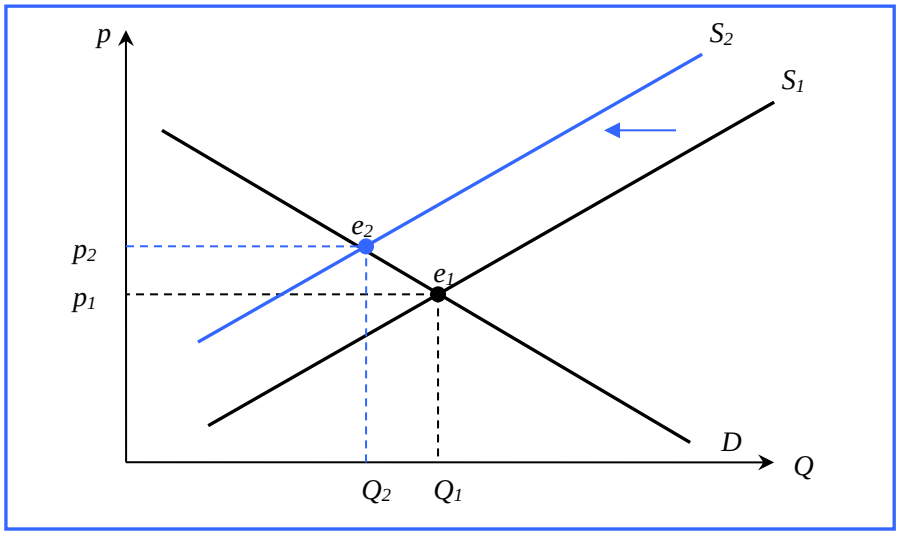
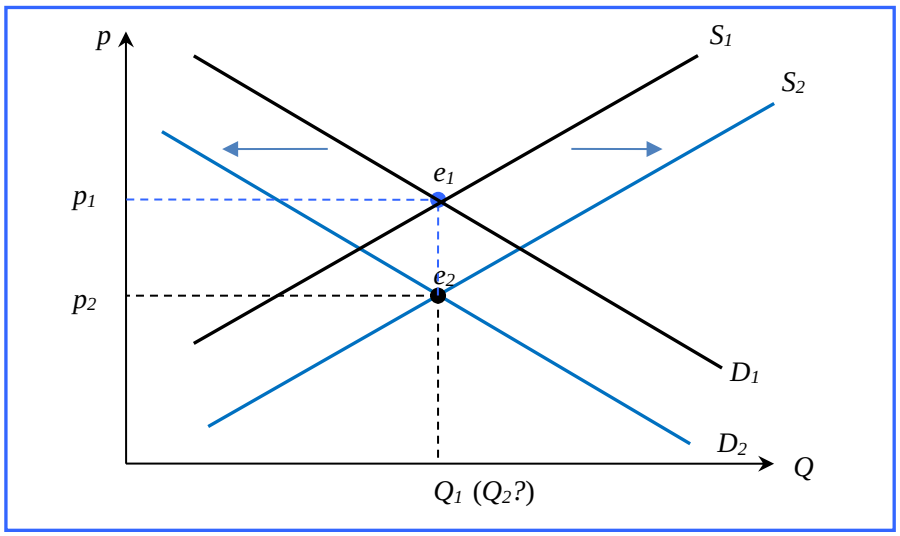
Homework Exercises 2: Demand and Supply

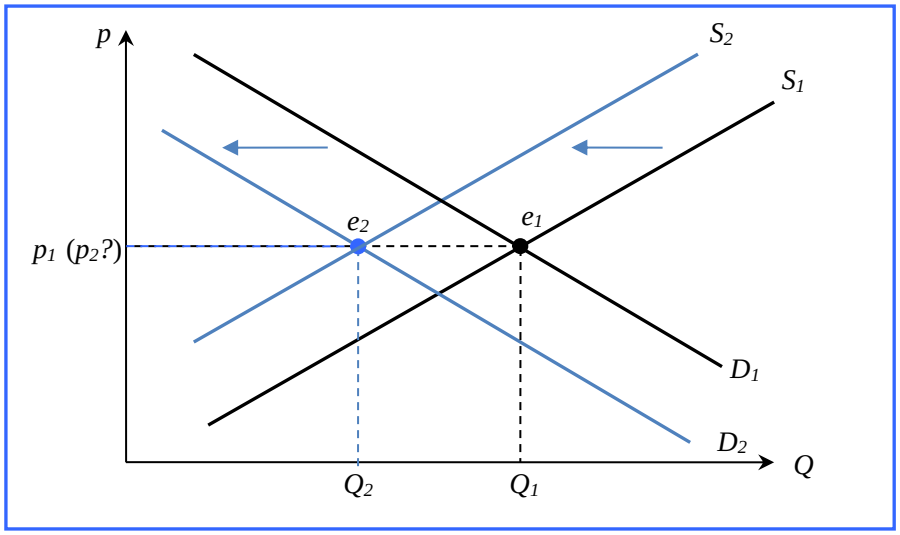
1. The drought lowers the supply of corn, shifting the supply curve to the left. This leads to a lower equilibrium quantity of corn and higher equilibrium price.



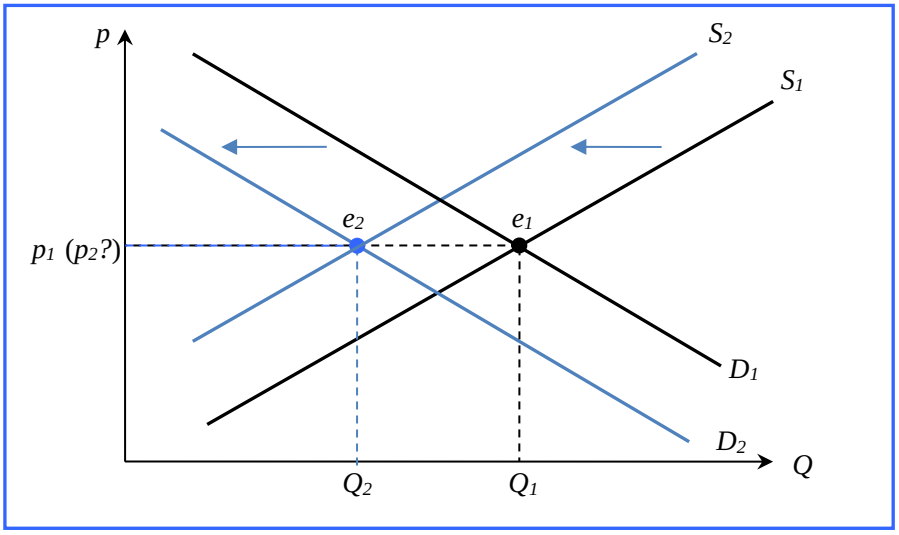
2. Global warming has increased the supply of lobster significantly, shifting the supply curve rightward. The economic downturn since 2008 has lowered the demand for lobster, as income of the consumers has dropped significantly. It shifts the demand curve leftward. These lead to a lower equilibrium price of lobster, while the impact on equilibrium quantity is ambiguous, depending on whether the demand or supply curve shift by larger extent.



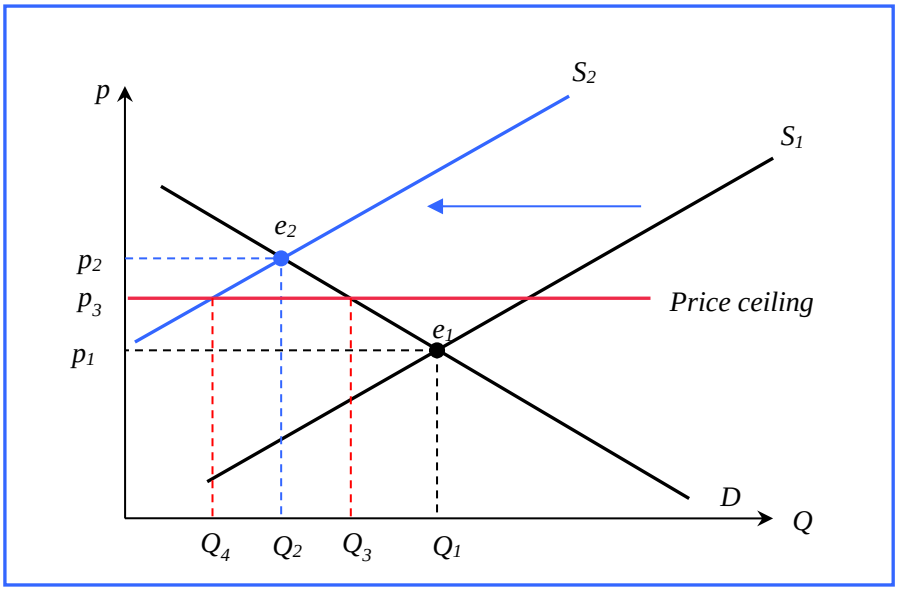
3. The demand curve for beef shifted to the left as consumers switched to other meats. At the same time, the supply curve for beef also shifted to the left, as farmers destroyed their herds. Since both of these shifts lead to a lower equilibrium quantity of beef, we know with certainty that equilibrium quantity will decrease. However, the impact on the price of beef is ambiguous and will depend on the relative sizes of the two shifts. If demand shifts more than supply, then the price of beef will fall. If supply shifts more than demand, then the price of beef will rise. If the two shifts exactly offset each other, the price of beef will remain constant.



4. Since sugar is an input in making generic soft drinks, this increase in input prices will decrease the supply of generic soft drinks. Coke and Pepsi's advertising campaign will decrease the demand for generic soft drinks. For these reasons, the equilibrium quantity of generic soft drinks sold will decrease. However, the equilibrium price may rise or fall, depending on the relative magnitude of the shifts in demand and supply.

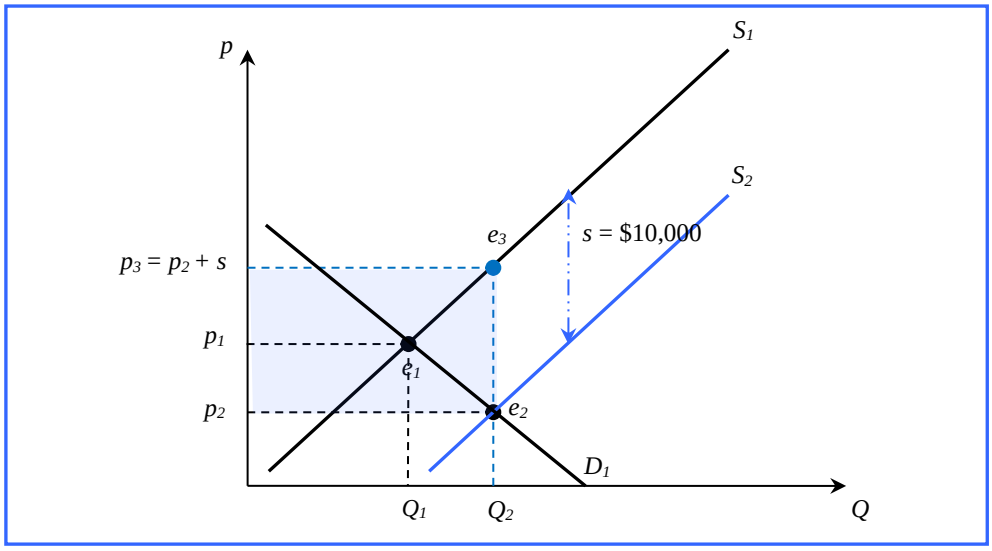


5. In the absence of price controls, the leftward shift of the supply curve as a result of Hurricane Katrina would push market prices up from p_1 to p_2 and reduce quantity from Q_1 to Q_2. Suppose the government imposed a price ceiling at p_3, consumers would want to purchase Q_3 units but producers would only be willing to sell Q_4 units. The resulting shortage would result in non-price competition and therefore extra opportunity cost for consumers to obtain the gasoline, making them worse off. The reduced quantity and price also reduced firms' profits.



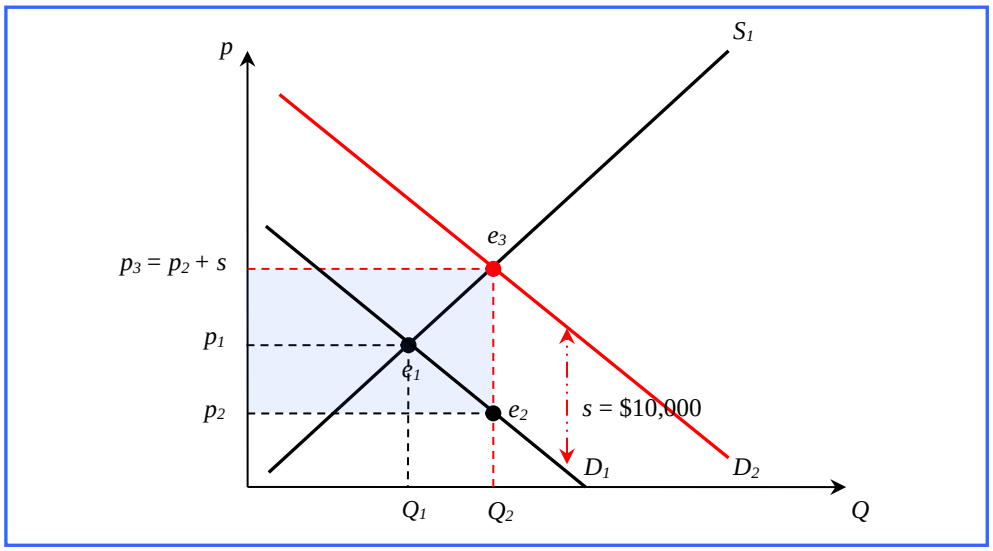
6. The mistake is in the assumption that a higher price will lead to a rightward shift in supply. Instead, we know that an increase in price of oranges (caused by the rightward shift in demand) will only cause a movement up along the supply curve, without shifting the supply curve. This will result in a higher equilibrium price and a larger equilibrium quantity traded.

7.a. When the government pays a unit subsidy of \$10,000 to colleges. It shifts the supply curve downward by s = \$10,000 from S_1 to S_2. That's part of the cost of providing education would be borne by the government. The market equilibrium changes from e_1 to e_2. Therefore, the equilibrium price decreases from p_1 to p_2 and the equilibrium quantity increases from Q_1 to Q_2. With subsidy, the students pay less per unit. However, the colleges receive more per unit (after receiving the subsidy), i.e. $p_3 = p_2 + s$. The government will have to pay the total amount of subsidy of $s \times Q_2$.



7.b. If the subsidy is paid to students, the effect would be to shift the demand curve upward by τ = \$10,000 from D_1 to D_2. That's because part of the price paid by students would be borne by the government. The market equilibrium changes from e_1 to e_3. The equilibrium price received by colleges increases from p_1 to p_3. However, the students pays less per unit (after receiving the

subsidy), i.e. $p_2 = p_3 - s$. The equilibrium quantity increases from Q_1 to Q_2. The government will have to pay the total amount of subsidy of $s \times Q_2$.



Comparing the answers of part (a) and (b) allows use to show that, for perfectly competitive markets, the impacts of subsidy are the same whether the subsides are paid to the colleges or the students.

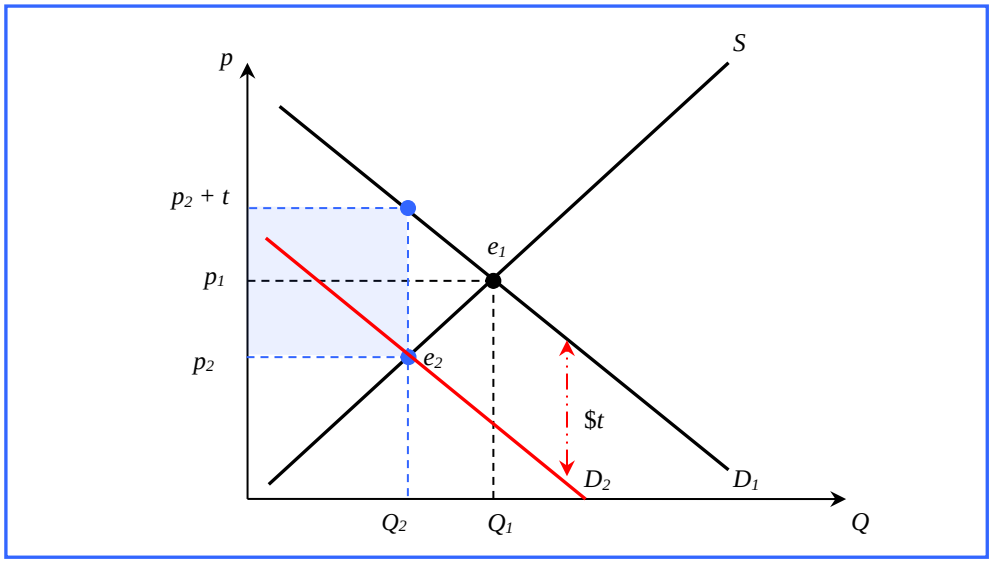
8. Demand Curve: $Q^d = 1600 - 300p$; Supply Curve: $Q^s = 1400 + 700p$

In equilibrium, $Q^d = Q^s$:

$$1600 - 300p = 1400 + 700p$$
$$1000p = 200$$
$$p^* = 0.2$$
$$Q^* = 1600 - 300(0.2) = 1540 \text{ or } Q^* = 1400 + 700(0.2) = 1540$$

The equilibrium price of a chocolate bar is \$0.20 and the equilibrium quantity is 1,540 bars.

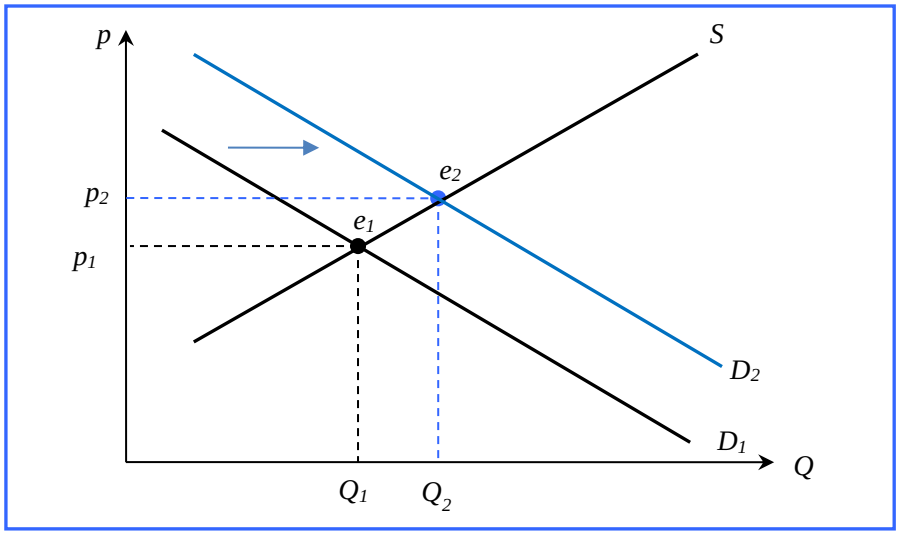
9.a. When the government collects a tax of \$$t$ from buyers, it shifts the demand curve downward by \$$t$ from D_1 to D_2. The market equilibrium changes from e_1 to e_2. Therefore, the equilibrium price would decrease from p_1 to p_2 and the equilibrium quantity decreases from Q_1 to Q_2. With tax, the sellers receive less per unit. However, the consumers pay more per unit (after tax), i.e. $p_2 + t$. The local government will receive the total amount of $t \times Q_2$.



9.b. The sales tax would increase the price of the e-cigarettes (paid by consumers) and lower its quantity consumed. If the tax would also induce the consumer to consume less alcohol, it implies that e-cigarettes and alcohol are likely to be complements. It makes sense as smoking and drinking tend to go together.

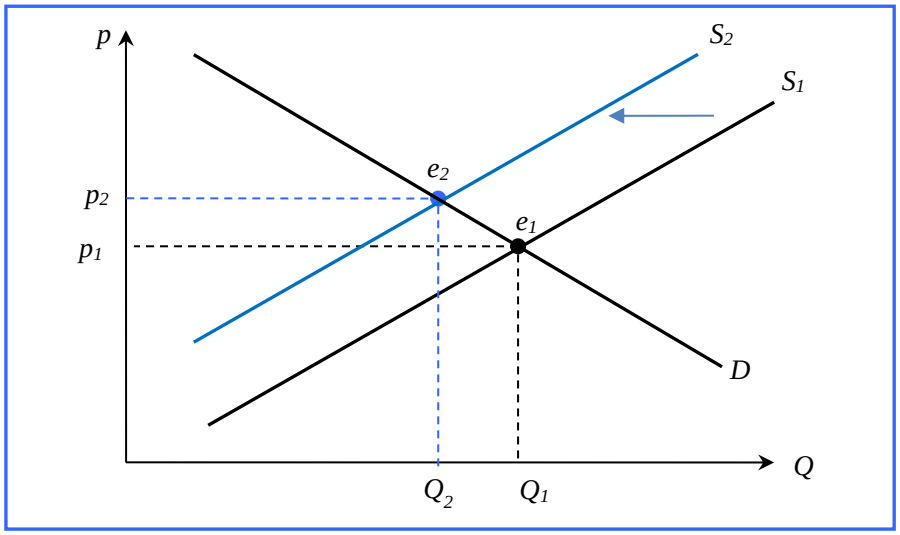
9.c. A tax on e-cigarettes might induce consumers to switch to traditional cigarettes (or other harmful substance, especially in countries/cities with legalized marijuana), as they might be substitutes. Government might consider more evidence or data (e.g. the cross-price elasticities of demand among these products, to be discussed in the next topic) to examine the overall impact of the policy[1]. On the other hand, some smokers use e-cigarettes as a means to quit smoking, a tax on e-cigarettes might discourage such use.

10a. Government support for biofuel production increases the demand for corn, since corn is the primary feedstock for ethanol; this causes the demand curve for corn to shift rightward, resulting in higher corn prices and increased corn production.

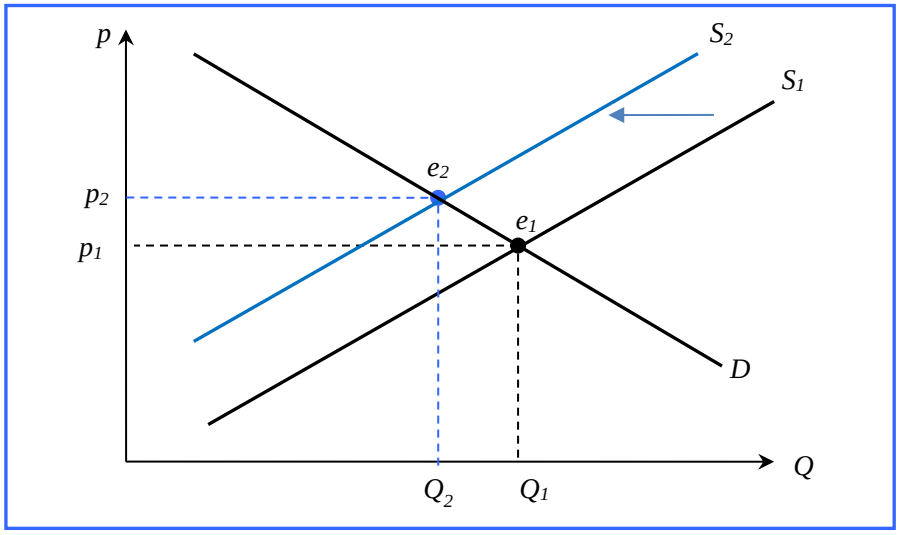


[1] In fact, a separate American study found that a $1 increase in e-cigarette taxes reduced daily vaping but increased cigarette smoking in young adults.

10b. With higher corn prices, farmers allocate more land to corn and less to soybeans, as they are substitutes in production. It decreases the supply of soybeans; reduced supply shifts the soybean supply curve left, leading to higher soybean prices and lower quantity produced.



10c. Rising grain prices increase the feed costs for livestock, which reduces supply in beef and pork markets; this leftward shift in the supply curve leads to higher meat prices and reduced quantity supplied.



10d. The World Bank suggests biofuel production is a key driver of higher food prices because increased demand for crops like corn raises their market price, squeezing food supplies and worsening food crises. It makes economic sense for governments to restrict first-generation biofuels if food security is a priority, as such policies can help prevent sharp spikes in staple food prices.