

ECON 110, Prof. Hogendorn

Problem Set 3

1. *JFK*. You take a job with a cargo company at JFK Airport in New York City. JFK's air cargo business has been suffering in recent years because new aircraft are able to fly directly from Europe to interior U.S. airports such as Memphis and Kansas City. Some of the other cargo firms serving JFK decide to petition the Port Authority of New York and New Jersey to intervene in the market. Based on your economics training, you believe that demand is quite elastic (because there are many substitute airports) and supply is inelastic (because it is hard to leave or enter the industry).
 - (a) Draw a supply and demand diagram with linear curves (be careful about the elasticities). Label the equilibrium price and quantity.
 - (b) Some firms are lobbying for a price floor p_f above the market equilibrium price. Show the resulting quantity q_f and show the effect on consumer and producer surplus and deadweight loss.
 - (c) Do you recommend that your firm lobby for this policy. Remember that you are only considering the costs and benefits for your firm, but these may differ in the short and long run. The answer is ambiguous, so state your reasoning.
2. *Dollar-sales-tax*. Demand is $q(p) = 40 - 3p$ and supply is $s(p) = 2p$.
 - (a) What is the equilibrium price and quantity? What is the consumer and producer surplus?

- (b) If a \$1 per unit sales tax is imposed on q , what is the new equilibrium price and quantity? What is the new consumer and producer surplus? What is the deadweight loss of the tax? How much revenue does the tax generate?

3. *Sugar*. Read the following beginning to an article:

Michael Schroeder, "Sugar Growers Hold Up Push For Free Trade," *The Wall Street Journal*, February 3, 2004, pg. A13.

WASHINGTON – The sugar industry – which accounts for less than 1% of all U.S. farm sales but 17% of agriculture's political contributions since 1990 – is proving to be an obstacle to Bush administration efforts to keep the free-trade ball rolling.

The industry not only is the sticking point in the administration's plans to get congressional backing for a free-trade pact with Central America, but also is gumming up talks toward a free-trade pact with Australia.

Australia, the world's fourth-largest sugar exporter, wants to sell more sugar to the U.S. in exchange for lowering the tariffs it levies on U.S.-made goods. Australia currently sells the U.S. 87,000 metric tons of sugar a year, less than 1% of the 10 million tons of sugar consumed in the U.S. Caps on sugar imports long have kept the U.S. price of refined sugar at twice the world market price.

- (a) Assume that all U.S. imports of sugar come from Australia for the purposes of this problem, and assume that sugar is subject to a *tariff*. Draw a supply and demand diagram of the U.S. market for sugar, showing the tariff and the amount of imports and sugar consumed. You don't have to draw the diagram perfectly to scale, but try to capture all of the information in the final paragraph above.
- (b) Label the effects of the tariff in terms of changes in producer and consumer surplus, deadweight losses, etc. With reference to

these effects, describe why the sugar industry works so hard to maintain the trade barrier and why the government, on behalf of the country in general, is working to end it.

4. *China Auto Parts Tariff*. The following excerpt is from John W. Miller, “China-Tariff Discord Escalates,” *The Wall Street Journal*, September 13, 2006, A2:

“BRUSSELS -- The U.S., the European Union and Canada are set to file a joint complaint with the World Trade Organization against China's import tariffs on auto parts, said people familiar with the matter.

“In March the three governments filed a preliminary complaint against Chinese protection of its auto-parts manufacturers. In negotiations with the governments, China has refused to change its protectionist policy, which charges an average 25% levy on imported auto parts. That leaves formal complaint as a last recourse at the WTO for Washington, Brussels and Ottawa.”

Total U.S. and EU exports of auto parts to China are valued at about \$5 billion per year. Let the world price of auto parts be \$1, and let China's domestic demand curve be $q(p) = 40.25 - 17p$.

- (a) Draw the effect of the tariff on a graph of the Chinese auto parts market. Show what deadweight losses China causes itself. In words, how do you interpret the deadweight losses?
- (b) Assume that current imports into China of auto parts are 5 billion units. What is the quantity supplied by Chinese producers?
- (c) Suppose that Chinese auto parts suppliers have a supply elasticity of $\varepsilon = 1.2$. What is the change in Chinese producer surplus that results from the tariff?

Review Problems only, not to turn in:

5. *Veerman*. Dutch agriculture minister Cees Veerman owns farms in Holland and France. Let's suppose that he grows turnips, and that his supply curve for turnips is

$$s(p) = 1000 + 6.44p$$

Because he is a small producer, the demand curve for Veerman's turnips is perfectly elastic; that is, he has to accept the market price. Currently that price is €250 per tonne.

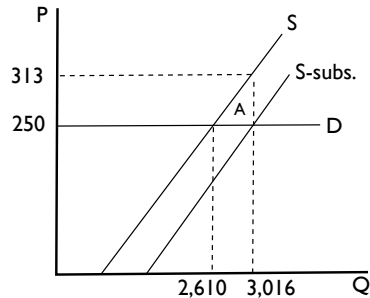
- (a) Draw and label the supply and demand curves, including the quantity produced by Veerman. (note this is *not* a problem about tariffs, imports, or exports!)
 - (b) Suppose the European Union offers Veerman a per-unit subsidy of €63 per tonne. The subsidy is paid directly to Veerman. Show the effects of the subsidy in your diagram, including Veerman's new quantity produced.
 - (c) How much money does Veerman get in subsidy from the EU? How large is the deadweight loss?
 - (d) What do you think, is the turnip subsidy progressive in the sense that lower income farmers receive a larger subsidy per euro of income? (given the information in this problem, there is no one correct answer, but you must justify your reasoning.)
6. *Tariff*. Let domestic demand be $q(p) = 60 - 2p$ and supply is $s(p) = p$. Let the world price be 10.
- (a) Under free trade, what is the quantity imported and what is domestic consumer and producer surplus?
 - (b) If the government imposes a tariff of \$5 per unit imported, how much revenue is generated, and what are the new domestic consumer and producer surpluses? How big is the deadweight loss?

7. *MexicanFarmers*. Mexico's farmers are about as productive as U.S. farmers, but “local farmers are still going out of business because their costs – from diesel to electricity to credit – are about a third higher than those north of the border.” “While the country’s farmers are being exposed to the full force of world competition, they are saddled with artificially high costs because much of the rest of the economy consists of public or private monopolies sheltering behind legal and constitutional barriers to competition.” (*The Economist*, Nov. 30, 2002, pg. 32.)
- (a) Suppose that U.S. farmers are willing to supply any amount of corn at \$2 per bushel. (This is akin to the “world price” of corn.) Suppose that Mexican farmers have supply curve $s(p) = -10 + 10p$. Let Mexican demand for corn be $q(p) = 50 - 5p$. How many bushels do Mexican farmers produce? How many do Mexican consumers buy? How large are imports from the U.S.?
- (b) Draw a graph of (a).
- (c) Actually, the North American Free Trade Agreement (NAFTA) allows Mexico to impose a tariff of about 70% on corn imports from the U.S. With the tariff, how much corn do Mexican farmers produce, and how much is imported?
- (d) Draw the tariff on your graph, and label the changes in producer and consumer surplus, the tariff revenue, and the deadweight losses.
- (e) If the goal is to help Mexican farmers, would the tariff work better if their supply were more elastic? Would the tariff then be better or worse for Mexicans as a whole? (Hint, use your graph and change the slope of the supply curve so that the same tariff causes a larger % increase in supply.)

Answers to Review Problems:

5. Veerman.

(a) Veerman takes the €250 price as given:



- (b) In the graph above, Veerman's supply curve is effectively shifted down by €63 because this represents a decrease in costs to him. As a result, his quantity increases.
- (c) The total subsidy to Veerman is €63 times the quantity 3,016, a total of €190,008. The area marked A in the diagram is dead-weight loss. In that area, the costs to Veerman, represented by line S , are greater than the value of 250 that consumers place on turnips. The area of A , one-half the base times the height, is $\frac{1}{2}(3016 - 2610) \times 63 = 12,789$.
- (d) We know the turnip subsidy is a flat in the sense that it is the same regardless of the quantity of turnips produced. So the answer to the question depends on whether small turnip producers have *proportionately* larger or smaller incomes than large turnip producers. I think there are several reasons to support the regressive story: (1) large turnip producers have large amounts of land, which is probably associated with large income from other sources; (2) there are probably fixed costs associated with turnip production (tractors and equipment, farm buildings, etc.), and

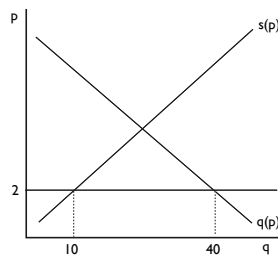
large turnip producers can spread this overhead across their output, thus lowering their average cost. But other stories could be told to justify a progressive argument.

6. *Tariff_a.*

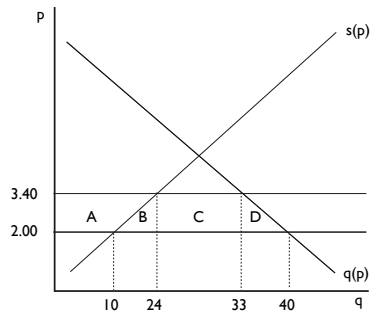
- (a) $q(10) = 60 - 2 \cdot 10 = 40$ and $s(10) = 10$, so imports are 30. The choke price is 30, so consumer surplus is $\frac{1}{2}(30 - 10)40 = 400$. Domestic producer surplus is $\frac{1}{2}10 \cdot 10 = 50$. Total surplus is 450.
- (b) The price with the tariff is 15, so $q(15) = 60 - 2 \cdot 15 = 30$ and $s(15) = 15$. Imports fall to 15 units, and government revenue is $15 \cdot 5 = 75$. The new consumer surplus is $\frac{1}{2}(30 - 15)30 = 225$ and the new domestic producer surplus is $\frac{1}{2}15 \cdot 15 = 112.5$. The total surplus is 412.5, so the deadweight loss is 37.5.

7. *MexicanFarmers_a.*

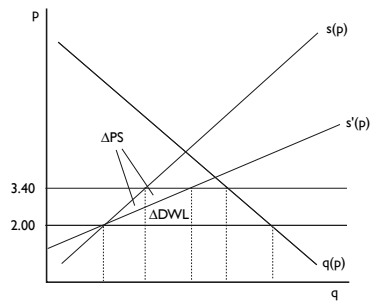
- (a) Mexican supply is $s(2) = -10 + 10 \cdot 2 = 10$. Mexican demand is $q(2) = 50 - 5 \cdot 2 = 40$. Imports are the difference between demand and supply: $40 - 10 = 30$.
- (b)



- (c) If imports cost $170\% \cdot 2 = 3.40$, then $s(3.40) = 24$ and $q(3.40) = 33$. Imports fall to $33 - 24 = 9$.
- (d) Mexican consumers lose $A + B + C + D$. Mexican producers gain A . The Mexican government earns tariff revenue C . B and D are deadweight loss.



(e) Suppose supply were more elastic:



There would indeed be an increase in PS, part of which would come from a reduction in deadweight loss and part of which would come out of government tariff revenue. The downside is that Mexicans as a whole would now suffer a larger deadweight loss which would come out of government tariff revenue.