Homework Exercises 2: Demand and Supply

Question 1

In 2012, the region that normally supplies over half of the world's corn experienced its worst drought in 50 years[1]. Using a supply-and-demand diagram, explain the effect of the drought on the corn market.

Question 2

Because of climate change, in the form of warmer oceans, there were plentiful lobster supply for years to come in Boston. However, there was an economic downturn U.S. since 2008[2]. Use a supply-and-demand diagram to explain the impact of both events on the Boston lobster market.

Question 3

In the late 1990s and early 2000s, concerns about "Mad Cow Disease" caused British consumers to switch away from beef. At the same time, the government destroyed thousands of cattle. Use a supply-and-demand diagram to show the effects on British beef's equilibrium price and quantity. Can you be certain about the direction of change in price? In quantity? Briefly explain your answer.

Question 4

You manage a firm selling *generic soft drinks* in a competitive market, alongside big brands like Coke and Pepsi. Suddenly, Congress imposes a $0.50 per pound tariff on imported sugar —the main ingredient for your product. It leads to higher sugar prices. Meanwhile, Coke and Pepsi start an aggressive ad campaign claiming their products are better than generics. Explain how these changes would affect the market for generic soft drinks.

Question 5

In 2005, Hurricane Katrina damaged much of the U.S.'s oil-refining capacity, how would it affect the gasoline prices? In 2006, many state and federal elected officials called for price controls. Had they been imposed, what effect would price controls have had? Who would benefit and would be hurt? Use a supply-and-demand diagram to illustrate your answer.

Question 6

Consider the following forecast: "Next month, we predict orange demand will rise, driving prices up. But the higher prices will increase supply, tending to lower prices. So, even though we predict that demand will increase, we cannot predict whether the price of oranges will rise or fall." Identify and explain the logical error in this statement.

Question 7

a. Show, using a supply-and-demand diagram, what happens in the market for college education if each college receives a $10,000 per unit subsidy. (*Hint:* Subsidy is a negative tax. If a subsidy is paid directly to the colleges, which curve will shift? In what direction?)
b. Show, using the same initial supply and demand, what happens if the $10,000 subsidy is paid directly to each student attending.

[1] Source: Corn on the cusp, *The Economist*, 4 August, 2012.

[2] Source: With warming seas, lobsters become an abundant bargain, *The Boston Globe*, 4 July, 2013.

Question 8

Market research has revealed the following information about the market for chocolate bars: The demand curve can be represented by the equation $Q^d = 1600 - 300p$, where Q^d is the quantity demanded and p is the price. The supply curve can be represented by the equation $Q^s = 1400 + 700p$, where Q^s is the quantity supplied. Find the equilibrium price and quantity in the market of chocolate bars.

Question 9

E-cigarettes use among U.S. high school students topped 2 million in 2022. While they are less harmful than traditional cigarettes, they still pose health risks for young adults.

One way to cut **e-cigarette consumption** (or vaping) is by imposing *a sales tax*. A study by the Centre for Health Economics & Policy Studies at San Diego State University found that a $1 increase in e-cigarette taxes is associated with a 14 – 26% decrease in vaping among high-school students. Unexpectedly, it also lowers teen **alcohol consumption**, possibly because teens often smoke and drink together[3].

a. Suppose the e-cigarette market is perfectly competitive. Use the *demand-and-supply model* to explain what happens if the tax on the e-cigarette market is *collected from buyers*.

b. What does the study suggest about the relationship between e-cigarettes and alcohol?

c. Should the government rely on this study to decide on e-cigarettes taxes? What other factors would you suggest the government to consider?

Question 10

Every year, over 40% of global grain output is used for biofuel or animal feed. In 2019, nearly 10% of grain was used for biofuel, mainly to make ethanol for cars, and 34% was used for animal feed. From 2010 to 2019, grain used for animal feed rose from 770 million tonnes to 987 million tonnes, as meat demand increased. **The World Bank says biofuel production has helped push food prices higher**[4]

a. Using the demand-and-supply model, explain how government support for increased biofuel production will affect the corn market, given that corn is the main feedstock for biofuels.

b. Higher corn prices encourage farmers to plant more corn and reduce the area planted with other crops such as soybeans, since these two crops are often rotated on the same land. Based on your answer in part (a), use the demand-and-supply model to explain how the expansion of biofuel production will affect the soybean market.

c. As grain prices rise, what effect will this have on livestock markets such as beef and pork? Explain your answer using a demand-and-supply diagram.

d. Why has the World Bank suggested that biofuel production is a major cause of higher food prices and food crises? Does it make economic sense for governments to restrict the use of this type of "first generation" biofuels?

[3] Source: Smoke and mirrors, *The Economist*, 7th May, 2022.

[4] Source: Against the grain, *The Economist*, 25th June, 2022.