Homework Exercises 3: Elasticity

Question 1

Three Guys, a moving company, is considering a price rise. Currently, they charge $30 per hour. A suggests increasing the price to $40, but B thinks this will decrease revenue. Therefore, C estimates the price elasticity of demand between $30 and $40 and finds that it is 0.5.

a. Should Three Guys increase their price if they want to increase the revenue? Explain.
b. Currently, Three Guys is the only moving company in town. B knows that several new companies are opening next year. Will the demand for Three Guys' services become more elastic, less elastic, or stay the same? Why?

Question 2

Suppose that business travelers and vacationers have the following demand for airline tickets from New York to Boston:

Price, $	Quantity Demanded (business travelers), tickets	Quantity Demanded (vacationers), tickets
150	2100	1000
200	2000	800
250	1900	600
300	1800	400

a. As ticket price increases from $200 to $250, what is the price elasticity of demand for (i) business travelers and (ii) vacationers? Use the midpoint method in your calculations.

b. A study[1] found that the price elasticity of demand for European low-cost carriers (LCC) varies across different routes, ranging from 0.5 – 0.6 for business-oriented routes (e.g. Hamburg, London) to 1.3 – 1.9 for leisure-oriented routes (e.g. Split, Lisbon). Why might vacationers have a different elasticity from business travelers.

Question 3

Consider public policy on smoking.

a. Studies show the price elasticity of demand for cigarettes is about 0.4. If a pack of cigarettes currently costs $2 and the government wants to reduce smoking by 20%, by how much should the price increase?
b. The long-run elasticity of demand for cigarettes is estimated between 1.0 to 2.5. Is this expected? Explain the relationship between short-run and long-run elasticity?

Question 4

To cut air pollution, Congress imposes a $0.50 per gallon tax on gasoline, to be paid by sellers.

a. Should this tax be imposed on producers or consumers? Explain using the supply and demand model.
b. If the demand for gasoline is more elastic, will this tax reduce gasoline consumption more or less effectively? Explain.

[1] Source: Morlotti, C., Cattaneo, M., Malighetti, O., & Redondi, R. (2017). Multi-dimensional price elasticity for leisure and business destinations in the low-cost air transport market: Evidence from easyJet, *Tourism Management*, 61, 23-34.

Question 5

Two drivers, Tom and Jerry, each drive up to a gas station. *Without looking at the price,* each places an order. Tom says, "I'd like 10 gallons of gas." Jerry says, "I'd like $10 worth of gas." What is each driver's price elasticity of demand? (Hint: For Jerry's case, consider how the price change affects the revenue received by the gas station?)

Question 6

At Fenway Park, home of the Boston Red Sox, seating is limited to 39,000. The City of Boston adds a per ticket tax of $5, paid by buyers. Suppose the demand curve for tickets is typically downward sloping, how would the equilibrium price and quantity be affected? On whom does the tax burden fall – the team's owners, the fans, or both? Explain.

Question 7

Norway currently exempts all battery electric vehicles (BEVs) from the sales taxes imposed on gasoline and diesel cars. As a result, BEVs made up 77.5% of new cars sold in September, up from 61.5% a year ago. But the policy comes at a substantial cost, estimated at 19.2 billion crowns (US$2.32 billion) in lost tax revenues last year[2].

Now, Norway's zero-tax policy could end, as the newly elected government plans to impose sales tax on BEVs.

a. Suppose the electric car market is *perfectly competitive*. Use the demand-and-supply diagram to show the effect of a per-unit tax of $*t* imposed *on buyers*.

The following table shows the own-price and cross-price elasticities of demand for BEVs and gasoline cars in Norway (Fridstrøm and Østli, 2021[3]).

Own-price and Cross-price elasticities of demand for BEVs and Gasoline Cars in Norway

		With respect to the price of:	
		BEVs	Gasoline cars
Elasticities of demand for:	BEVs	-0.99	0.36
	Gasoline cars	0.19	-1.08

b. Interpret the cross-price elasticities of demand for gasoline cars with respect to the price of BEVs. How might the proposed sales tax might affect the demand for BEVs and gasoline cars?

Question 8

The war between Ukraine and Russia has disrupted the sunflower oil market. They are the world's two largest exporters of sunflower oil. Ukraine's exports have nearly stopped, and Russia has imposed export quotas on its sunflower oil. Besides sunflower oil, the war also impacted the price of palm oil, which were increased by 70%[4].

[2] Source: Time for Norway to tax luxury electric cars, IMF economists say, Reuters, June 10th, 2021; With help from Tesla, nearly 80% of Norway's new car sales are electric, Reuters, Oct 4th, 2021.

[3] Fridstrøm, L., & Østli, V. (2021). Direct and cross price elasticities of demand for gasoline, diesel, hybrid and battery electric cars: the case of Norway. *European Transport Research Review*, *13*(1), 1-24.

[4] Source: Palm roiled, *The Economist*, 7th May, 2022.

a. Use the *demand-and-supply model* to explain the impact of the war on the sunflower oil market.

b. The table below shows the *own-price* and *cross-price elasticities of demand* for various edible vegetable oils (for food use) (Kojima, Parcell, and Cain, 2016)[5].

Table 1. Own-price and Cross-price Elasticities of Demand for Edible Vegetable Oils

		With respect to the price of:			
		Sunflower Oil	Palm Oil	Soybean Oil	Rapeseed Oil
Elasticities of Demand for:	Sunflower Oil	-0.54	0.41	-0.10	0.03
	Palm Oil	0.09	-0.46	0.11	0.09
	Soybean Oil	0.11	0.37	-0.42	0.11
	Rapeseed Oil	0.58	-0.06	0.00	-0.68

Source: Kojima, Y., Parcell, J., and Cain, J. (2016).

Interpret the own-price elasticities of demand for sunflower oil and palm oil. What does the cross-price elasticities indicate about the relationship between sunflower oil and palm oil? If sunflower oil price rises by 1%, how would palm oil demand be affected?

c. Indonesia, a major palm oil exporter, restricted exports from April 28. Using supply and demand analysis, discuss the impact of the war, as well as Indonesia's export ban, on the global palm oil market.

d. The war and export bans have made it difficult for companies like Nestlé and Procter & Gamble (P&G) to buy vegetable oils from certified, deforestation-free suppliers. Explain how these challenges might affect (i) their production costs and (ii) their ability to maintain environmental standards. What trade-offs do these firms face?

[5] Kojima, Y., Parcell, J., and Cain, J. (2016). A Global Demand Analysis of Vegetable Oils for Food and Industrial Use: A Cross-Country Panel Data Analysis with Spatial Econometrics. Conference paper presented at the 2016 Agricultural & Applied Economics Association Annual Meeting, Boston, Massachusetts, July 31 – August 2.