Problem set 2

PPHA 32300 Microeconomics and Public Policy I

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October 16, 2025

1. In both the United States and France, the demand for haircuts is given by

$$Q_D = 300 - 10P$$

$$P = 30 - 0.1Q_D$$

In the US the supply is given by:

$$Q_S = -300 + 20P$$

$$P = 15 + 0.05Qs$$

while in France, the supply is:

$$Q_S = -\frac{100}{3} + \frac{20}{3}P$$

$$P = 5 + 0.15Q_S$$

1. **Solve for the equilibrium price and quantity of a haircut in each country.**
2. **Without computing the elasticity of supply, which country has a more elastic supply curve? (Hint: What can you infer about the slopes of the supply curves from the equations?)**
3. **Suppose that due that a popular new hairstyle has emerged, fueled by a social media influencer. This trend drives more people to seek professional haircuts, leading to a higher quantity demanded across the board. The demand for haircuts in the United States increases by 100 units at every price point. Hence, the new demand is QD = 400 - 10P. Solve for the new equilibrium price and quantity in the United States.**
4. **Suppose that, in a similar fashion, the demand for haircuts in France increases by 100 units at each price as well. Solve for the new equilibrium price and quantity in France.**
5. **Drawing on your answers to (3) and (4), judge whether the following statement is true or false: "The impact of an increase in demand depends critically on the slope of the supply curve.**

2. Consider the market for owner-occupied houses in Chicago, IL.

For each scenario, describe how
the supply and/or demand curves will shift, and the effects on the equilibrium price and quantity.

1. Rental prices for apartments decrease
2. The state of Illinois makes public colleges free for residents
3. The Federal Reserve Board signals that it will raise interest rates in the future.

3. Consider the market for dry cleaning.

Dry cleaners need to pay for labor, rent, and chemicals to produce one additional unit of cleaned clothing, resulting in the following market supply curve: Q = 8P and inverse supply curve: P = Q/8. The market demand curve for dry cleaning is: Q = 100 - 2P and the inverse demand curve is: P = 50 -1/2 Q. However, the chemicals used in the dry cleaning process contaminate the soil around the facility which generates a cost to nearby residents of 5 per unit of clothing cleaned.

1. **What are the private market equilibrium price and quantity?**
2. **What is the social marginal cost function? What is the efficient (surplus-maximizing) quantity and price? (Hint: For the price, it can be determined by the intersection of the SMC curve and the demand curve.**
3. **Draw a diagram with the supply, demand, and social marginal cost curves. Label the market price, the market quantity, the efficient (surplus-maximizing) price, and the efficient (surplus-maximizing) quantities, and the vertical intercepts (AKA choke-prices) of the supply curve, demand curve, and SMC curve. (Hint: For your own benefit in subsequent questions, what is the private marginal cost faced by the producer of the optimal quantity? Mark that on the diagram as well.)**
4. **At the market equilibrium, what will consumer surplus and producer surplus be? How large will the external costs be?**
5. **At the efficient (surplus-maximizing) equilibrium, what will consumer surplus and producer surplus be? How large will the external costs be? (Hint: To find the producer surplus, calculate the total revenue earned by producers and subtract the total private costs.)**
6. **How much deadweight loss does this externality cause?**