Econ 200 AE Spring '25 Week 8

Anirudh Ravishankar, `onirudh3@uw.edu`

May 23, 2025

Section Information / Reminders

Friday 11:30am, MOR 221.

Office Hours: Tue Thur 11am-12pm, SAV 403.

Weekly material posted on https://onirudh3.github.io/teaching.

Grading:

- Homework: 20% (lowest grade dropped), due every Thursday 11:59pm.

- Writing assignments: 20% (due May 1 and June 5).

- Midterm: 30% Tuesday, April 29.

- Final: 30% (non-cumulative) June 5.

Unit 8 Review

Some important things to recall (not exhaustive):

- Price floors and ceilings. Price ceilings provide an upper bound on prices. To have an effect, it needs to be less than market price. Price floors provide an lower bound on prices. To have an effect, it needs to be more than market price.

- Taxes and subsidies. Taxes require the buyer or seller to pay an additional amount to the government, raising the price, while subsidies involve a payment from the government to the buyer or seller, lowering the price.

- Externalities occur when the actions of a decision maker affect others. Positive externalities provide spillover benefits to others and lead to underproduction, while negative

externalities impose spillover costs on others and lead to overproduction.

- Coase Theorem. Externalities cause inefficiency by leading to over- or underproduction. One private solution is to assign property rights. According to the Coase Theorem, if property rights are clearly assigned – regardless of to whom – individuals can negotiate and reach an efficient outcome through private bargaining.

Problems

1. Find the market equilibrium for the following economy. Demand: $P = 20 - 2Q$. Supply: $P = Q + 2$.

   For equilibrium quantity: $20 - 2Q = Q + 2 \implies Q^* = 6$, and for equilibrium price: $P^* = Q^* + 2 \implies P^* = 8$.

(a) Draw a price ceiling at \$12. What is the amount of shortage at this price? Draw and calculate the deadweight loss.

   The price ceiling is above the equilibrium price so it will have no effect. The market will function at its equilibrium. There is no shortage, and there is no deadweight loss.

(b) Draw a price ceiling at \$4. What is the amount of shortage at this price? Draw and calculate the deadweight loss.

   The shortage due to the price ceiling is $Q_D - Q_S = 8-2 = 6$. The deadweight loss is $\frac{1}{2}(6-2)(16-4) = 24$
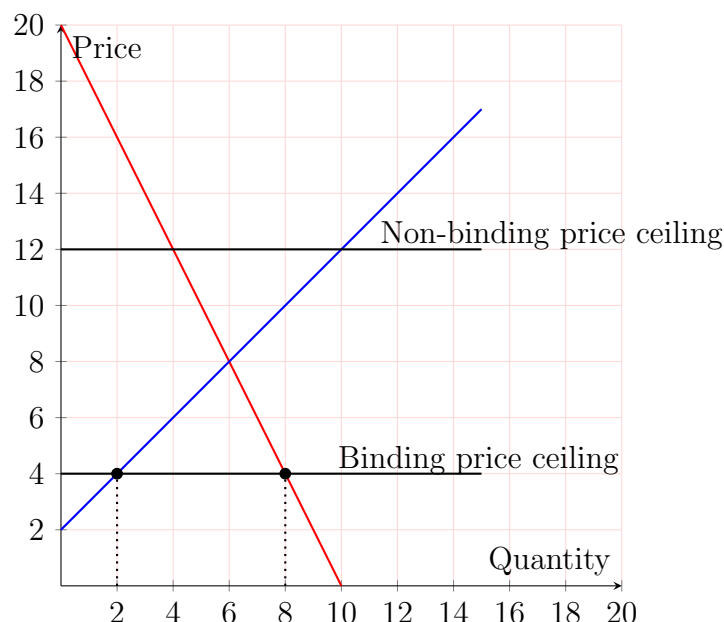
2. The Organisation for the Promotion of Brussels Sprouts has convinced the government of Ironia to institute a price floor on the sale of brussel sprouts, at $8 per bushel. Demand is given by $P = 9 - Q$ and supply by $P = 2Q$, where Q is measured in thousands of bushels.

(a) What will be the price and quantity of brussels sprouts sold at market equilibrium?

For equilibrium quantity: $9 - Q = 2Q \implies Q^* = 3$. For equilibrium price: $P^* = 2Q^* \implies P^* = 6$.

(b) What will be the price and quantity sold with the price floor?

Price floor will have an effect since it is above P^*. When $P = 8$,

$$Q_S = \frac{P}{2} = 4$$

$$Q_D = 9 - P = 1$$

Since 4 thousand bushels are supplied, but only 1 thousand is demanded. Hence, quantity sold is 1 thousand bushels at $8.

(c) How big will be the excess supply of brussels sprouts produced with the price floor?

Excess supply at the price floor is:

$$Q_S - Q_D = 4 - 1 = 3 \text{ (thousand bushels)}$$

3. The market shown in the figure below is in equilibrium. Suppose there is a $1.50 per unit tax levied on sellers. The initial supply curve is given by $P = 1 + 0.025Q$. After the tax, the supply curve is given by $P = 2.5 + 0.025Q$.
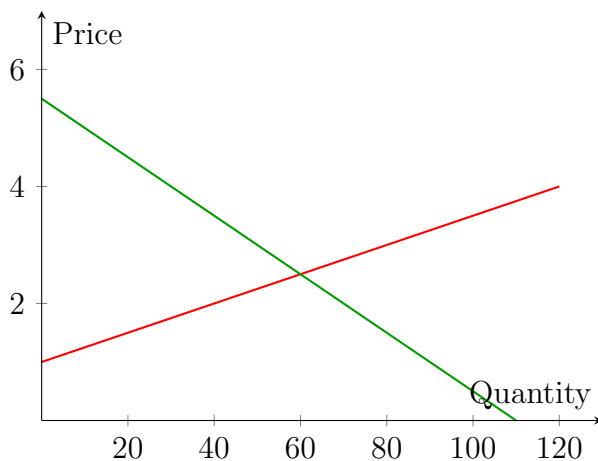
(a) Draw the after-tax supply curve.

(b) Plot the after-tax price paid by consumers and the after-tax price received by sellers.

Consumers pay $3.5, Sellers get 3.5 - tax = $2.

(c) Draw consumer surplus, producer surplus, tax revenue, and deadweight loss after the tax.
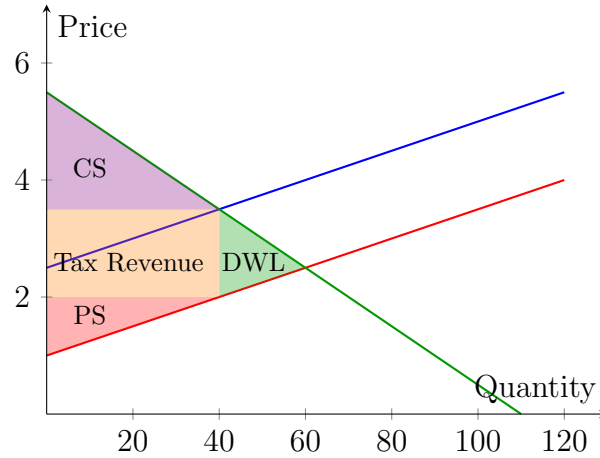
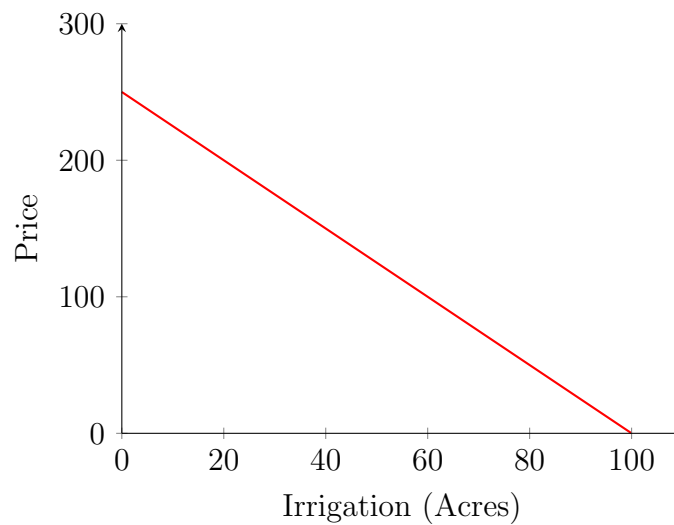(d) Calculate deadweight loss.

Deadweight Loss = $\frac{1}{2}(3.5 - 2)(60 - 40) = 15$.

(e) Calculate total surplus.

Total Surplus = CS + PS + Tax Revenue = $40 + 20 + 60 = 120$.

4. The figure shows the demand curve for a U.S. farmer for irrigating his land.

It costs the farmer $100 per acre to irrigate the land. Each acre of land irrigation generates

salty run-off that winds up in the Colorado River. It costs $50 to desalinate this river water so Mexican farmers can irrigate their crops.

(a) Draw the marginal private cost of irrigation on the graph.

   Constant horizontal line at $100 per acre.

(b) Draw the marginal social cost of irrigation on the graph.

   Constant horizontal line at $150 per acre.

(c) How many acres will the U.S. farmer irrigate?

   60 acres, where marginal benefit intersects marginal private cost.

(d) What is the efficient level of irrigation?

   40 acres, where social marginal benefit intersects social marginal cost.

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