

# *SS201: Principles of Economics*

**AY 23-2**

## Lesson 9: Taxes

### 1 Review

For each question below, select either True, False, or Uncertain. Then in the space provided, briefly justify your answer (one or two sentences maximum).

True

False

Uncertain

1. If the demand for a good is elastic, then a firm can raise prices and increase revenue.

True

False

Uncertain

2. If a price ceiling is binding, then the original market equilibrium price is beneath this value.

True

False

Uncertain

3. Total surplus within a market is the sum of the value to buyers minus the cost to sellers.

## 2 Bottom Line Up Front

Taxes affect both consumers and producers. Despite the government taxing a consumer or producer, who ultimately pays the most of that tax resides with which side is more inelastic.

## 3 Buyers vs. Seller Taxes

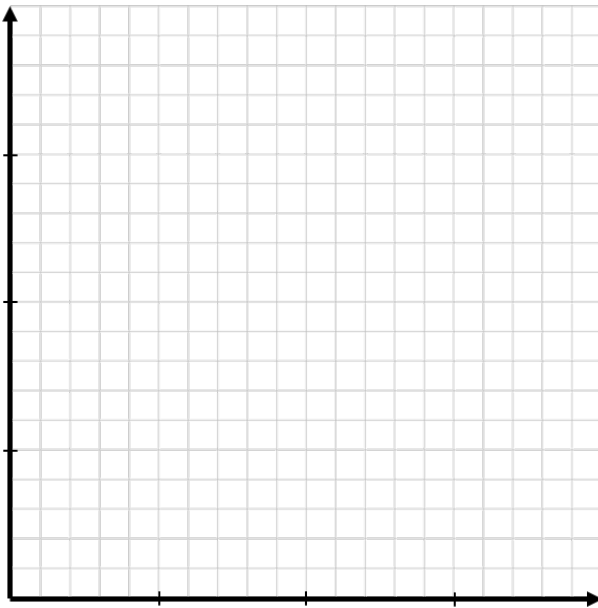
Joseph Cooper is a former NASA pilot that now owns and operates a corn farm. He models the market for corn with the equations:

$$Q_D = 1300 - P$$

$$Q_S = -300 + P$$

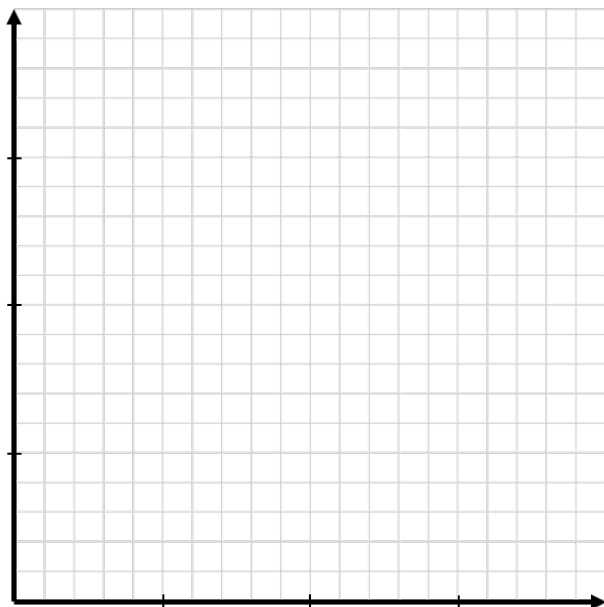


1. Graph this market below. Label your axes and all intercepts. Solve for the equilibrium price and quantity and show it on the graph.

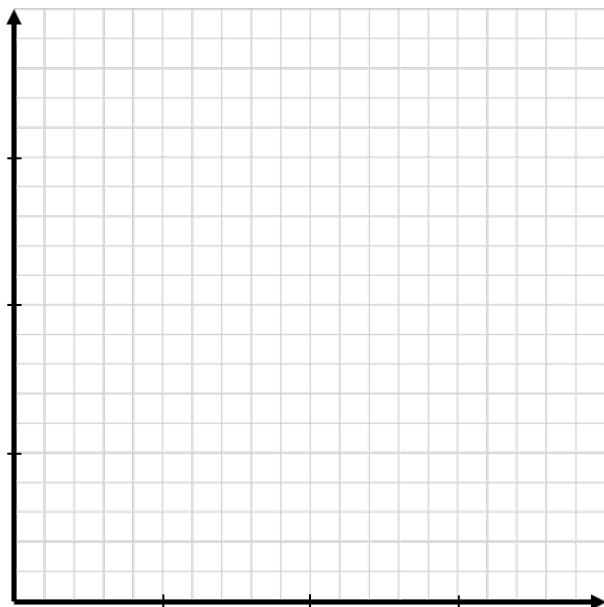


2. Calculate the consumer, producer, and total surplus.

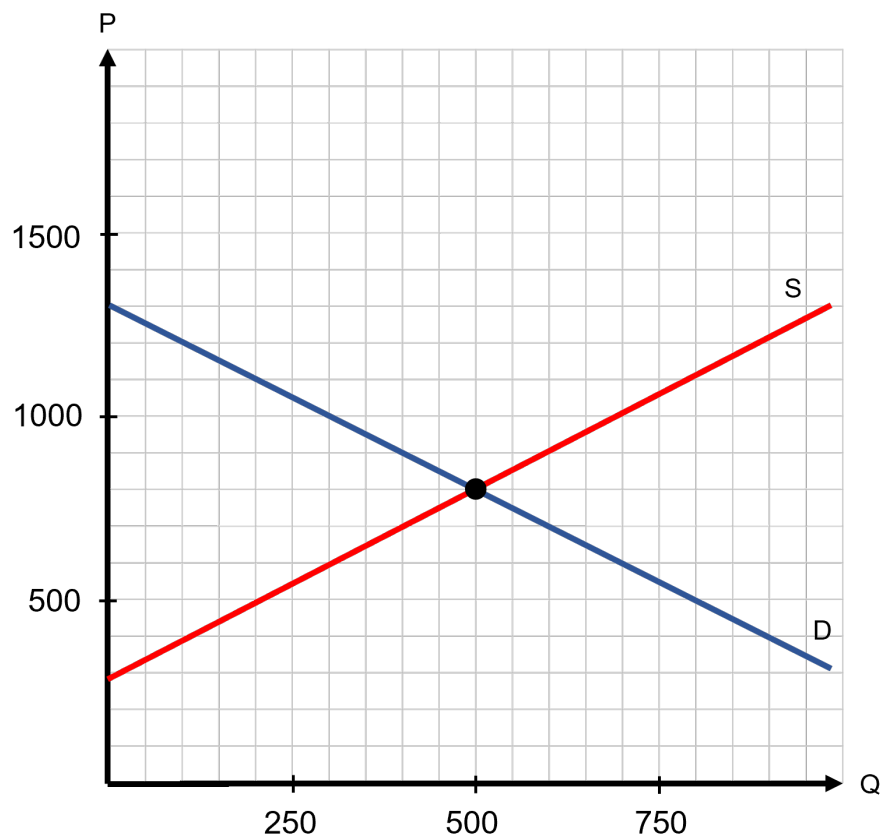
3. Now suppose that the government applied a \$200 per unit tax on the *sellers* of corn. Draw a small graph below to show which curve shifts in response to this tax. Solve algebraically for the after-tax price received by the sellers, the price paid by buyers, and quantity sold.



4. Now suppose that the government applied a \$200 per unit tax on the *buyers* of corn. Draw a small graph below to show which curve shifts in response to this tax. Solve algebraically for the after-tax price received by the sellers, the price paid by buyers, and quantity sold.

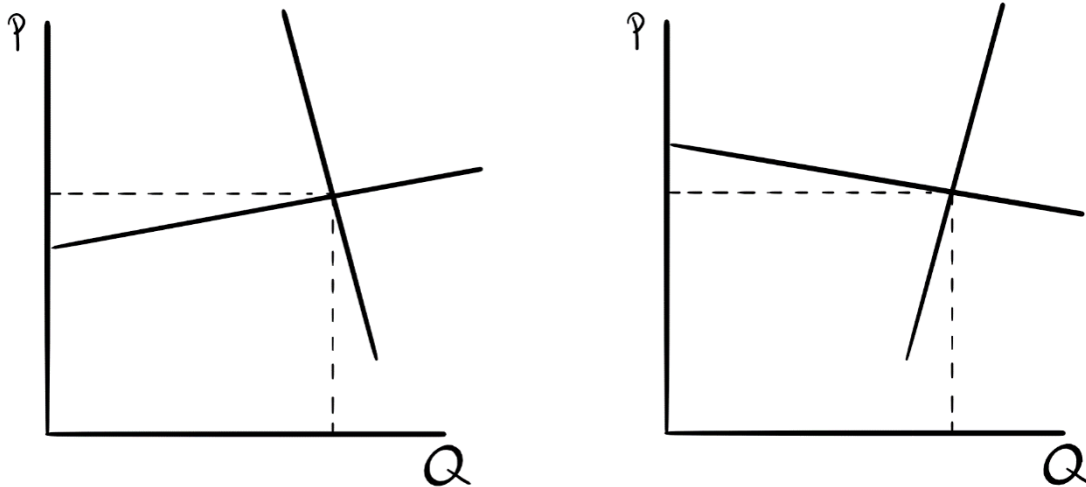


5. Using the tax-wedge method, show the impact of a \$200 tax on the market for corn on your figure from part 1 (given below). Label the values of the after-tax quantity, the price buyers pay, and the price sellers receive. Calculate and identify on the graph consumer surplus, producer surplus, and government tax revenue. Calculate the total social surplus.



6. Why is the total social surplus different in questions 1 and 5? What do we call this difference? Label the area of the graph associated with this difference.
  
  
  
  
  
  
  
  
  
  
7. Define tax incidence. What is the tax incidence on buyers and sellers in this market? Who bears the larger burden of the tax?

## 4 Taxes and Elasticity



1. Who bears the greater burden of the tax in the market on the left? On the right?

2. Complete the statement: “The tax burden will fall more heavily on buyers when..”

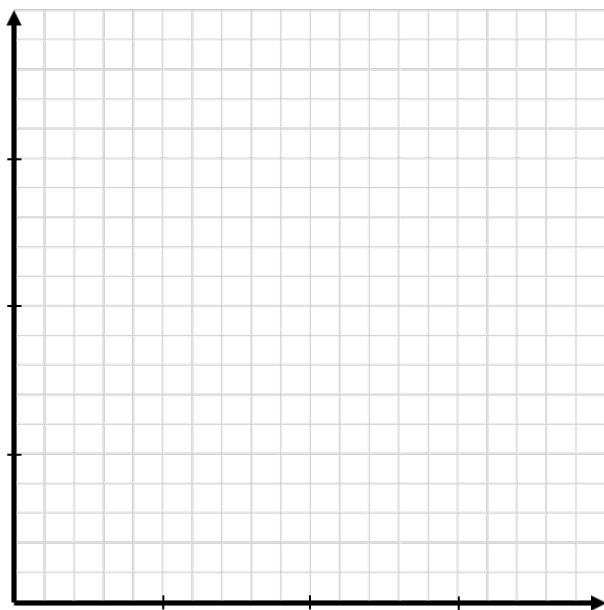
Suppose the market for drones is given by the equations:

$$Q_D = 20 - 2P$$

$$Q_S = \frac{1}{2}P$$

3. Solve for the equilibrium price and quantity. Suppose we want to evaluate the effect of a \$4 per unit tax placed on the sellers of this good. Solve (using algebra) for the new equilibrium quantity ( $Q^T$ ), buyer price ( $P_D$ ), and price sellers receive ( $P_S$ ), from a \$4 per unit tax?

4. Now graph the market, draw your solution on the graph and check that it is reasonable. What is the tax incidence on sellers? On buyers? Who bears more of the tax burden?



5. Calculate the POINT ELASTICITY of supply and demand at the original market equilibrium. How do these elasticities relate to your answer from question 4?

## 5 Efficiency vs. Equity

Suppose the government places a \$10/unit tax on a good with perfectly inelastic demand.

1. What happens to the market quantity sold? What happens to the price buyers pay? What happens to the price sellers receive?
2. Does this tax generate a deadweight loss?
3. Is this type of tax efficient?
4. Is this type of tax likely to be equitable? (Hint: think about what types of goods tend to have inelastic demand)



## 6 Why Tax?

Share of Aggregate Income Received by Quintile 1967-2013										
Income	1967	1975	1980	1985	1990	1995	2000	2005	2010	2013
Lowest 20%	4.0	4.4	4.3	4.0	3.9	3.7	3.6	3.4	3.3	3.2
Second 20%	10.8	10.5	10.3	9.7	9.6	9.1	8.9	8.6	8.5	8.4
Third 20%	17.3	17.1	16.9	16.3	15.9	15.2	14.8	14.6	14.6	14.4
Fourth 20%	24.2	24.8	24.9	24.6	24.0	23.3	23.0	23.0	23.4	23.0
Highest 20%	43.8	43.2	43.7	45.3	46.6	48.7	49.8	50.4	50.2	51.0
Top 5%	17.5	15.9	15.8	17.0	18.6	21.0	22.1	22.2	21.3	22.2

Data from: U.S. Bureau of the Census (2013).



#### Share of Aggregate Income Accruing to the Top 1%

The top 1% earned almost one-quarter of all income in the United States in the mid-1920's. This share fell dramatically during the Great Depression and World War II, stayed low for decades, then began to rise in the 1980's. It has continued to rise ever since, more than doubling since 1975.

*Data from: Alvaredo et al. (2013), Figure 1.*

# Income Distribution in the OECD

Income Share In Total Income for OECD Nations						
Country	Income Share In Total Income					
	Bottom 10%	Bottom 20%	Bottom 40%	Top 40%	Top 20%	Top 10%
Austria	3.1	8.5	22.6	59.2	36.0	21.6
Belgium	3.6	8.8	22.6	58.8	35.2	20.8
Canada	2.8	7.6	20.4	62.2	39.1	24.2
Czech Republic	4.0	9.9	24.3	58.0	35.7	21.7
Denmark	4.0	9.8	24.3	57.3	34.5	20.8
Finland	3.9	9.4	23.6	58.3	35.5	21.5
France	3.4	8.5	21.8	61.3	39.5	25.3
Germany	3.6	8.8	22.4	60.2	37.8	23.5
Greece	2.0	6.4	18.8	63.6	40.3	25.1
Hungary	3.1	8.3	22.0	60.2	37.0	22.5
Italy	2.2	6.9	19.7	62.8	39.7	24.7
Korea	2.2	6.8	20.5	61.1	37.1	21.9
Luxembourg	3.4	8.5	21.6	61.1	38.7	24.2
Mexico	1.2	3.9	12.5	73.9	52.9	36.7
New Zealand	3.1	7.6	19.7	63.8	40.7	25.7
Norway	3.3	9.1	24.1	57.3	34.5	20.6
Poland	3.2	8.1	21.5	61.0	38.1	23.2
Portugal	2.6	7.0	19.5	63.7	41.1	25.9
Slovak Republic	3.5	9.1	23.8	57.7	34.2	19.7
Sweden	3.5	8.7	22.7	59.0	36.1	21.9
Turkey	2.1	5.6	16.0	69.0	47.4	31.7
United Kingdom	2.7	7.2	19.3	64.5	42.6	28.0
Unweighted Average	2.9	7.7	20.6	62.2	39.4	24.6
United States	1.6	5.2	16.0	68.2	45.5	30.0
Data from: U.S. Bureau of the Census (2015).						