Economics 101
Spring 2018
Answers to Homework #2
Due Thursday, February 22, 2018

Directions:

- The homework will be collected in a box **before** the lecture.
- Please place **your name, TA name, and section number** on top of the homework (legibly). Make sure you write your name as it appears on your ID so that you can receive the correct grade.
- Late homework will **not** be accepted so make plans ahead of time.
- **Show your work**. Good luck!

Please realize that you are essentially creating "your brand" when you submit this homework. Do you want your homework to convey that you are competent, careful, and professional? Or, do you want to convey the image that you are careless, sloppy, and less than professional? For the rest of your life you will be creating your brand: please think about what you are saying about yourself when you submit any work for someone else.

Part I: PPF, Opportunity Cost, Trading prices, Comparative and Absolute Advantage

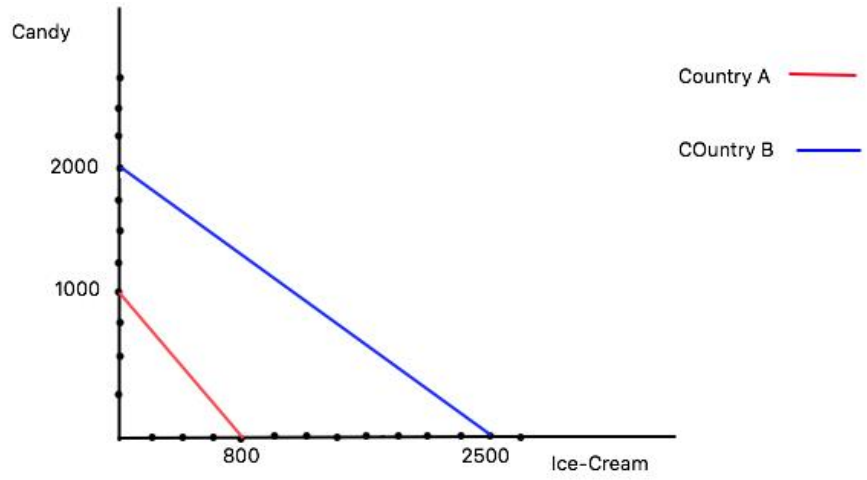
Consider two countries A and B. Assume all people living in those countries are employed. There are 100 people living in A and 300 in B. There are only two products that both countries produce: candy and ice-cream. Given the same time period, country A can produce 1000 pounds of candies or 800 pounds of ice-cream or any other combination of the two goods that lies on the line containing these two production points while country B can produce 2000 pounds of candies or 2400 pounds of ice-cream or any other combination of the two goods that lies on the line containing these two production points.

a) Graph the production possibilities frontiers of both countries with ice-cream on the horizontal axis and candy on vertical axis. Write the equations of both PPF's.

Solution:

Country A: $candy = 1000 - \frac{5}{4} ice - cream$

Country B: $candy = 2000 - \frac{5}{6} ice - cream$



b) Identify which country has an absolute and comparative advantage in both goods. Calculate the opportunity cost of producing each good taking into consideration the number of workers each country has.

Solution:
Country A has absolute advantage in the production of candy since it can produce 10 pounds per worker. In contrast, country B can produce 20/3 pounds of candy per worker.
Neither country has an absolute advantage in producing ice-cream because both countries can produce 8 pounds of ice-cream per worker.
Country A has the comparative advantage in the production of candy and Country B has the comparative advantage in the production of ice-cream. This is apparent from the opportunity costs of each country:

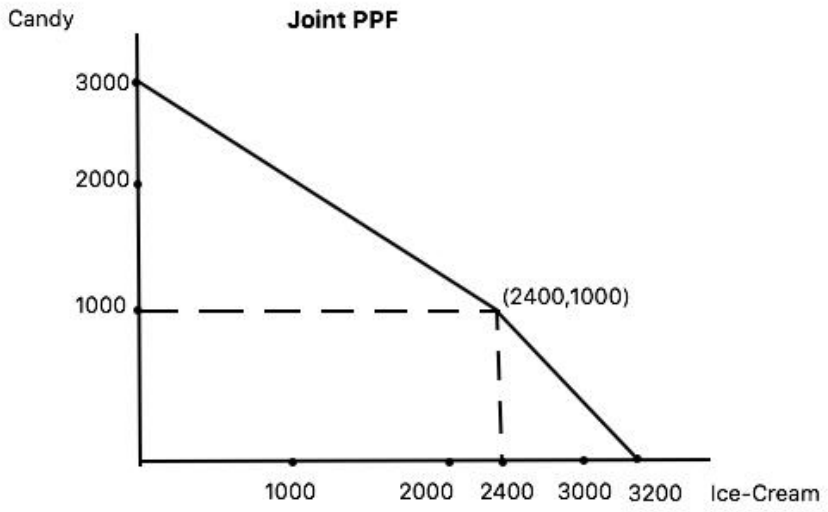
Country	OC of one pound of candy	OC of one pound of ice-cream
A	4/5 pound of ice-cream	5/4 pound of candy
B	6/5 pound of ice-cream	5/6 pound of candy

c) Graph and write down the equation for the joint PPF of both countries. Remember to find the kink point and that the function is defined differently on different parts of the production possibility frontier.

Solution:

$$candy = \begin{cases} 3000 - \frac{5}{6} ice - cream, & for\ ice - cream \leq 2400 \\ 4000 - \frac{5}{4} ice - cream, & for\ 2400 < ice - cream \leq 3200 \end{cases}$$

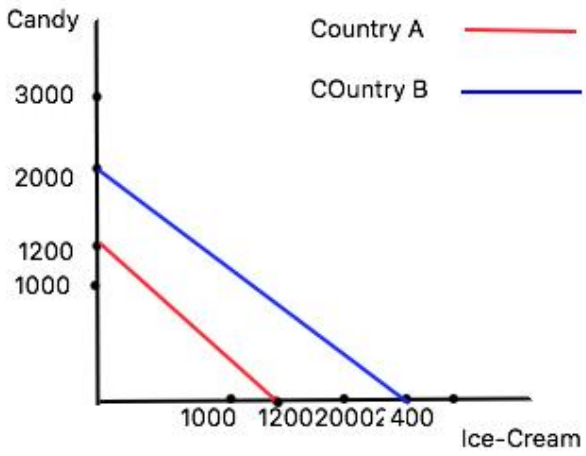
The joint PPF has one kink point at (2400,1000).



d) What is the range of acceptable trading prices for one unit of ice-cream and one unit of candy between the two countries? Explain your answer.

Solution:
Country A has the comparative advantage in the production of candy, therefore it would be willing to sell one pound to Country B for a price equal to or higher than 4/5 pounds of ice-cream. For any lower price, Country A would be better off producing its own candy. Country B would be willing to buy one pound of candy at a price equal to or lower than 6/5 pounds of ice-cream. For any higher price, Country B would be better off producing its own candy. Hence, the acceptable range of trading prices for one pound of candy would be $\frac{4}{5} pounds\ of\ ice - cream \leq P_{candy} \leq \frac{6}{5} pounds\ of\ ice - cream.$
The trading price for ice-cream is determined using the same logic. Country A would be willing to buy one pound of ice-cream if the trading price is equal to or lower than 5/4 pounds of ice-cream. Country B would be willing to sell one pounds of ice-cream if the trading price is higher than 5/6 pounds of candy. Therefore, the acceptable range of trading prices for one pound of ice-cream would be $\frac{5}{6} poundsof\ candy \leq P_{ice-cream} \leq \frac{5}{4}\ pounds\ of\ candy.$

e) After a strong earthquake in country B, 200 people decided to move from country B to country A. They all immediately found jobs and started working. Since more people are now working in country A, production of both goods increased there. Suppose now that given the same time period, country A can produce 1200 pounds of candies or 1200 pounds of ice-cream while country B can still produce 2000 pounds of candies or 2400 pounds of ice-cream. Graph new PPFs for both countries and derive the equations.



Country A: $candy = 1200 - ice - cream$
Country B: $candy = 2000 - \frac{5}{6} ice - cream$

f) Which country now has absolute advantage in production of both goods? Which country has comparative advantage in ice-cream production and in candy production? Remember to take into account movement of people from country B to country A.

Solution:

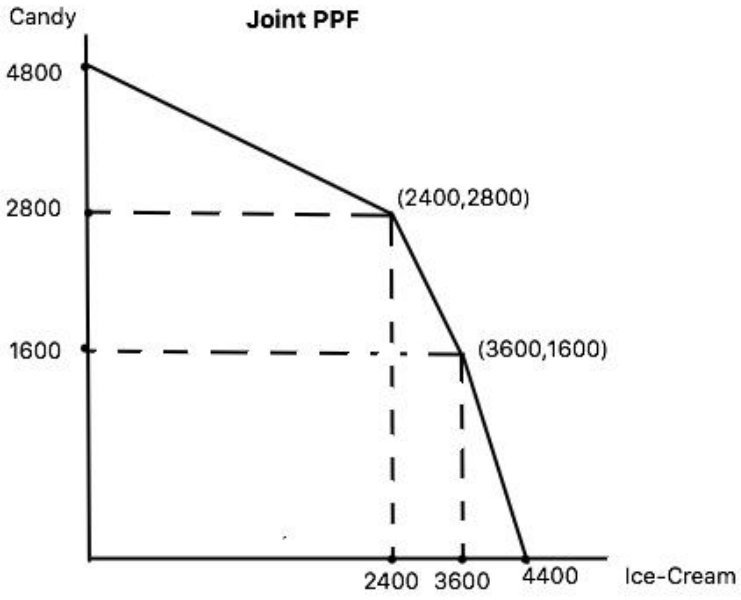
Country B has absolute advantage in the production of both candy and ice-cream since it can produce 20 pounds of candy and 24 pounds of ice-cream per worker. In contrast, country A can produce 4 pounds of candy and 4 pounds of ice-cream per worker.

Country A has the comparative advantage in the production of candy and Country B has the comparative advantage in the production of ice-cream. This is apparent from the opportunity costs of each country:

Country	OC of one pound of candy	OC of one pound of ice-cream
A	1 pound of ice-cream	1 pound of candy
B	6/5 pound of ice-cream	5/6 pound of candy

g) Assume that now the third country C decided to start producing the same two goods. Given the same time period as before, country C can produce either 800 pounds of ice-cream or 1600 pounds of candies or any combination of the two goods that lies on the line containing these two production points. Does this change which country has the comparative advantage in producing ice-cream or candy now? Which country should specialize in producing candy? Which country should specialize in producing ice-cream? Plot the joint PPF for countries A, B and C. Remember that you have to identify the kink points based on specialization of each country.

Solution:
Country C's opportunity cost for one pound of candy is 1/2 pound of ice-cream and the opportunity cost of one pound of ice-cream is 2 pounds of candy. Country C now has the comparative advantage in producing candy while Country B still has the comparative advantage in producing ice-cream.



Part II: Demand and Supply Shifts

Suppose there are only two laptop producers: Dell and Lenovo. Fundamental assumptions of supply and demand are that quantity demanded decreases when price increases while quantity supplied increases when price increases. Therefore, the demand curve has a negative slope and the supply curve has a positive slope. Let the Dell and Lenovo laptops be perfect substitutes for each other, meaning that whenever the price of a Dell laptop increases the demand for laptops made by Lenovo increases and vice-versa. Assume that both types of computers are normal goods.

Initially markets for both types of laptops are in equilibrium. In each of the following questions describe the change to the demand and the supply (this could be a demand shift, a supply shift, a change in the quantity demanded, and/or a change in the quantity supplied) for both types of laptops and explain how the equilibrium prices and quantities change compared to the initial equilibrium prices and quantities for these two types of laptops.
Assume that before every change in the scenario the market price and quantity in both markets returns to equilibrium.

a) One of the Lenovo's factories that makes 40% of their laptops was damaged by an earthquake and has to be closed for 6 months to repair the damage. As a consequence of this earthquake, many people lost their jobs in the Lenovo factory.

Solution: the supply curve for Lenovo laptops shifts to the left because of the decrease in production due to an earthquake. The demand curve for both Dell and Lenovo laptops shifts to the left due to the decrease in income from workers losing their jobs. The equilibrium price and quantity of Dell laptops is now lower than their initial levels. The equilibrium quantity of Lenovo laptops decreases, while the equilibrium price effect is ambiguous and depends on the relative magnitude of the shifts in the supply and demand curves.

b) News spread out that Dell used cheap chips inside of their laptops and those chips are dangerous for people's health. Consequently, consumers are now more willing to buy Lenovo laptops.

Solution: the demand curve for Dell laptops shifts leftward since consumer's tastes and preferences make them less inclined to buy this brand of laptop. The demand curve for Lenovo laptops shifts rightward for the same reason. The equilibrium price and quantity of Dell laptops is now lower than their initial levels, and the equilibrium price and quantity of Lenovo laptops is now higher than their initial levels.

c) Dell has to change one of their input suppliers to a more expensive one because of a disagreement with their initial supplier of inputs. This change in input suppliers raises the cost of producing a Dell laptop.

Solution: the supply curve for Dell laptops shifts leftwards due to an increase in production costs. Consequently, the equilibrium price of Dell laptops increases and equilibrium quantity decreases compared to the initial equilibrium levels. Since Dell and Lenovo are perfect substitutes and the Dell laptop price increased, the demand for Lenovo laptops will shift rightwards, thereby increasing the equilibrium price and quantity in the Lenovo laptop market relative to their initial levels.

d) For this question, consider only the market for Lenovo laptops. A new study ordered by the government finds that the adverse effect from laptop radiation is not nearly as harmful as from other electronic devices, so people are now willing to buy more laptops. The government wishing to cover the cost of the study has assessed a new tax on laptop producers that will cover the cost of the study.

Solution: the demand curve for both types of laptops shifts to the right since consumers feel relief at hearing that the use of laptops does not generation radiation issues. At the same time, since the government imposed a tax on producers to finance the study, the production costs for the producers of laptops have increased. Consequently, the supply curve shifts leftwards in both markets. In both markets the equilibrium price increases while the effect on the equilibrium quantity is ambiguous.

e) Assume that Dell laptops are an inferior good and that Lenovo laptops are a normal good. Also, do not forget that consumers are indifferent between buying any of the two laptops, i.e. the two different brands of laptops are perfect substitutes for one another. Suppose the production

costs for Lenovo as well as Dell laptops have increased. At the same time the wealth of all consumers in these markets have increased. How will the equilibrium in both markets change?

Solution: Consider first the market for Lenovo laptops. Since the production costs for Lenovo laptops increased, the supply curve shifts leftwards. At the same time, the increase in consumer wealth leads to a rightwards shift in the demand curve for the normal good Lenovo laptop. The equilibrium price for Lenovo laptops increases, while the effect on the equilibrium quantity is ambiguous and depends on the scale of the shift.
Now consider the market for Dell laptops. Since the production costs increased, the supply curve shifts leftwards. At the same time, the increase in consumer wealth leads to a leftward shift in the demand curve for the inferior good Dell laptop. The equilibrium quantity for Dell laptops decreases, while the effect on the equilibrium price is ambiguous and depends on the scale of the shift.
The third factor to consider is that Lenovo and Dell laptops are substitutes for one another. Since the equilibrium price of the Lenovo laptops increased, the demand for Dell laptops increases. The demand curve for Dell laptops therefore shifts to the right from this effect (and to the left due to the impact of the change in wealth) and therefore there is an ambiguous final effect on both equilibrium price and quantity for the Dell laptops.

Part III: Price Ceiling and Price Floor

One of the common examples of a price ceiling policy is the setting of maximum rent in big cities such as New York and San Francisco. Now consider the market for rental apartments in Madison and assume that all the apartments are the identical. Use graphs to help visualize the following changes.
Demand and Supply equations for the market are as follows:

Demand for apartments in Madison: $Q_d = 450 - (1/2)P$

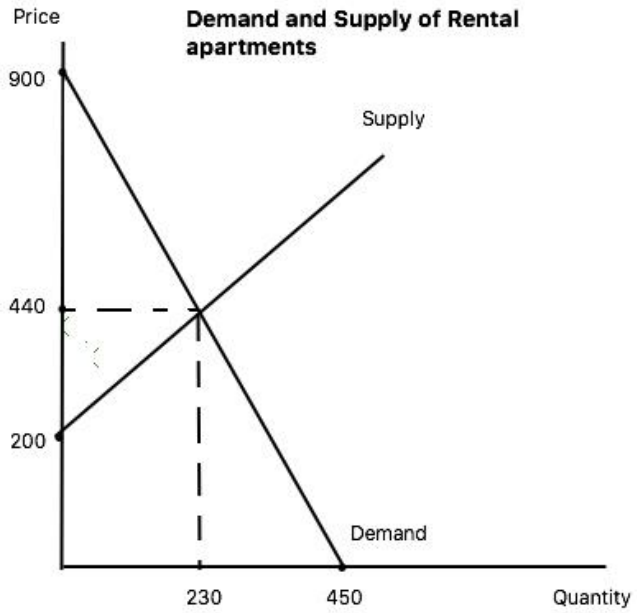
Supply of apartments in Madison: $P = Q_s + 210$

a) What is the equilibrium price and quantity in the market for apartment rentals?

Solution: Equilibrium price is $440 and equilibrium quantity is 230 apartments.

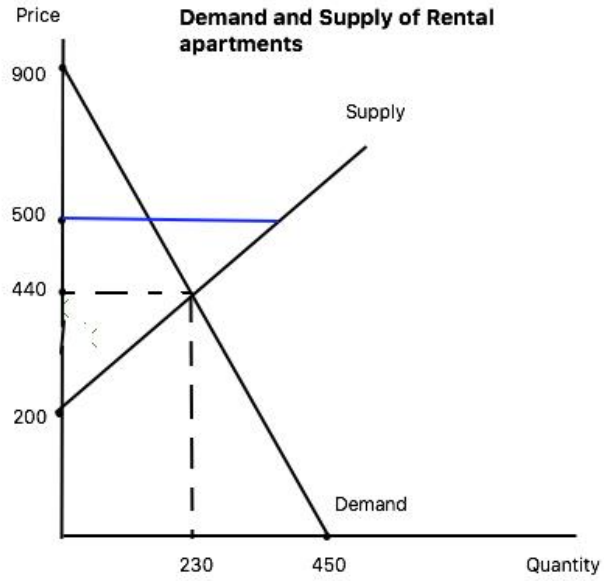
b) What is the value of consumer surplus and producer surplus in the market for apartment rentals in Madison? Draw a graph illustrating your answer and then provide a numerical calculation for these two values.

Solution:
Consumer surplus = 1/2*(900 - 440)*230 = $52,900
Producer Surplus = 1/2*(440 - 210)*230 = $26,450
Total Surplus = $79,350



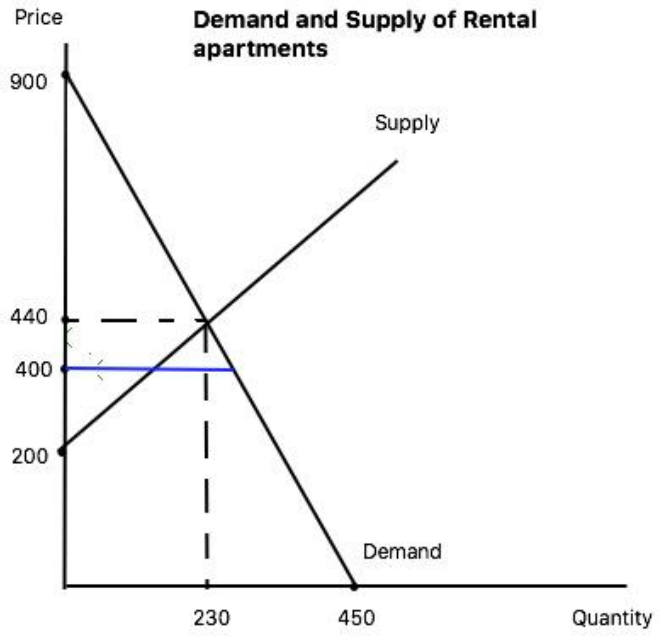
c) Suppose the government decides to enact a price ceiling in the market for apartments in Madison. The price ceiling is set at $500. Given this price ceiling what is the quantity of apartments demanded in this market and what is the quantity of apartments supplied in this market? Is there a shortage or a surplus in the market once the price ceiling is implemented? Calculate the deadweight loss, consumer, producer and total surplus given this policy relative to no government intervention in this market.

Solution:
The equilibrium price in the market is $440. If the government decides to set a price ceiling of $500, which is greater than $440, it will have no effect on the current equilibrium price and quantity. The price ceiling is the maximum price that sellers are allowed to set for their product and if it is higher than the price that clears the market, it has no effect on the market. Therefore, the rental apartments market in Madison will remain in equilibrium with the equilibrium price of $440 and an equilibrium quantity of 230 apartments. Since the market is in equilibrium, there is no shortage or surplus. The consumer surplus and producer surplus are the values given in (b) and there is no deadweight loss due to the imposition of this ineffective price ceiling.



d) Suppose the government implements a price ceiling of $400 in the market for apartments in Madison. Given this price ceiling what is the quantity of apartments demanded in this market and what is the quantity of apartments supplied in this market? Is there a shortage or a surplus in the market once the price ceiling is implemented? Calculate the consumer surplus and producer and total surplus given this policy relative to no government intervention in this market.

Solution:
The equilibrium price in the market is $440. If the government decides to set a price ceiling of $400, which is lower than $440, it will have an effect on the current equilibrium price and quantity. The price ceiling of $400 will define a new price in the market. If the price ceiling is below the equilibrium price, the quantity demanded exceeds the quantity supplied at the fixed price ceiling. At the price of $400, Q_d = 450 - (1/2)*400 = 250 apartments and Q_s = 400 -210 = 190 apartments. Since 250 > 190, there is a shortage of sixty apartments at the implemented price ceiling.
Consumer Surplus with a price ceiling of $440 = 1/2*[(520 - 400) + (900 - 400)]*190 = $58,900 (formula of an area of trapezoid)
Producer Surplus with a price ceiling of $440 = 1/2*(400 - 210)*190 = $18,050
Total Surplus with a price ceiling of $440 = 58,900 + 18,050 = $76,950
Relative to no government intervention in this market, the consumer surplus increases with this price ceiling ($58,900 versus $52,900); the producer surplus decreases with this price ceiling ($18,050 versus $26,450); and total surplus decreases with this price ceiling ($76,950 versus $79,350).



e) Fill in the table below that compares the price ceiling of $400 and initial equilibrium price and quantity in the market that was calculated in (a) and (b).

	Before price ceiling	After price ceiling	Change
Consumer Surplus			
Producer Surplus			
Deadweight Loss			
Total Surplus			

Solution:

	Before price ceiling	After price ceiling	Change with implementation of this price ceiling
Consumer Surplus	1/2*(900 - 440)*230 = $52,900	1/2*(120 + 500)*190 = $58,900	+ $6000
Producer Surplus	1/2*(440 - 210)*230 = $26,450	1/2*(400 -210)*190 = $18,050	- $8400
Deadweight Loss	$0	79350 – 76950 = $2400	+ $2400
Total Surplus	52900 + 26450 = $79,350	58900 + 18050 = $76950	- $2400

f) One famous economist claimed that implementing a price floor instead of a price ceiling increases social welfare. Suppose the government decides to conduct a field experiment to evaluate this claim. Instead of implementing a price ceiling, the government decides to set a

price floor of $500 per apartment. Given this price floor what is the quantity of apartments demanded in this market and what is the quantity of apartments supplied in this market? Is there a shortage or a surplus in the market once the price floor is implemented? Calculate the deadweight loss, consumer, producer and total surplus given this policy. Fill in the table below that compares the price floor of $500 per apartment and the initial equilibrium price and quantity in the market that was calculated in (a) and (b).

	Before price floor	After price floor	Change
Consumer Surplus			
Producer Surplus			
Deadweight Loss			
Social Welfare			

Solution:

A price floor is a minimum price that can be charged for the apartment. The price floor increases the price in the market from the equilibrium level of $440 per apartment to $500 per apartment. At the price of $500, $Q_d = 450 - (1/2)*500 = 200$ apartments and $Q_s = 500 - 210 = 290$ apartments. Since 290 > 200, there is a shortage of 90 apartments at the implemented price floor.
Consumer Surplus = 1/2*(900 - 500)*200 = $40,000
Producer Surplus = 1/2*[(500 - 410) + (500 - 210)]*200 = $38,000 (formula of an area of trapezoid)

	Before price floor	After price floor	Change
Consumer Surplus	$52,900	1/2*(900 - 500)*200 = $40,000	- $12,900
Producer Surplus	$26,450	1/2*[90 + 290]*200 = $38,000	+ $11,550
Deadweight Loss	$0	79,350 – 78,000 = $1350	+ $13,50
Total Surplus	$79,350	40,000 + 38,000 = $78,000	- $1350

Part IV: Agricultural Markets: Price Support and Price Guarantee Systems

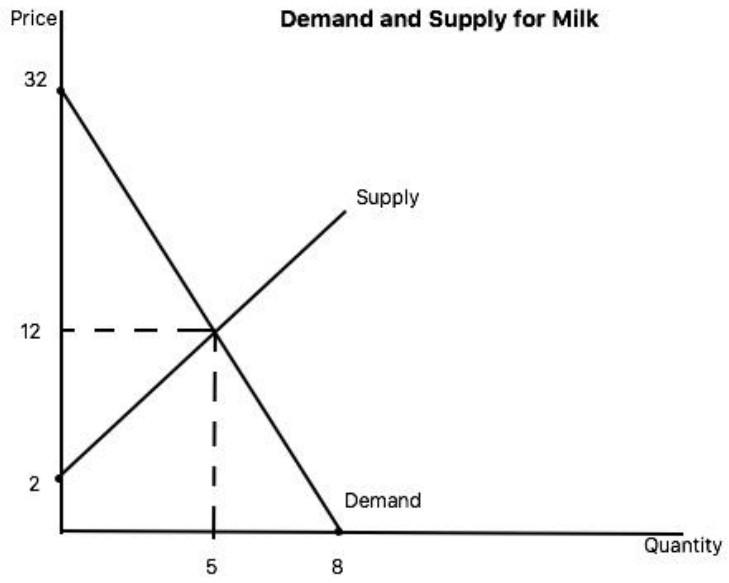
Suppose the U.S. Department of Agriculture proposes a plan to support farmers who produce milk. Under this program, the government will buy any excess quantity of milk at a price that will be determined.
Demand and Supply for milk are defined by following equations where P is the price per gallon and Q is the number of gallons:

Demand: $P = 32 – 4Q_d$

Supply: $P = 2Q_s + 2$

a) What are the price and quantity of milk in a competitive equilibrium, before any government intervention? Plot the supply and demand curves and the point of equilibrium in a graph.

Solution:



2Q + 2 = 32 – 4Q
6Q = 30
Q = 5 gallons of milk
P = $12 per gallon of milk
The equilibrium price is $12 per gallon of milk and the equilibrium quantity is 5 gallons of milk.

b) The government decides to buy any excess supply from farmers at a price of $14 per gallon of milk. Given the implementation of this program, what quantity of milk will be purchased by consumers? What quantity of milk will be purchased by the government? Given this program, how much do consumers spend on milk? What is the cost to the government of this program? What is the total revenue to the farmers from this program?

Solution:
The government is willing to buy any quantity of milk at a price of $14 per gallon of milk, therefore farmers will sell milk at this price. At the price of $14 per gallon of milk, $Q_d = 8 - 1/4*14 = 4.5$ gallons of milk and $Q_s = 1/2*14 – 1 = 6$ gallons of milk. The quantity produced would therefore be 6 gallons of milk. At this price, consumers will reduce their consumption of milk and will only buy 4.5 gallons of milk. The government would buy the excess quantity that consumers won't buy: that is, 1.5 gallons of milk. The amount consumers spend on milk with this program is now equal to ($14)*(4.5) or $63. The cost to the government is the amount of excess demand it has to purchase times the price: $(6 - 4.5) * 14 = \$21$. The total revenue for the farmers is equal to ($14)*(6) = $84.

c) To be able to compare all available policies, the government decides to cancel the previous program and instead initiates a price guarantee program. Under this program the government will ensure that consumers can purchase the total quantity of milk in the economy that farmers are willing to produce at a price of $14 per gallon by subsidizing the producers of milk so that they receive $14 per gallon of milk after receipt of the subsidy. This is the amount that you computed in part (b). The implementation of this policy turned out to be costly for the government and it had to hire a specialist and promise to pay the specialist 30% of the total subsidy the government paid the farmers.
Given this program, what quantity of milk would be purchased by consumers? What is the price per gallon of milk to consumers with this price subsidy program? What is the price per gallon of milk for farmers given this price subsidy program? Given this program, what is the consumer expenditure on milk? What is the cost to the government of this subsidy program? What is the total revenue to the farmers given this subsidy program?

Solution:
The government is now subsidizing a production of 6 gallons of milk. Plug 6 in the demand equation to get that the price consumers pay for milk is $P = 32 - 4 * 6 = \$8$ per gallon of milk. At this price, farmers would have only produced $8 = 2Q + 2$ or 3 gallons of milk, so the government has to pay them a subsidy of $6 per gallon of milk to get the farmers to produce 6 gallons of milk. The total price per gallon that farmers receive will be $14 per gallon and they will sell 6 gallons of milk: so, total revenue to farmers will be ($14 per gallon of milk)*(6 gallons of milk) or $84. Consumer expenditure on milk will be ($8 per gallon of milk)*(6 gallons of milk) or $48. Cost to the government of just the subsidy will be ($14 per gallon of milk - $8 per gallon of milk)*(6 gallons) = $36. But, the government must also pay the specialist organizing this program 30% of the cost of the subsidy: so, (.3)*($36) = $10.80. So, total cost of this program for the government would equal $36 + $10.80 = $46.80.

d) Compare the two programs. Which program would consumers prefer? Which program would producers prefer? Which program would the government prefer? Why?

Solution:
Consumers would prefer the price guarantee or subsidy program (the second program), since it enables them to buy more milk at a lower price. Producers (farmers) are indifferent between the two programs since their total revenue is $84 in each program. The government would prefer the price support or price floor program (the first program) since it only costs them $21 while the price guarantee or subsidy program (the second program) costs the government $46.80.

e) Besides the cost of the programs to the government, what other considerations could impact the government's choice between the price support and the price guarantee program? Explain your answer fully and completely.

Solution:
The government may have decided to put forward those plans in order to promote the consumption and production of milk motivated by public health considerations. Under the first plan, the consumption of milk actually decreases, while under the second plan the consumption

of milk rises. Therefore, just because the second plan costs more than the first plan, that does not mean that the government will definitely prefer the first plan. The government might still want to implement the second plan since it advances their goal of greater milk consumption. The government may also prefer the second program since it does not require the government to store excess milk.

Part V: Demand and Supply: numerical example

Consider the market for coffee in Madison. Assume quantity (Q) is measured in cups of coffee and price (P) is measured in dollars per cup. The supply and demand in the market are given by following equations:

Demand: $Q_d = 3500 - 500P$

Supply: $Q_s = 1000P – 1000$

a) Calculate equilibrium price and quantity in the market for coffee. Calculate consumer, producer and total surplus in equilibrium. What is the deadweight loss in equilibrium?

Solution:

Equating demand and supply, $3500 - 500P = 1000P - 1000$. The equilibrium price is P = \$3 per cup and the equilibrium quantity is Q = 2000 cups of coffee.

Consumer surplus = 1/2*(7 - 3)*2000 = \$4000.

Producer surplus = 1/2*(3 - 1)*2000 = \$2000.

Total surplus = CS + PS = 4000 + 2000 = \$6000.

In equilibrium, there is no deadweight loss.

b) During the final exam period, consumption of coffee among students increases dramatically. Assume that the demand increases by 1500 cups of coffee at each price level during the final exam period. Find the new equation for the demand for coffee. Note that supply is not changing.

Solution:

$Q_{d\ new} = 3500 - 500P + 1500 = 5000 - 500P$.

c) Find new equilibrium price and quantity in the coffee market. Calculate consumer, producer and total surplus.

Solution:

Repeat (a) for a new demand equation. 5000 - 500P = 1000P - 1000. The equilibrium price is $4 per cup of coffee and the equilibrium quantity is 3000 cups of coffee.

Consumer surplus = 1/2*(10 - 4)*3000 = $9000

Producer surplus = 1/2*(4 - 1)*3000 = $4500

Total surplus = CS + PS = 9000 + 4500 = $13500

d) Assume that during exam period coffee producers decided to increase the price of a cup of coffee to $6 per cup of coffee. Find the quantity demanded and supplied at this new price taking into consideration the new demand curve equation which you derived in (c). Is there a shortage or surplus in the market for coffee now? What if coffee suppliers decreased the price to $2 per cup, would there be a surplus or shortage in the coffee market?

Solution:

At the price of $6 per cup of coffee, $Q_{d\ new} = 5000 - 500*6 = 2000$ cups of coffee and $Q_s = 1000*6 – 1000 = 5000$ cups of coffee. Since the price of $6 per cup of coffee is higher than the equilibrium price the quantity supplied is greater than the quantity demanded. There is a surplus of coffee at this price.

At the price of $2 per cup of coffee, $Q_{d\ new} = 5000 - 500*2 = 4000$ cups of coffee and $Q_s = 1000*2 – 1000 = 1000$ cups of coffee. Since the price of $2 per cup of coffee is lower than the equilibrium price the quantity demanded is greater than the quantity supplied. There is a shortage of coffee at this price.

Part VI: Excise tax

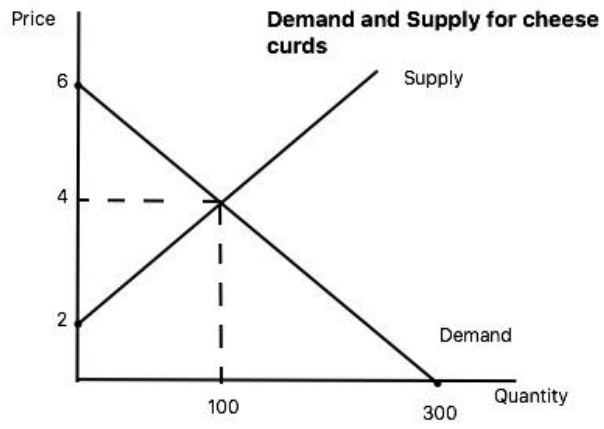
Consider the market for cheese curds in Madison. Assume the quantity (Q) is measured in pounds of cheese curds and the price (P) is measured in dollars per pound. Demand and supply in the market are given by following equations:

Demand: $Q_d = 300 - 50P$

Supply: $Q_s = 50P – 100$

a) Draw a graph of the supply and demand curves in this market. Pay special attention to the y-intercept of the supply curve. Find the equilibrium price and quantity in the market and calculate consumer, producer and total surplus.

Solution:



300 - 50P = 50P - 100

The equilibrium price is $4 per pound of cheese curds and the equilibrium quantity of cheese curds is 100 pounds. Consumer surplus is equal to (1/2)(6 – 4)(100) = $100. Producer surplus is equal to (1/2)(4 – 2)(100) = $100. Total surplus is equal to $200.

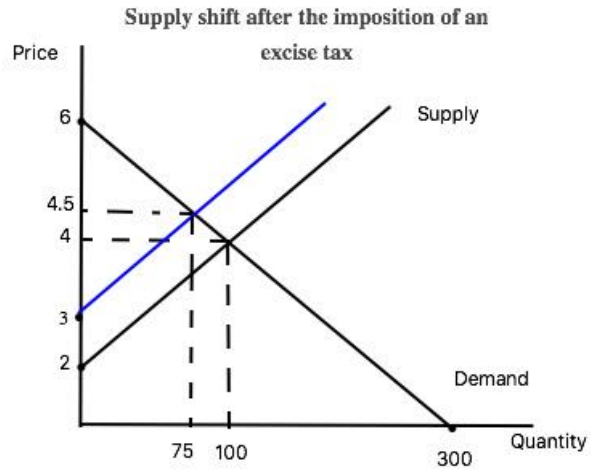
Now suppose that the government decides to impose an excise tax of $1 per pound of cheese curds in order to control or limit the consumption of cheese curds.

b) Find the new equation for the supply of cheese curds with the imposition of this excise tax. What happens to the equilibrium quantity and price of cheese curds after the imposition of an excise tax? Calculate the value of consumer surplus, producer and total surplus in this market once this excise tax is implemented. How much tax revenue is generated when this excise tax is implemented? What is the amount of deadweight loss due to the excise tax?

Solution:

Imposition of an excise tax causes the supply curve to shift vertically up by the amount of the excise tax. Therefore, the supply curve will shift by $1 at each quantity level. The original supply curve in y-intercept form is P = (1/50)Q + 2 so the new supply equation in y-intercept form will be P = (1/50)Q + 3 or in x-intercept form the new supply equation is

$Q_s = 50P – 150.$



Therefore, the new equilibrium price is $4.50 per pound of cheese curds and the new equilibrium quantity is 75 pounds of cheese curds. The price that buyers pay is $4.50 per pound of cheese curds and the net price that sellers receive is the new equilibrium price minus the amount of tax $4.50 - $1 = $3.50 per pound of cheese curds. The difference between the two prices multiplied by the quantity sold is the government tax revenue.

Consumer Surplus with the excise tax = 1/2*(6 - 4.5)*75 = $56.25

Producer Surplus with the excise tax = 1/2*(3.5 - 2)*75 = $56.25

Total Surplus with the excise tax = CS + PS = $112.50

Government tax revenue with the excise tax = $1*75 = $75

Deadweight loss due to the implementation of the excise tax = 1/2*(4.5 - 3.5)*(100 - 75) = $12.50

Part VII: Production Possibility Frontier with 3 individuals.

Suppose individuals A, B and C are on a stranded island. There are no other people on the island except for A, B and C. Each of them can only do two activities to survive: either gather coconuts or catch fish. Individual A can either gather 10 coconuts or catch 16 fish; individual B can either gather 8 coconuts or catch 10 fish and individual C can either gather 20 coconuts or catch 20 fish. Assume that all three of these individuals have linear production possibility frontiers.

a) Who has the absolute advantage in catching fish and who has the absolute advantage in gathering coconuts? Consider the maximum productivity of each individual when deciding on who has the absolute advantage.

Solution: Individual C has the absolute advantage in gathering coconuts and catching fish since s/he can gather the largest quantity of coconuts and catch the most fish out of the three individuals.

b) Who has the comparative advantage in catching fish and who has the comparative advantage in gathering coconuts? Consider the opportunity costs each individual has in each of the tasks when determining the comparative advantage.

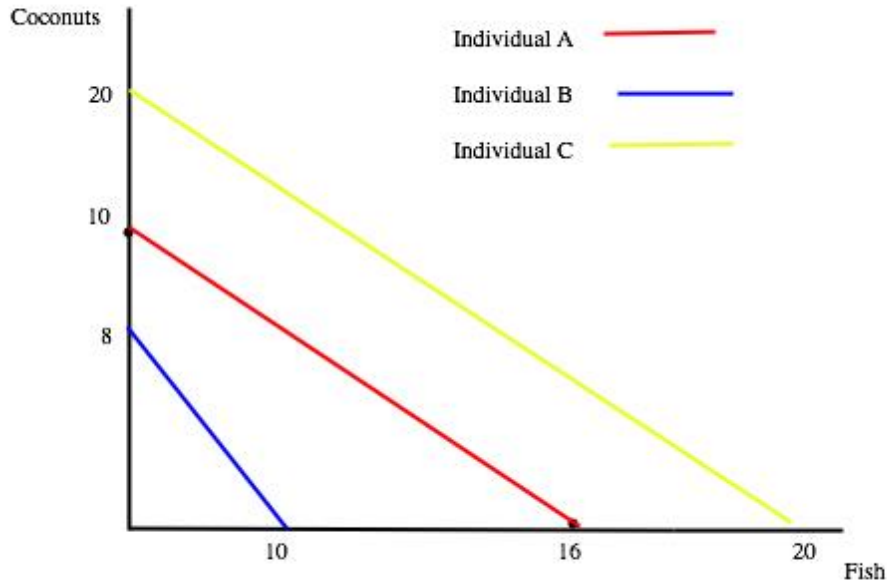
Solution:

Individual	OC of one coconut	OC of one fish
A	1.6 fish	0.625 coconut
B	2.25 fish	0.8 coconut
C	1 fish	1 coconut

As the table above describes, individual C has the comparative advantage in gathering coconuts while individual A has the comparative advantage in catching fish.

c) Plot each individual's PPF. Put the quantity of fish on x-axis and quantity of coconuts on the y-axis.

Solution:



d) Plot the joint PPF of all three individuals. Remember to take into account the kink points.

Solution: