

**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!

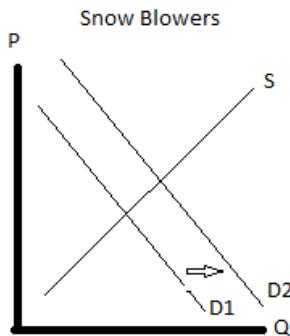
Please realize that you are essentially creating “your brand” when you submit this homework. Do you want your homework to convey that you are competent, careful and professional? Or, do you want to convey the image that you are careless, sloppy, and less than professional. For the rest of your life you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

### 1. Demand Shifts

Consider the following scenarios and indicate the effects on demand. For each scenario, draw a graph, show if there is a movement along the curve or a shift, and show the effect on the equilibrium price and quantity.

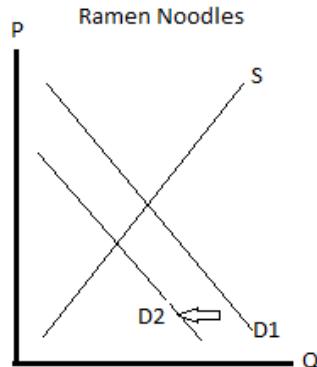
- a. Suppose the government announces in November that a tax increase of 3% on snow blowers will occur during the month of December. What will happen to the demand for snow blowers during the month of November?

Consumers will buy snow blowers in November, ahead of the 3% tax increase taking place in December. The demand for snow blowers will increase, and the demand curve will shift right. The equilibrium price and quantity of snowblowers in November will increase.



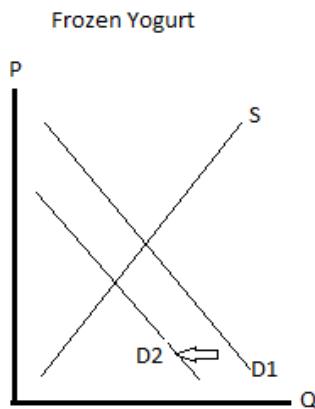
- b. Assume that Top Ramen noodles are an inferior good. Consumer income rises in 2016. What are the effects of an increase in consumer income on the demand for Top Ramen noodles in 2016?

Recall that for inferior goods, an increase in income results in a decrease in demand of the good. Because Top Ramen noodles are an inferior good, as consumer income rises, demand for the noodles will decrease and the demand curve will shift left. The equilibrium price and quantity of Top Ramen noodles will decrease.



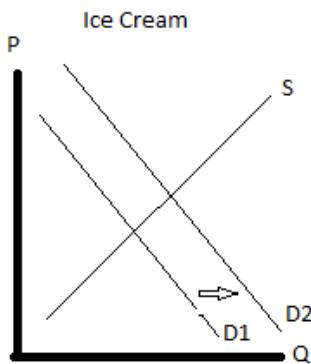
c. A recent study claims that carrageenan, a key ingredient found in frozen yogurt, is linked to an increased risk for cancer. How will this study impact the demand for frozen yogurt?

The new study will cause the demand for frozen yogurt to decrease, and the demand curve will shift left. The equilibrium price and quantity of frozen yogurt will decrease.



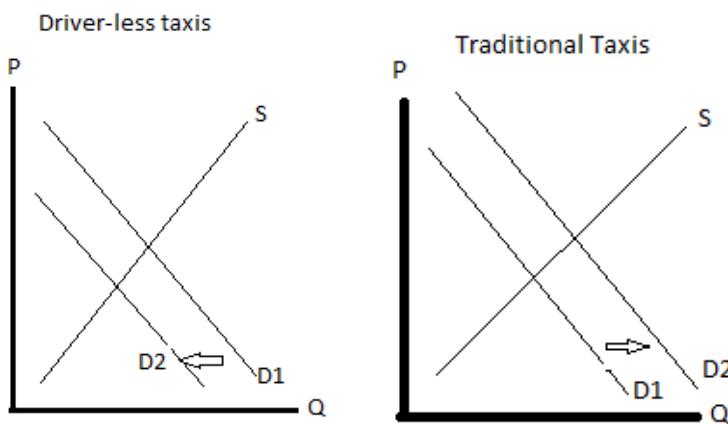
d. You believe that ice cream is a tasty substitute for frozen yogurt. Given the information in part (c), how will the demand for ice cream change?

Because ice cream is a substitute for frozen yogurt, people will buy less frozen yogurt and buy more ice cream. The demand curve for ice cream will shift right. The equilibrium price of ice cream and the equilibrium quantity of ice cream will increase.



- e. After the launch of driver-less taxis in Pittsburgh, a glitch in the technology caused several road accidents. How will this impact the demand for driverless taxis? How will this impact the demand for traditional taxis?

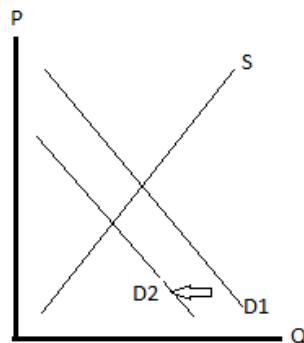
People will take fewer driver-less taxi rides at every price and therefore the demand for driver-less taxi rides will decrease: the demand for driver-less taxis will shift to the left. Assuming traditional taxis are considered a substitute for driverless taxis, demand for traditional taxis will increase and the demand curve for traditional taxis will shift right. The equilibrium price of a taxi ride provided by a driver-less taxi will fall while the equilibrium price of a traditional taxi ride will rise. The equilibrium quantity of driver-less taxi rides will decrease while the equilibrium quantity of traditional taxi rides will increase.



- f. Consider the market for college education. Suppose an influential economist announces that the value of college education is now lower than a salaried position requiring only a high-school degree. How will this new information affect the demand of college education?

The demand for college education will decrease, and the demand curve will shift left. One would expect the equilibrium price of college to fall and the equilibrium quantity of college education to also decrease.

### College Education

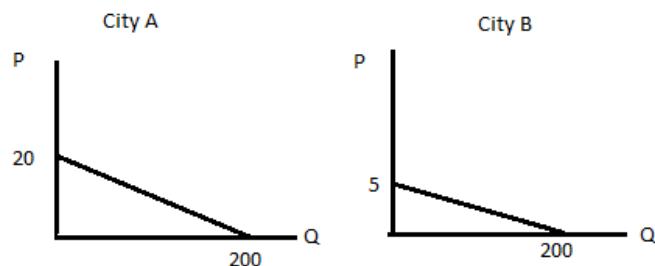


## 2. Market Demand, Consumer Surplus, Producer Surplus

Consider the demand for widgets. The population of City A collectively has demand for widgets expressed by the equation  $Q = 200 - 10P$  where  $Q$  is the quantity of widgets and  $P$  is the price. The population of City B has a demand for widgets expressed by the equation  $Q = 200 - 40P$ .

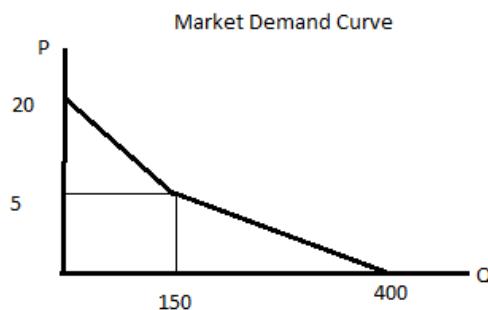
- a. Draw the demand curves of City A and City B on separate graphs. Label your intercepts, where the y-intercept represents the price at which zero quantity is demanded.

**Answer:**



- b. Draw the market demand curve of widgets for both City A and City B. Clearly label the kink point. Give the equation of the market demand curve for each linear segment. In your equation, express quantity as the dependent variable (that is, write your equation in x-intercept form).

The equation for the demand curve for  $P$  greater than or equal to 5 is  $Q = 200 - 10P$ . At  $P = 5$ , City B begins to demand widgets as well, so the demand is  $Q = 400 - 50P$  for  $P$  less than or equal to 5.



c. Suppose the supply curve for widgets is  $Q = 40P - 240$ . What is the equilibrium price and quantity of widgets? Make sure you are using the market demand curve from part (b).

To answer this question, it is best to first graph the supply function. Transforming it into y-intercept form, we have

$$Q = 40P - 240$$

$$Q + 240 = 40P$$

$$P = (1/40)Q + 6$$

We know that supply for prices less than 6 is 0. Therefore only City A buys widgets in equilibrium, so we can use the equation for the top line of the graph:

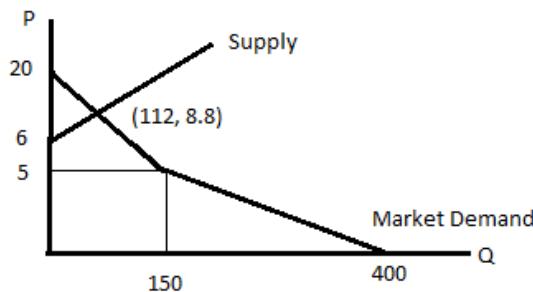
$$40P - 240 = 200 - 10P$$

$$440 = 50P$$

$$P = \$8.80 \text{ per widget}$$

$$Q = (40)(8.8) - 240 = 112 \text{ widgets}$$

The equilibrium price is \$8.80 per widget and the equilibrium quantity is 112 widgets.



d. Calculate the value of producer and consumer surplus when this market is at its equilibrium. Show your work.

$$\text{Producer surplus is } (1/2)(112 - 0)(8.80 - 6) = \$156.8$$

$$\text{Consumer surplus is } (1/2)(112 - 0)(20 - 8.80) = \$627.2$$

e. How much of the consumer surplus goes to the City B population when the widget market is in equilibrium?

Only City A buys widgets in equilibrium, so City B gains no consumer surplus.

### 3. Price Ceilings and Price Floors

The supply and demand functions for apples is as follows:

Market Demand:  $Q_D = 10 - 2P$

Market Supply:  $Q_S = 3P - 9$

- a. Suppose the United States government imposes a price ceiling at \$6. Is there a shortage or a surplus in this market?

Given this information , the imposition of this price ceiling does not result in a shortage or a surplus.

First solve for the market equilibrium price and quantity:

$$10 - 2P = 3P - 9$$

$$19 = 5P$$

$$\$3.80 \text{ per apple} = P$$

$$Q = 10 - 2(3.80) = 2.40 \text{ apples}$$

So the equilibrium price and equilibrium quantity are  $P = \$3.80 \text{ per apple}$ ,  $Q = 2.40 \text{ apples}$

The price ceiling (a maximum price that can be charged) is set above the market price so it doesn't change the market equilibrium.

- b. Now suppose the government lowers the price ceiling to \$3.50 per apple. Describe the change in the shortage or surplus.

With a price ceiling of \$3.50 per apple, producers only supply 1.50 units of apples, and consumers demand 3 units of apples. Therefore there is a shortage of 1.50 units of apples. This is an effective price ceiling since the price ceiling is set below the equilibrium price.

- c. Now suppose the government imposes a price ceiling or price floor that leaves a surplus of 4 units. Given this information is this a price floor or a price ceiling? What government implemented price would create this surplus?

It is a price floor. We must find the price at which a horizontal distance between quantity supplied and quantity demanded is 4 units and where supply is greater than demand (since we are dealing with a surplus).

$$Q_s - Q_d = 4$$

$$(3P - 9) - (10 - 2P) = 4$$

$$P = \$4.60 \text{ per unit of apples}$$

#### 4. Joint PPF and trading range of prices

Pentos and Volantis are two cities that produce both swords (S) and daggers (D). The workers in Pentos need 4 hours to make one sword and 2 hours to make one dagger. The workers in Volantis need 3 hours to make either one sword or one dagger. Workers in both cities work 12 hours a day.

a. Which city has a comparative advantage in producing swords? Which city has a comparative advantage in producing daggers?

Whoever has a lower opportunity cost in producing swords has a comparative advantage in producing swords. So in order to answer the question, we need to find the opportunity costs of producing swords for both cities.

When using all of their time, the workers of Pentos could produce either  $12/4 = 3$  swords, or  $12/2 = 6$  daggers. So the opportunity cost of producing 3 swords is 6 daggers, and the opportunity cost of producing 1 sword is  $6/3 = 2$  daggers.

The workers of Volantis could at most produce  $12/3 = 4$  swords, or  $12/3 = 4$  daggers. The opportunity cost of producing 1 sword is  $4/4 = 1$  dagger.

Since Volantis has a lower opportunity cost in producing swords, it has a comparative advantage in producing swords. This means that Pentos has a comparative advantage in producing the other good, i.e. daggers. You could use similar calculations to validate the claim.

b. The two cities now engage in bilateral trade (that is, they trade with one another). Draw the joint PPF graph. Put swords on the horizontal axis and daggers on the vertical axis. Label the coordinates of any “kink points”.

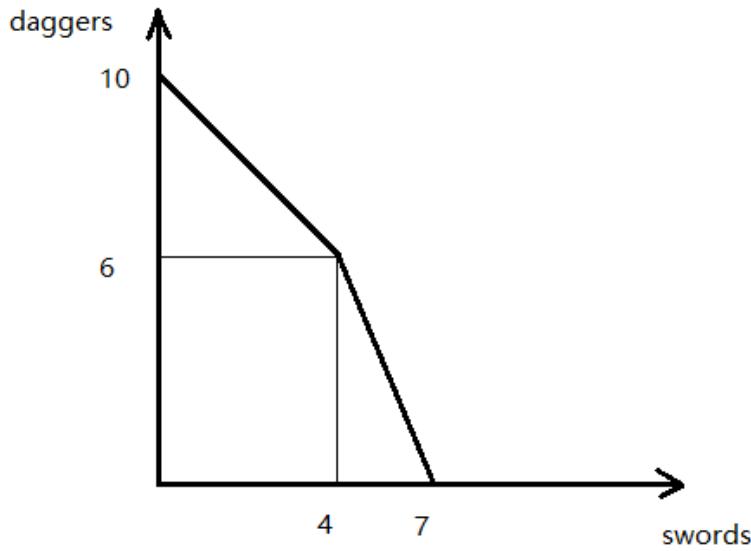
To determine the shape of the joint PPF curve, you basically need three key information points: the vertical intercept, the horizontal intercept, and the kink point(s). Now we have two cities with two different opportunity costs for swords, so the joint PPF should be made up of two line segments, and one kink point between them.

The vertical intercept represents the total amount of daggers the two cities could produce, when no swords are being produced. You simply add the vertical intercepts from the two individual PPFs, and get  $6+4 = 10$  daggers.

The horizontal intercept represents the total amount of swords that the two cities could make, when no daggers are being made. That number is  $3+4 = 7$  swords.

At the kink point, the city with a comparative advantage in making swords is only making swords, and the city with a comparative advantage in making daggers is only making daggers. So Pentos is making 6 daggers and no swords, and Volantis is making 4 swords and no daggers. Therefore the kink point is (4, 6).

Together, the joint PPF looks like this:



c. Find the slope-intercept form of each line segment that makes up the joint PPF curve.

You need to write down the equation for each of the two line segments.

The upper line segment passes through (0, 10) and (4, 6). The slope is  $(6-10) / (4-0) = -1$ , and the vertical intercept is 10. So the slope-intercept form is  $Y = -X+10$ . Or, if we use S as our symbol for swords and D as our symbol for daggers:  $D = 10 - S$  for  $6 \leq D \leq 10$ .

The lower line segment passes through (4, 6) and (7, 0). The slope is  $(0-6) / (7-4) = -2$ . Plug in (7, 0) into  $Y = -2X+b$ , we can solve for  $b = 14$ . So the slope intercept form is  $Y = -2X + 14$ . Or, using the same symbols as before:  $D = 14 - 2S$  for  $0 \leq D \leq 6$ .

Notice that the slope of the upper line segment comes from the opportunity cost of producing swords in Volantis, and the slope of the lower line segment comes from the opportunity cost of swords in Pentos.

d. What is the trading range of prices for one sword? What is the trading range of prices for one dagger? In your answer be careful to include the units of measurement.

The people of Pentos are willing to buy one sword, if its price is lower than its opportunity cost of production in Pentos, which is 2 daggers (otherwise, they are better off making it themselves).

Similarly, the people of Volantis are willing to sell one sword, if its price is higher than its opportunity cost of production in Volantis, which is 1 dagger (otherwise, the Volantenes are better off buying swords instead of making them).

Hence the trading range of prices for one swords is between 1 dagger and 2 daggers. Notice that the range is essentially between the opportunity costs of making one sword in the two cities.

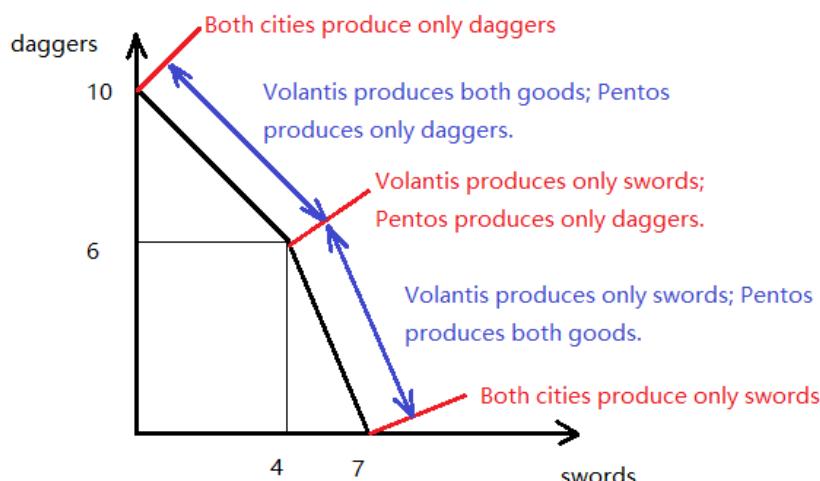


Similarly, the trading range of prices for one dagger is between the opportunity costs of making one dagger in the two cities. In other words, it is between  $1/2$  sword and 1 sword.



e. The consumers in the two cities demand a total production of 3 swords and 7 daggers. Under this scenario, which city is producing swords, and which city is producing daggers?

Refer to the following graph for the production arrangements along the joint PPF curve. Notice that the city with comparative advantage in one good will be the first to make that good. If it still does not produce enough of that good, then the other city joins in.



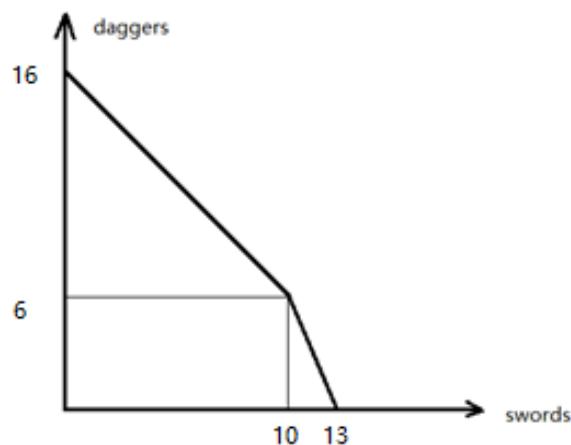
Now, notice that the point (3, 7) lies on the upper segment of the joint PPF curve. The two cities need to produce a lot of daggers, but not many swords. The city with a comparative advantage in daggers, Pentos, will focus completely on producing daggers, while Volantis will do a little of both.

f. A third city, Braavos, now enters the market. The workers of Braavos could at most produce either 6 swords or 6 daggers in a day. Draw a new joint PPF curve for all three cities. How many kink points are there?

Notice that the opportunity cost of producing one sword for Braavos is  $6/6 = 1$  dagger. This is the same as for Volantis. Therefore, the individual PPF curves for Braavos and for Volantis have the same slope (remember, absolute value of the slope = opportunity cost of the x-axis item).

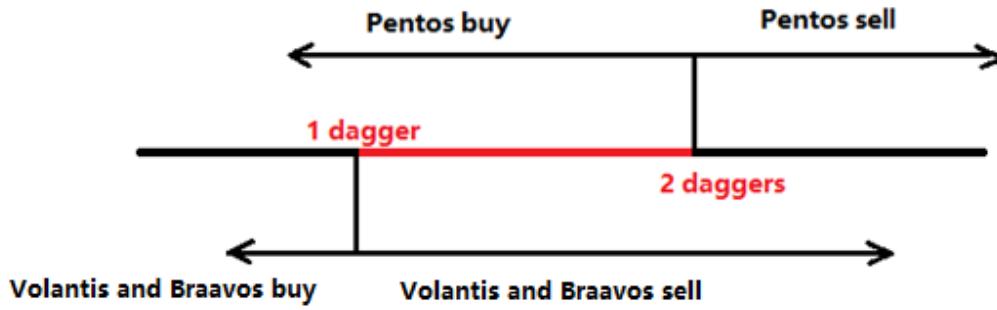
This means that for the joint PPF of the three cities, we only have two different slopes (one for Pentos, and one for Braavos and Volantis). Therefore, the joint PPF only has two line segments and one kink point. Essentially, you view Braavos and Volantis as one single nation with a comparative advantage in making swords, while Pentos remains the city with a comparative advantage in daggers. Then the single kink point happens when Pentos is making only daggers, while Braavos and Volantis are making only swords. Pentos makes 6 daggers, while Braavos and Volantis make  $4 + 6 = 10$  swords.

The joint PPF looks like this:



g. What is the trading range of prices for one sword between all three cities?

Again, it might help if you consider Volantis and Braavos as one single nation, with the exact same opportunity cost for sword. Then, the trading range of prices for one sword remains the same as before.



## 5. International trade

The supply and demand curves for sushi rolls in Japan are:

$$\text{Supply: } P = 2Q + 100$$

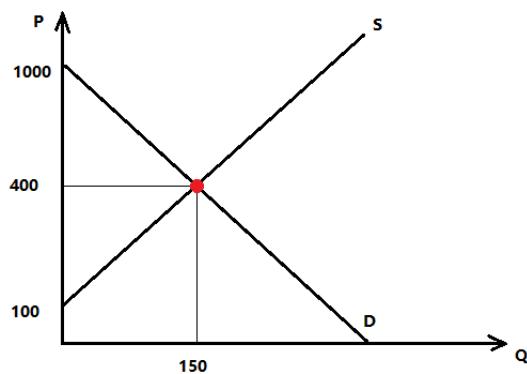
$$\text{Demand: } P = 1000 - 4Q$$

The price is measured in Japanese Yens (¥), while the quantity is measured in millions.

- a. Under autarky (this term means that the market is closed to trade and that there is no international trade), how many sushi rolls are produced in Japan? What is the price for one sushi roll?

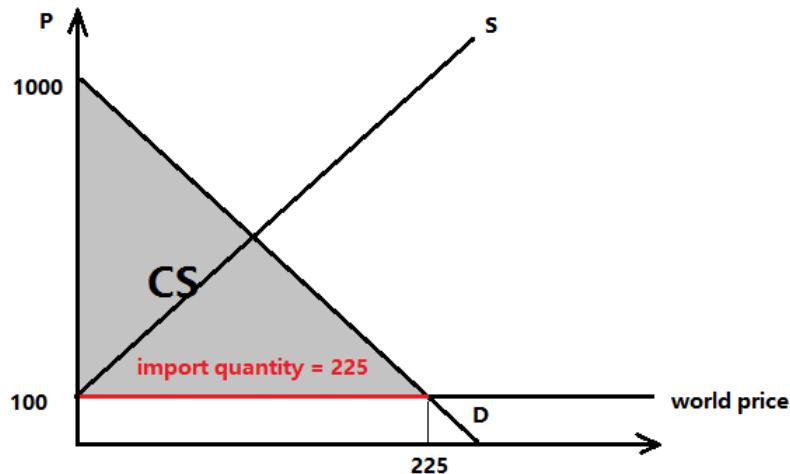
To calculate the autarky equilibrium, simply set the supply equal to the demand. You will get  $2Q + 100 = 1000 - 4Q$ , which means  $Q = 150$  million. Plug in  $Q = 150$  into either the supply or the demand equation, and you could solve for  $P = ¥400$ .

The graph looks like this:



- b. Suppose that Japan enters the international market for sushi, where one sushi roll costs ¥100. Given this information, how many sushi rolls does Japan import? Find the consumer surplus (CS) and the producer surplus (PS).

As Japan enters the international market, it becomes a price taker for sushi rolls and has to accept ¥100 as its domestic price. Plug in  $P = ¥100$  into the demand equation  $P = 1000 - 4Q$ . You get  $Q = 225$ , which is the quantity demanded by Japanese consumers. Plug in  $P = ¥100$  into the supply equation  $P = 2Q + 100$ , and you get  $Q = 0$ , which is the quantity supplied by Japanese producers. The difference between them is the quantity imported, which is 225 million.

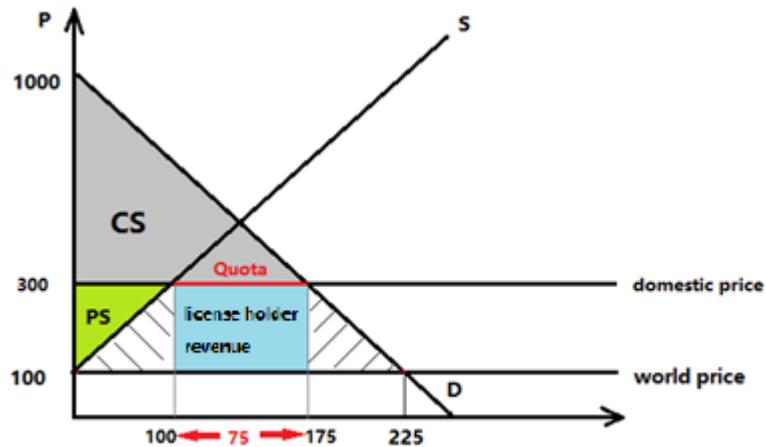


Notice that under the ¥100 price level, Japanese sushi producers simply stop producing. This industry is completely eliminated by foreign competition. So producer surplus is zero:  $PS = 0$ . The consumer surplus is the area of the grey triangle in graph:  $CS = (1000 - 100)*(225/2) = ¥101,250$  million.

- c. To protect its sushi industry, the Japanese government decides to impose a quota on imported sushi rolls. Now Japanese consumers can at most buy 75 million foreign sushi rolls, and only through a certified importer, Cheap Sushi Inc. Given this information, find the consumer surplus (CS) and producer surplus (PS) again. What is the deadweight loss (DWL) resulting from the imposition of this quota?

After the quota is imposed, Japanese consumers can only import 75 million foreign sushi rolls. This means that the domestic price for sushi rolls in Japan must rise, such that the difference between the quantity demanded and the quantity supplied is reduced to 75 million.

Suppose that the domestic price is  $P_d$ . Solving for  $Q$  in the demand equation, we have quantity demanded  $= (1000 - P_d)/4$ . Solving for  $Q$  in the supply equation, we have quantity supplied  $= (P_d - 100)/2$ . So the difference  $75 = (1000 - P_d)/4 - (P_d - 100)/2$ . And we could solve for  $P_d$ , which is ¥300. At a price of ¥300, quantity demanded is  $(1000 - 300)/4 = 175$ , and quantity supplied by domestic suppliers is  $(300 - 100)/2 = 100$ . The difference between the quantity demanded domestically and the quantity supplied domestically is the amount of the imports: in this case, the imports are 75 million.



The consumer surplus is the area of the grey triangle in the graph:  $CS = (1000 - 300)*(175/2) = \text{¥}61,250$  million. The producer surplus is the area of the green triangle in the graph:  $PS = (300 - 100)*100/2 = \text{¥}10000$  million.

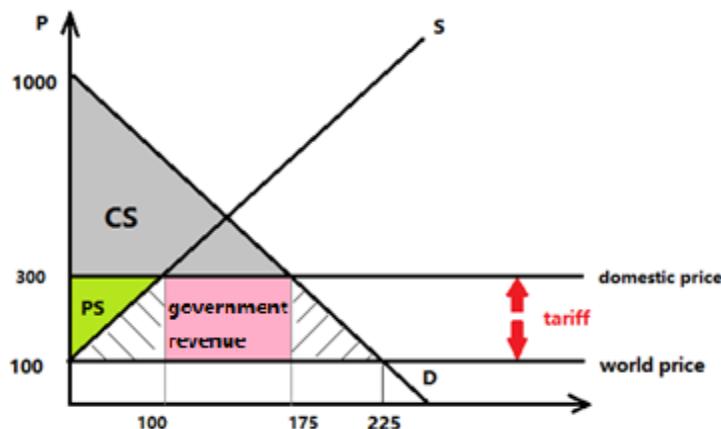
The area of the blue rectangle represents the profit of the importing company, Cheap Sushi Inc. The company buys each sushi roll on the world market for ¥100, then sells it in the domestic market for ¥300, earning ¥200 for each sushi roll imported. Together, it earns  $200*75 = \text{¥}15,000$  million.

The deadweight loss is represented by the area of the two striped triangles in the graph. Together, these areas are equal to the total deadweight loss (DWL).  $DWL = (300 - 100)*(100/2) + (300 - 100)*(50/2) = \text{¥}15,000$  million. You can check the answer by adding up all the surpluses, the license holder revenue and deadweight loss together, which should equal to the total surplus when the market is open to trade and before the quota is imposed of ¥101,250 million.

d. As the CEO of Cheap Sushi Inc., what is the maximum amount you are willing to pay for the legal right to sell imported sushi rolls?

Cheap Sushi Inc. earns a profit of ¥15,000 million simply by moving sushi rolls from the international market to Japan's domestic market (assuming no transportation costs). Therefore, the company is willing to pay up to ¥15,000 million for this privilege. If the import certificate costs exactly ¥15,000 million, then the company is indifferent between importing and not importing.

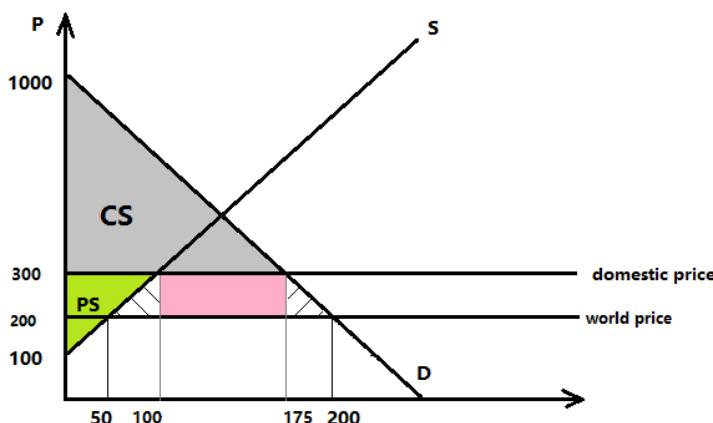
e. Due to complaints from the World Trade Organization (WTO), the Japanese government decides to drop the import quota, but subsequently imposes a tariff that leads to the same amount of imports as under the previous quota. What is the amount of the tariff? What is the resulting deadweight loss?



Again, the Japanese government wants to raise the domestic price to a level such that the difference between the quantity demanded and the quantity supplied is 75 million. We know from the previous question that the domestic price level needed is ¥300. So the government simply adds a ¥200 tariff to the world price of ¥100. The area labeled "government revenue" is the area that represents the revenue the government gets when it imposes an import tariff.

Notice that consumer and producer surpluses remain the same as they were with the import quota. The only thing that changes from the quota scenario is that the importer's profit is replaced by the government's revenue from the tariff. The deadweight loss remains ¥15,000 million, the same as before.

- f. The world price for sushi rolls rises to ¥200, but the Japanese government still wants to keep the amount of its imports at 75 million. What is the quota level that could accomplish this goal? If instead of using a quota the government decided to implement a tariff, what would the tariff price need to be to accomplish this goal? Calculate the deadweight loss that results from implementing these two alternative policies.



This question is relatively easy. The world price is now ¥200, which is still lower than the autarky (no international trade) price level ¥400, so Japanese consumers still want to buy foreign sushi rolls. To ensure an import quantity of 75 million, the government could simply set the import quota to 75 million.

Otherwise, it could charge a tariff of ¥100 per imported sushi roll, which is the difference between the world price ¥200, and the domestic price ¥300 that leads to an excess demand and thus import of 75 million sushi rolls. The price with the tariff per sushi roll would need to be ¥300 which reflects a tariff of ¥100 per imported sushi roll.

The deadweight loss is represented by the striped areas. The total area is  $(300 - 200)*(100 - 50)/2 + (300 - 200)*(200 - 175)/2 = ¥3,750$  million.

g. Now, return to the scenario where world price equals ¥100. Find all the possible tariff levels that maximize dead weight loss, then find all the possible tariff levels that minimize it.

To maximize dead weight loss, the Japanese government should forbid import altogether and return the country to autarky. To accomplish that, the tariff should be sufficiently high, such that paying (world price + tariff) is more expensive than just paying the autarky price. Any tariff higher or equal to  $400 - 100 = ¥300$  could fulfill this purpose.

To minimize dead weight loss, the Japanese government should allow free trade and set the domestic price equal to the world price. The only tariff that could accomplish that is a tariff of zero.

h. Now, return to the scenario where world price equals ¥100. Find all the possible quota levels that maximize the consumer surplus, then find all the possible quota levels that maximize the producer surplus.

Consumer surplus is maximized under free trade, when consumers are allowed to freely purchase sushi rolls at the cheap price of ¥100. Therefore, any quota that does not restrict free trade maximizes consumer surplus. Under free trade, Japanese consumers want to import 225 million sushi rolls, so any quota larger than 225 million is non-binding and thus maximizes consumer surplus.

Producer surplus is maximized under autarky, when domestic producers are shielded from foreign competition and could sell at the high price of ¥400. To achieve autarky, the government must impose a quota of zero. So only a quota of zero could maximize producer surplus. Notice that here is a conflict of interest between Japanese consumers and Japanese producers.

i. (Challenging!) Find the tariff level that maximizes government revenue. What is the maximum revenue the government can get from imposing a tariff in this market?

Government revenue = tariff \* import quantity. Suppose that the amount of the tariff is  $T$ . The domestic price is thus  $(100 + T)$ . Plug this price into the supply and demand equations, and you could solve for the quantity supplied and demanded.

$$\text{Quantity supplied} = T/2$$

$$\text{Quantity demanded} = (900 - T)/4$$

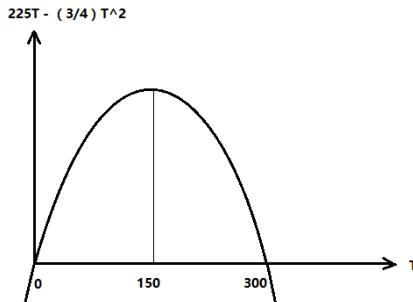
The import quantity is thus  $(900 - T)/4 - T/2 = 225 - (3/4)T$ .

Government revenue =  $T*(225 - (3/4)T) = 225T - (3/4)T^2$ . This is a quadratic function, and there are several ways to find the  $T$  that maximizes it.

- You can find the derivative with regard to  $T$  and set it to zero:

$$225 - (3/2)T = 0. \text{ You then get } T = 150.$$

- You can also draw a graph for the quadratic function.



Notice that the curve intersects the horizon axis at  $T = 0$  and  $T = 300$ . It achieves its highest value at the midpoint  $T = 150$ .

The government revenue when maximized can be calculated as:

$$\text{Government Revenue} = 225(150) - (3/4)(150)(150)$$

$$\text{Government Revenue} = 33,750 \text{ million} - 16,875 \text{ million}$$

$$\text{Government Revenue} = \$16,875 \text{ million}$$

## 6. Price support and price guarantee

During the Great Depression, cow farms in the U.S. were often forced to dump fresh milk into the rivers, because the price for milk was too low for the farms to stay profitable. Theoretically, multiple government policies could help dairy farmers in this situation by keeping milk prices high.

- a. Suppose that the supply and demand for milk are given by the following equations where  $Q$  is the quantity in units of milk and  $P$  is the price per unit of milk:

$$\text{Supply of Milk: } Q = (1/2)P - 3$$

$$\text{Demand for Milk: } Q = 27 - (1/3)P$$

What are the equilibrium price and quantity in the milk market without government intervention? Illustrate your answer with a well labeled graph.

First, we rewrite the supply and demand equations in the price-intercept form:

$$\text{Supply: } P = 2Q + 6$$

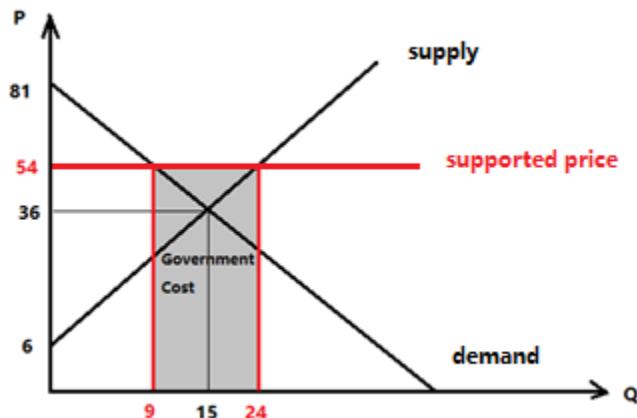
$$\text{Demand: } P = 81 - 3Q$$

Set them equal to each other, and you get  $Q = 15$  units of milk,  $P = \$36$  per unit of milk.

- b. The government tries to raise milk prices using a price support program. It sets the price at \$54 per unit of milk, and commits to buy any leftover milk. Given this program, how much milk do consumers buy? How much milk does the government buy? What is the cost of the program to the government?

Plug  $P = 54$  into the demand curve and the supply curve respectively, you can get the quantity demanded = 9 units of milk and quantity supplied = 24 units of milk. The excess supply is thus  $24 - 9 = 15$  units of milk, which is purchased by the government under the price support program.

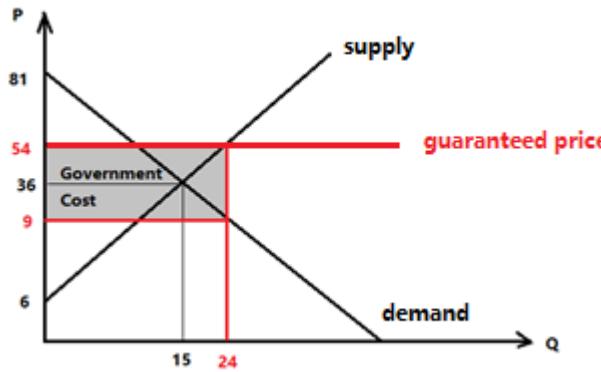
Therefore, consumers buy 9 units of milk, and the government buys 15 units of milk, at the price of \$54 per unit of milk. The cost to the government is  $15 * 54 = \$810$ .



- c. Now, suppose the government still wants to keep the price of milk at \$54 per unit of milk, but instead of implementing a price support program the government decides to enact a price guarantee program that will subsidize the milk producers. Under this scenario, how much milk will consumers buy? What is the cost of the program to the government? Illustrate your answer with a well labeled graph.

Under a price guarantee program, the producers receive a price of \$54 per unit of milk and produce 24 units of milk. The consumers will buy at a discounted price, so that they are willing to buy all 24 units of milk. The price differential is the government subsidy per gallon of milk.

For the consumers to be willing to buy 24 units of milk, the price they pay must be  $-3 * 24 + 81 = \$9$  per unit of milk. Therefore, for each unit of milk the government must pay a subsidy of  $54 - 9 = \$45$  per unit of milk. Since altogether 24 units of milk are produced and sold, the total cost to the government is  $45 * 24 = \$1,080$ .



d. Given the market and the programs described in this problem answer the following questions and provide a rationale for your answer to each question. Which program will the consumers prefer? Which program will the producers prefer? Which program will the government prefer?

Under the price support program, consumers buy 9 units of milk at the price of \$54 per unit. Under the price guarantee program, they could buy a larger quantity (24 units) at a lower price (\$9 per unit). So consumers will prefer the price guarantee program.

The producers get to sell 24 units of milk at the price of \$54 per unit under both programs, so they are indifferent between the programs.

Finally, the government incurs a higher cost under the price guarantee program, so it prefers the price support program.

e. Could you think of any reason for the government to prefer the price guarantee program?

Under the price support program, the government buys a large quantity of milk and thus has to pay a storage cost. Furthermore, milk goes bad quickly, and it might be costly for the government to get rid of sour milk. So there is a “hidden” cost associated with the price support program.