Case, Fair, and Oster
Macroeconomics – Chapter 4
Supply and Demand Applications

Problem 1. Supply and Demand.
a. Sale of a Painting.
On December 8, 2009, a painting by Rembrandt, "Portrait of a man with arms akimbo", was sold at Christie's auction house for £ 18,000,000 or about $ 27, 900,000 (the exchange rate is $ 1.55 per pound as of Sept. 12, 2010).

It last sold at auction in 1930, for £ 18,500. The useful web site http://measuringworth.com indicates that, using the UK GDP deflator to adjust for inflation, this would be worth about £ 952,000 today – that is, less than £ 1 million pounds. The price of the Rembrandt painting increased more than 20 times even after adjusting for inflation.

Obviously, the supply of authentic Rembrandt paintings has not shifted since 1669, when Rembrandt died. The change in price is due to a shift in demand, in turn presumably due to an increase in the income of the very, very rich.

Draw a vertical supply curve and a very large shift in demand to illustrate this problem.

b. Hog market.
Hog prices (for US #1-2, 210-240 lb., Iowa and Minnesota) were $ 49.55 in Sept. 2008 and $ 43.12 in Sept. 2009. Output of pork rose from 36 million pounds to 37 million pounds (USDA data). Assuming that the demand for pork remained constant, what had to happen to supply to create this result.

Answer: an increase in supply, due to lower cost of production (perhaps due to falling corn prices). The new supply curve should be below and to the right of the old one.

c.Greenhouse plants.
Both the demand and supply for houseplants increases in this problem.
Note that the curves **could** be drawn to result in higher, lower or identical prices, but **must** be drawn to show an increased equilibrium quantity (as long as neither curve is vertical).

In this case, we are told that there was a drop in price, so supply shifted more dramatically than did demand.

In general, given the information that both supply and demand increased, you should say that "Quantity will certainly increase, but the new equilibrium price is uncertain. It may be either higher or lower than the old"

Chapter 4 – Problems, page 2.

Problem 2. Agree or Disagree:
"Every demand curve must eventually hit the **quantity** axis, because with limited incomes, there is always a price so high that there is no **demand** for the good"

There are two problems with this phrasing:

a. The speaker has apparently confused the price and quantity axes. As the price rises, the demand curve will hit the price axis when the quantity demanded is zero.

b. It is incorrect to say that there is "no demand" – the demand curve does not disappear from the graph. The **quantity demanded** takes the value zero.

Note also that although this will likely be true eventually, it is not necessary for an economist modeling the demand for water to estimate what the price would be at which Qd = 0. Were Bill Gates really unable to afford a glass of water, the economist would already have died of thirst. For a realistic range of prices, the demand curve may be better modeled as a curve touching neither axis.

Problem 3. Tickets and scalpers.
Figure 4.4 on p. 77 represents excess demand for an event. Scalpers would eliminate the excess demand by making sure the effective price for a ticket rises to ration the tickets.
This does enhance market efficiency in one respect (there are gains from trade between those willing to wait in line to get the tickets and those willing to spend more money rather than wait), but the rationing would probably be more efficient if the original seller were more aggressive in raising prices to ration the good. The reason sellers don't do so directly is the perception that raising prices would be unfair – that **equity** is not the same thing as economic **efficiency**.

Problem 4. Agriculture subsidies.
The payment is to leave land unplanted, so supply will be reduced and prices increase.
A diagram showing a supply curve moving to the left (quantity reduction) and an unchanged demand curve will necessarily show a higher equilibrium price.
The confusion of the critic is that subsidy payments are sometimes paid for additional production, and if that were the case, the cost of production would in fact be lower for the farmer, and the price to the consumer would wind up being lower (though the total price to the taxpayer who is financing the subsidy would be higher).

Problem 5. New York apartments.
"Both the rent of New York City apartments and the demand for NYC apartments are rising. But the law of demand says that higher prices should lead to lower demand"
The law of demand only says that higher prices should lead to a lower **quantity demanded, other things equal.**
What has presumably been happening in NYC is that we did see an increase in demand (due perhaps to a booming financial sector when the text was written) If the price of apartments had not risen, there would have been excess demand; rising prices reduced the quantity demanded along the new demand curve, but the Qd on the new demand curve at the higher price was greater than the Qd on the old demand curve at the lower price.

Problem 6. Draw supply and demand curves.
a. Agriculture subsidies not to plant wheat. Shift backwards (to the left) in the supply curve, raising prices (see problem 4).

b. Impact of higher chicken prices on hamburger market.
Chicken and hamburgs are substitutes; so if the price of chicken rises, more people will visit McDonald's and not go to KFC. In the hamburg market, this means the demand for hamburg increases (the demand curve shifts to the right). As a result both price and quantity increase in the new equilibrium in the hamburg market.

c.Two shifts in the gasoline market.
Incomes rise, and since gasoline is a normal good, demand for gasoline will increase.
By itself, this would lead to an **increase in price** and an **increase in quantity**
Oil prices rise, so the cost of production of gasoline rises, and the supply curve shifts upward.
By itself, the reduction in supply would lead to an **increase in price** and a **decrease in quantity**.
Note the bolded terms: price is bound to increase, but the changes are pulling quantity in both directions.

Problem 7. Draw some more supply and demand curves.

a. Minimum wage results in unemployment.
Draw labor supply and demand curves crossing at wage = $ 5 an hour and Q = 10 million workers.
Draw a horizontal line at a minimum wage of $ 10 an hour, and assume that at this wage,
Qd = 9 million and Qs = 11 million. The resulting unemployment will be 2 million, since the **short-side rule** implies that the total employment will be 9 million.

Note that this does not imply that the total wages paid to minimum wage workers will decrease:
$ 5 times 10 million = $ 50 million.
$ 10 times 9 million = $ 90 million.
It is not therefore clear that low income households in general are worse off with a minimum wage.

b. Effect of increase in heating oil prices on the demand for insulation material.
The two are substitutes – spend more on insulation, and you will spend less on heating oil.
The graph is identical to that in problem 6, part b.

Chapter 4 – Problems, Page 4

Problems 8 and 9. The oil market: demand and supply in an open economy.
The table presented by the text can be translated into the following supply and demand curves for the United States:

SUPPLY: P = 64 + Qs or Qs = P - 64
DEMAND: P = 100 – 2 Qd or Qd = 50 - 0.5 P

Simultaneous solution will yield Q* = 12 and P = $ 76 we are limited to the domestic supply of the US.
If a ceiling price of $ 70 had been set by the US government, we would have:
US quantity supplied at Qs = 70 - 64 = 6 million barrels
US quantity demanded at Qd = 50 – 0.5 (70) = 50 – 35 = 15 million barrels

Or there would be an excess demand of Qd – Qs = 15 – 6 = 9 million barrels

Given an international economy with the world price of oil at $ 70, the excess demand for US oil will be supplied by imports of 9 million barrels.

With, as in part c of the problem, a $ 4 tax or **tariff** on imports, the effective US price is $ 74. At this price, Qd = 13 and Qs = 10, reducing imports to the new excess demand = 13 – 10 = 3 million barrels.

The tariff revenue will be $ 4 per barrel * 3 million barrels = $ 12 million.

Clearly, domestic consumers are hurt and domestic producers benefit from the higher prices; the US government benefits from the tariff revenue and foreign producers are hurt by having to pay the tariff revenue. This does not mean that the net effects are a wash from the point of view of the world – or even from the point of view of US economic actors.

If we add up the loss of consumer surplus, the gain of producer surplus, and the tariff revenue, we find that there is a loss of total economic surplus (= consumer surplus + producer surplus + tariff revenue).

[Final calculations are not for macroeconomics, but may be used in a microeconomics class:

The free trade CS is 0.5 * (100 – 70) * 15 = 225 million dollars
The free trade PS is 0.5 * (70 – 64) * 6 = 36
Total economic surplus is CS + PS = 261

In the tariff situation, you will find that:

CS = 0.5 * (100 – 74) * 13 = 169 or a loss of 56 million dollars
PS = 0.5 * (74 – 64) * 9 = 45 or a gain of 4 million dollars
Tariff revenue = 13 or a gain of 13 million dollars as calculated above

Total economic surplus is CS + PS + Tariff revenue = 169 + 45 + 13 = 227 rather than 261.
The difference is 261 – 227 = a loss of 34 million dollars.