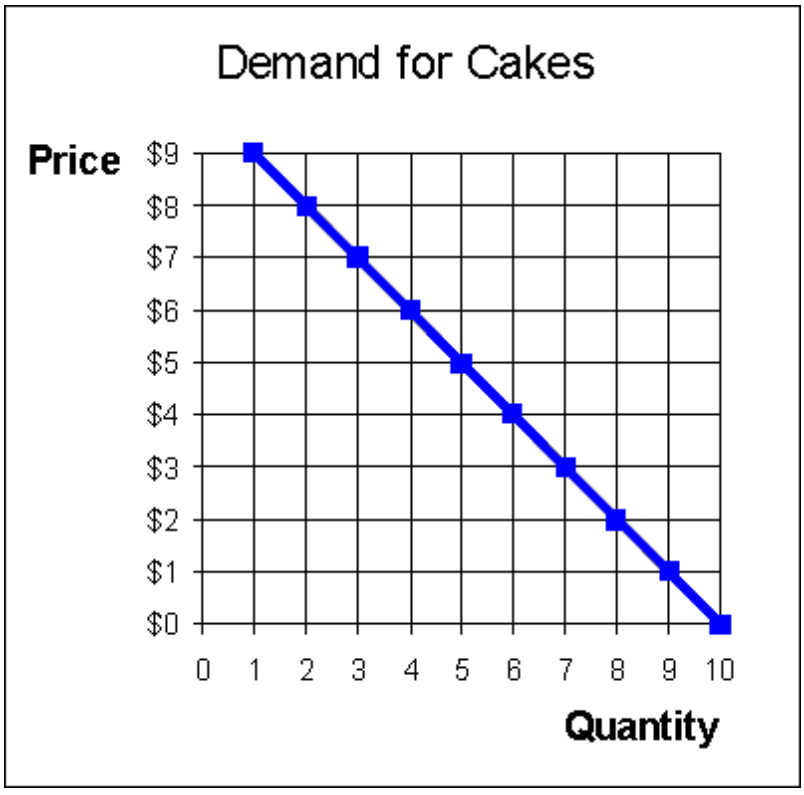
The Demand curve answers this question: What quantity of a good would consumers buy at each possible price?

Suppose we have an economy of only ten consumers, and we ask them the following question: How much cake would you purchase, per day, at prices ranging from nothing to 10? Suppose are consumers are named A through J. Here are their answers.

	Prices										
Consumer	$0	$1	$2	$3	$4	$5	$6	$7	$8	$9	$10
A	1	1	1	1	1	1	1	1	1	1	0
B	1	1	1	1	1	1	1	1	1	0	0
C	1	1	1	1	1	1	1	1	0	0	0
D	1	1	1	1	1	1	1	0	0	0	0
E	1	1	1	1	1	1	0	0	0	0	0
F	1	1	1	1	1	0	0	0	0	0	0
G	1	1	1	1	0	0	0	0	0	0	0
H	1	1	1	0	0	0	0	0	0	0	0
I	1	1	0	0	0	0	0	0	0	0	0
J	1	0	0	0	0	0	0	0	0	0	0
total quantity	10	9	8	7	6	5	4	3	2	1	0

A likes cake a lot and will pay as much as $9 for a cake. Nobody else likes cake that much. J does not like cake at all and will accept one only if it is free. Note that A happily continues to buy a cake even if it costs less than $9. (To keep our numbers simple, we assume nobody ever buys more than one cake per day.)

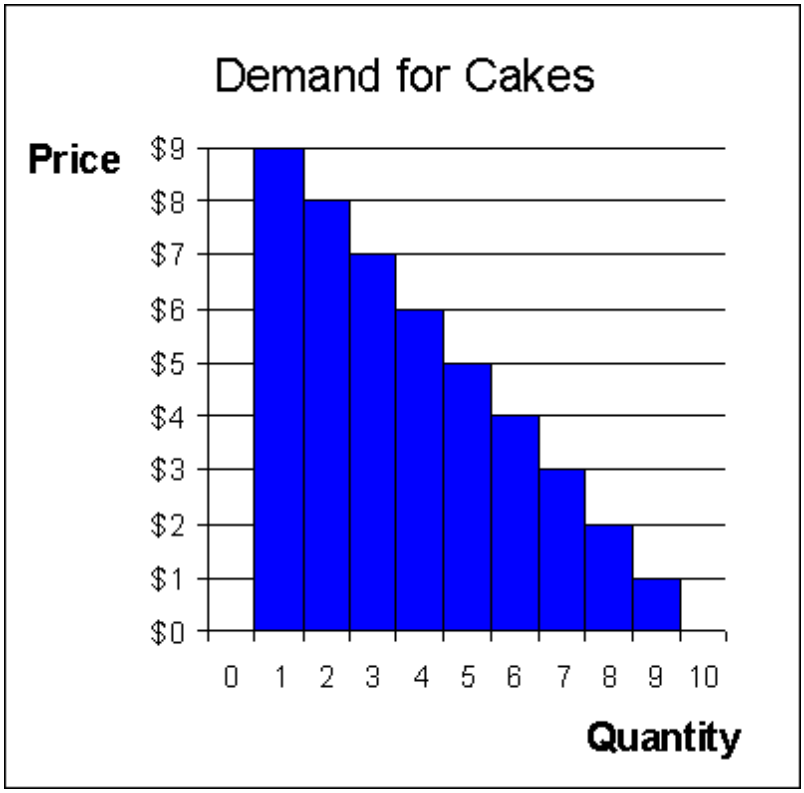
By adding up the quantities demanded by each consumer at each price, we can draw a "demand curve." This is just a line which shows the quantity demanded at each possible price.



Remember that we always reason from price to quantity: this shows us the quantity demanded (on the horizontal axis) for

every possible price (on the vertical axis).

Here is a different way of looking at the same thing. We draw the graph as a series of columns, and the height of each column can be understood as how much each consumer likes cake, based on our simple numbers above.

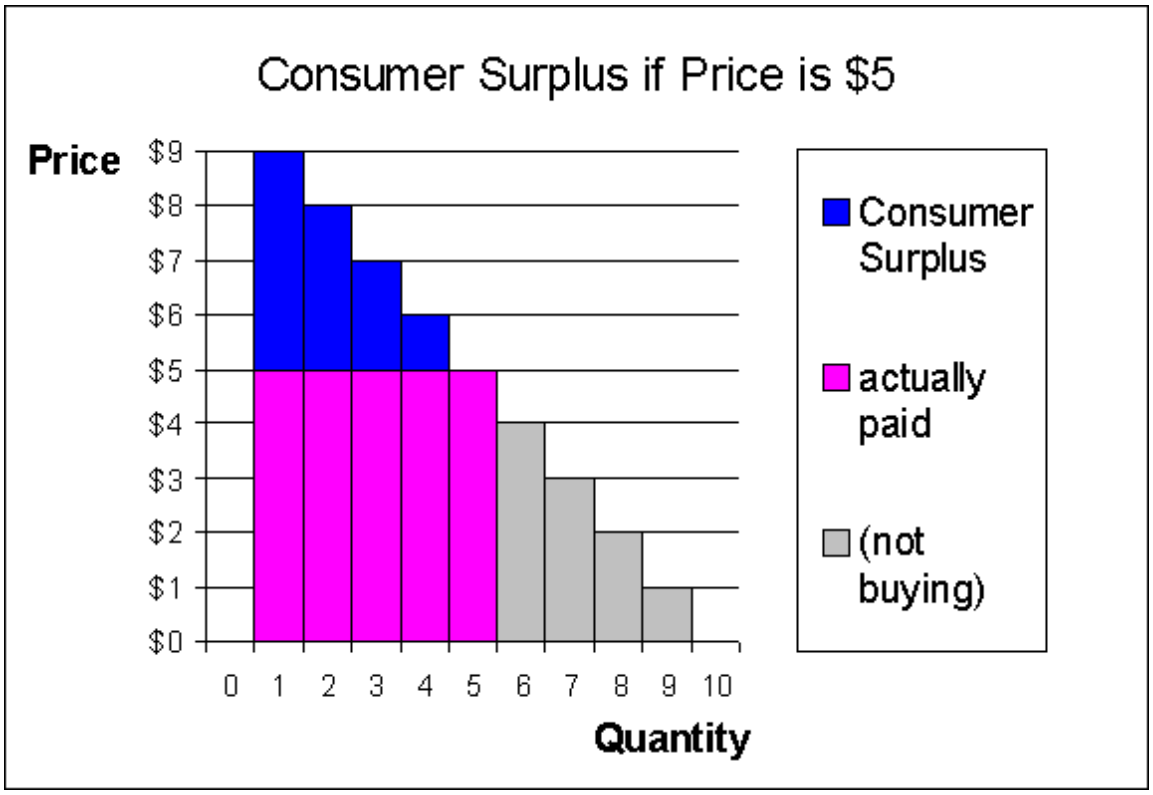


Now, suppose that the largest amount a consumer is willing to pay for something is how much it is "worth" to them -- how much pleasure, happiness, value, benefit, usefulness, utility, or whatever you want to call it the consumer gets out of the good. So Consumer A gets $9 of happiness from cake, which is why she is willing to pay as much as $9 for one. Consumer B gets only $8 worth of happiness fom a cake, which is why he will not buy one for $9, but will buy one for $8. And so on.

Consumer Surplus

If that makes sense (however strange it sounds), then you have the main idea. Let us define an individual's "consumer surplus" as the difference between the most they would be willing to pay for a good, and what they actually pay. Here's how we use the concept. Suppose the price of a cake is actually $5. Consumer A buys one, paying $5 for something that provides $9 worth of happiness. So her "consumer surplus" is $4. Consumer B pays $5 for a cake that provides him $8 worth of happiness, so his consumer surplus is only $3. Consumer E pays $5 for something that provides her with exactly $5 of happiness, so her consumer surplus is zero. Consumers F-J are priced out of the market -- $5 is too high for them, so they don't buy at all.

We can show all of that on the same graph, in which the purple area represents total expenditure, and the blue area represents total consumer surplus of all the different consumers.



Supply

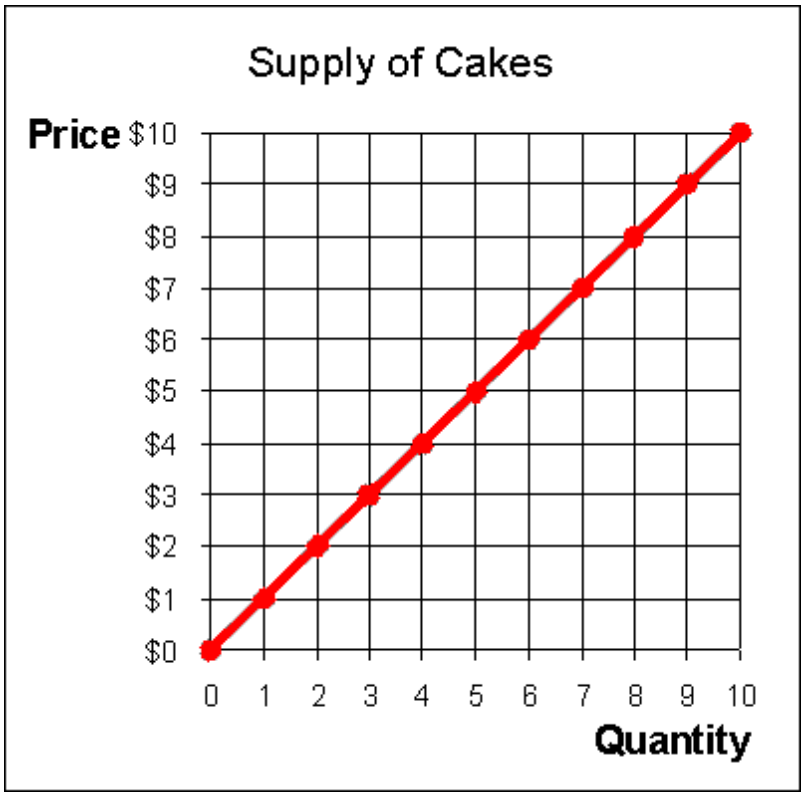
The Supply curve answers this question: What quantity of a good would producers make at each possible price?

Suppose we have an economy of only ten producers, and we ask them the following question: How much cake would you make, per day, at prices ranging from nothing to 10? Suppose are producers are named K through T.

	Prices										
Producer	$0	$1	$2	$3	$4	$5	$6	$7	$8	$9	$10
K	0	1	1	1	1	1	1	1	1	1	1
L	0	0	1	1	1	1	1	1	1	1	1
M	0	0	0	1	1	1	1	1	1	1	1
N	0	0	0	0	1	1	1	1	1	1	1
O	0	0	0	0	0	1	1	1	1	1	1
P	0	0	0	0	0	0	1	1	1	1	1
Q	0	0	0	0	0	0	0	1	1	1	1
R	0	0	0	0	0	0	0	0	1	1	1
S	0	0	0	0	0	0	0	0	0	1	1
T	0	0	0	0	0	0	0	0	0	0	1
total quantity	0	1	2	3	4	5	6	7	8	9	10

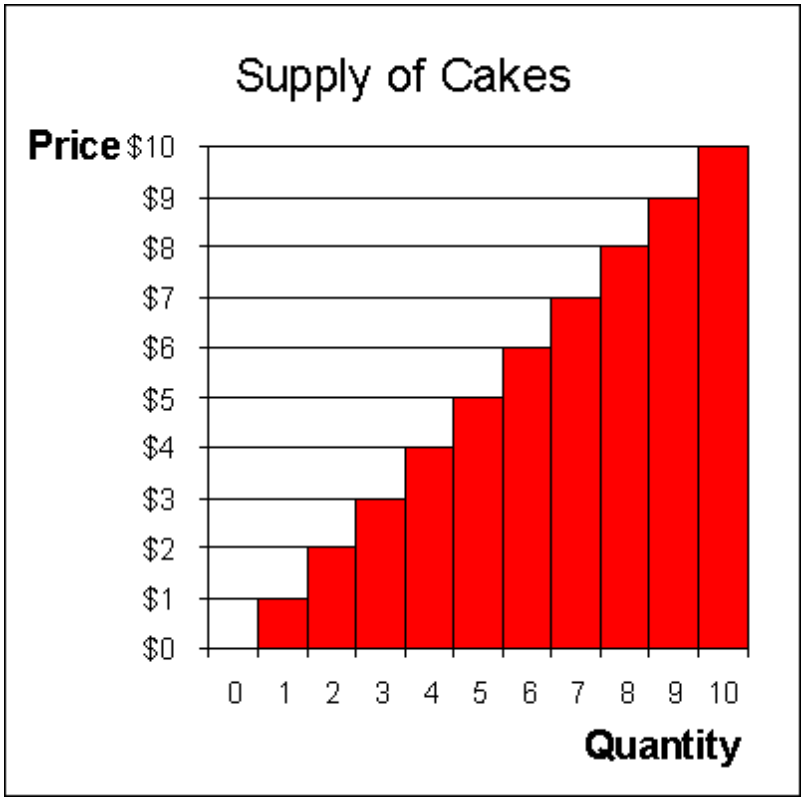
K is a very efficient producer and has costs of just $1 per cake. So at a price of $1 K will produce one cake per day. None of the other producers are efficient enough to produce cake at that selling price, so at $1 nobody but K makes cake. If the price rises to $2 producer L, who could not produce profitably at $1, is just able to cover costs of $2 per cake. And so on up to producer T, who is so inefficient that its costs per cake are $9, and it will only produce when the price gets that high. Note that K continues to produce cake at higher prices. (To keep our numbers simple nobody ever makes more than one cake per day, and they will produce if they just cover costs.)

By adding up the quantities supplied by each producer at each price, we can draw a "supply curve." This is just a line which shows the quantity supplied at each possible price.



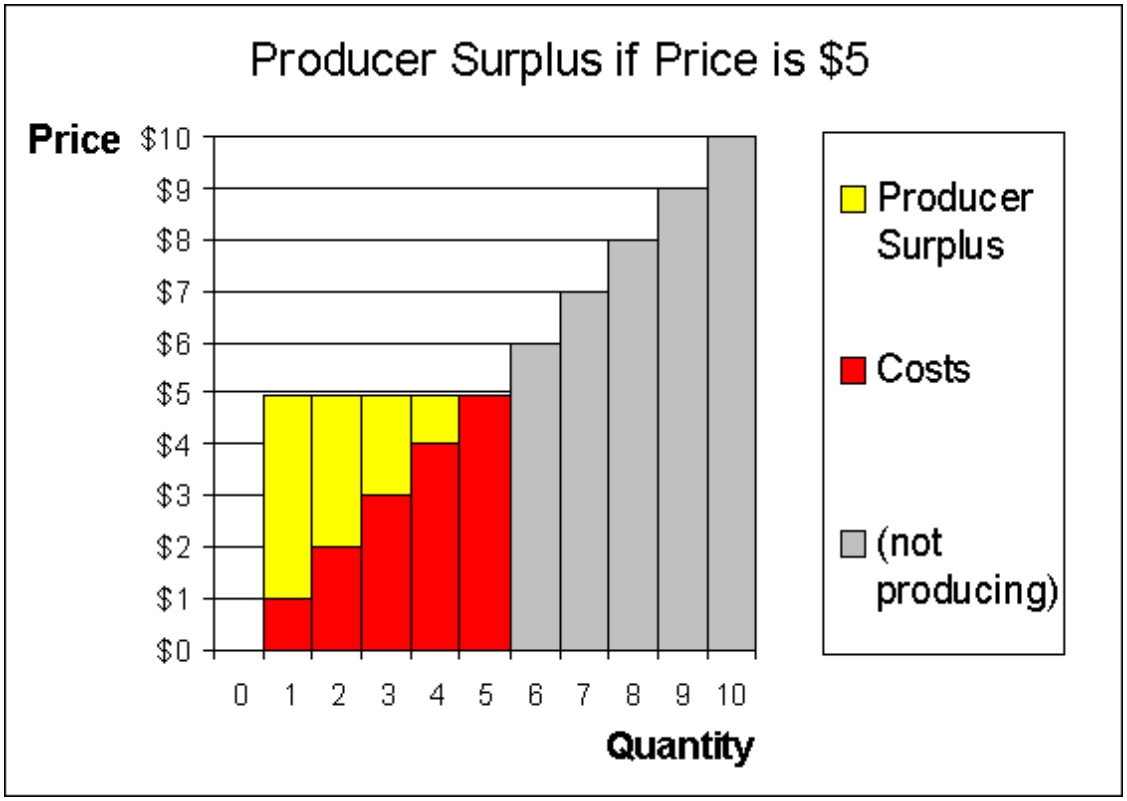
Remember that we are still reasoning from price to quantity: this shows us how much our producers will make in response to each possible price.

Here is a different way of looking at the same thing. We draw the graph as a series of columns, and the height of each column can be understood as the cost per cake for each producer.



Producer Surplus

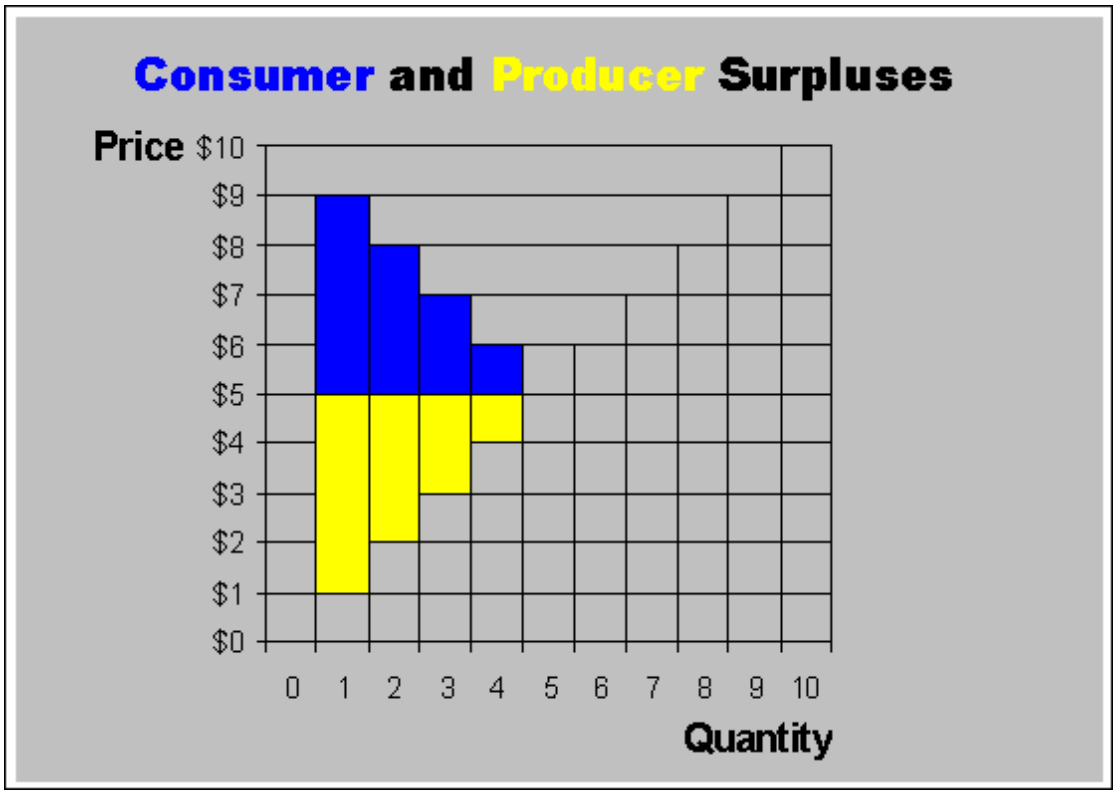
If that makes sense, then we're almost done. Let us define a firm's "producer surplus" as the difference between its cost and what it actually gets for the good. You can think of this, in very simple terms, as the firm's profit (assuming zero fixed costs, but don't worry about that -- this is not a microeconomics class). Here's how we use the concept. Suppose the price of a cake is actually $5. Producer K makes one, receiving $5 for something that costs it $1. Its "producer surplus" is $4. Producer L receives $5 for a cake that cost it $2 tp make, so its producer surplus is only $3. Producer O receives $5 for something that cost it $5 to make, so its producer surplus is zero. Producers P-T would lose money if they made and sold cake at a price of $5, so they make no cake. We can show all of that on the same graph, in which the red area representing costs, and the yellow area representing total producer surplus of all the different producers.



Putting it together

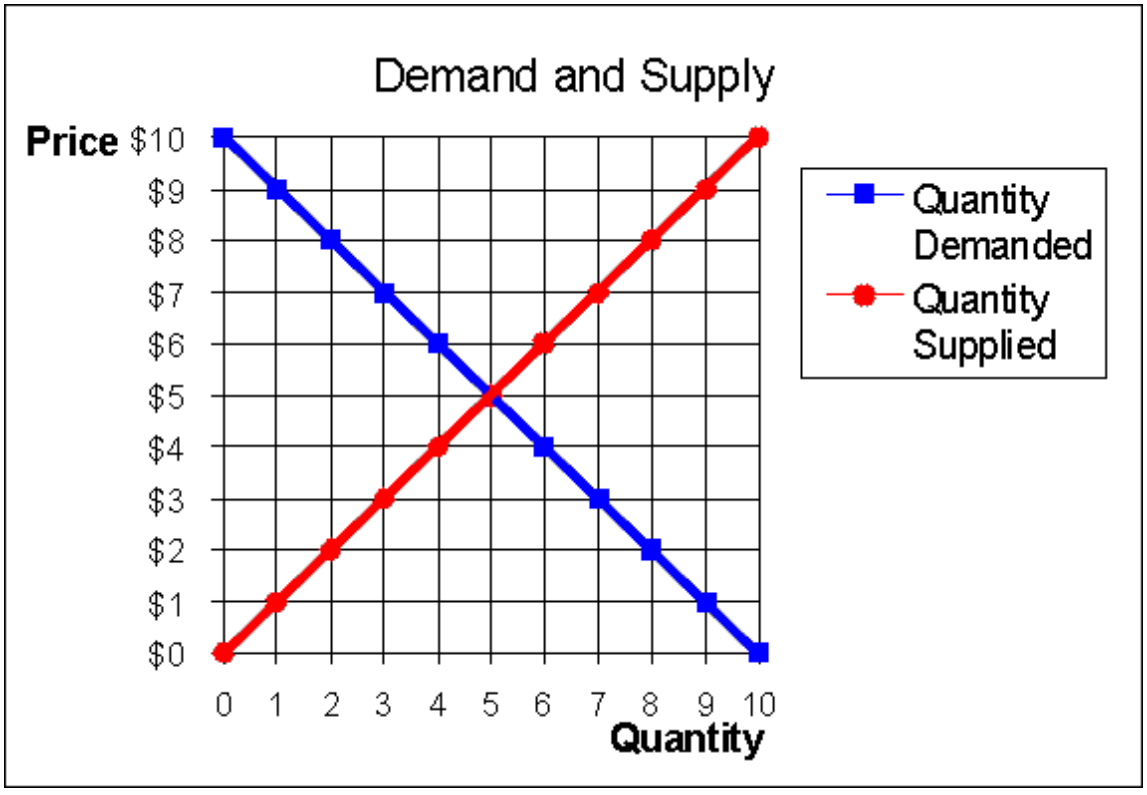
Note that the yellow area plus the red area represent total consumer spending, and are the same as the purple area in the consumer graph.

We can show both consumer and producer surplus at the same time:



Note that in this presentation, with only a few producers and consumers, the areas have a step-like shape. As we move to markets involving larger numbers of people they will become smoother triangles, as in the web material on tariffs and quotas.

Finally, here are the same demand and supply graphs in their more traditional configuration.



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