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Econ 301—Bethany College

**Homework 02—Key**

Answer all the following on a ***typed, stapled*** (if applicable)separate sheet of paper. You do not need to type equations and graphs. I charge 25 cents to staple your homework. Make sure that you justify your answers, use your own words, and show your work. All questions are equally weighted.

1. In the Soviet Union, Moscow set minimum production quotas on all kinds of products. These quotas were often difficult to fulfill due to institutional and logistical challenges. In the nail quota, for example, producers adapted by making very small nails (to save on metal) or very poor quality nails (to save on time). Illustrate the effects of a minimum production quota on nails set above equilibrium quantity. Be sure to include deadweight loss and the price consumer pay. Finally, explain why the price consumers pay is not *actually* a lower price for the consumers (or, in other words, this minimum production quota was not a good deal for consumers).

Quantity

Price

S

D

Quota

DWL

QL

P

*The price consumers pay is not actually a good price because, as the paragraph notes, quality of nails fell. Sometimes the nails wouldn’t be the size people wanted or the nail itself wouldn’t be very good (it might be bent, weak, or have no head). As a side note, this was a constant problem in the Soviet Union as the central planning board had difficulty not only determining what products the economy needed the most but also how to get factories to make them on the rare occasions they knew what people needed.*

1. Suppose the demand curve is given as QD = 20 – 3P and the supply curve is given as QS = 5 + 2P. If there is a price floor of 5, find the size of the shortage or surplus (and if the control creates a shortage or surplus), the true price, the quantity supplied and demanded, and the size of the deadweight loss.

*We begin by determining the optimal price and quantity.*

$$5+2P=20-3P$$

$$5P=15$$

$$P=3, Q=11$$

*Now, with a price floor of 5, which is above equilibrium price and thus will have an effect on the market, we determine quantity demanded and supplied at that price. Note our total surplus is 10 (=15 – 5).*

$$Q\_{S}=5+2\left(5\right)=15$$

$$Q\_{D}=20+3\left(5\right)=5$$

*To determine the true price, use the lower quantity—here the demand—and set it equal to the equation for supply. Solve for P.*

$$5=5+2P$$

$$P=0$$

*Now we can find deadweight loss using the area of a triangle. The difference between the legal and true price is 5 (=5 – 0) and the difference between the quantity demanded and the equilibrium is 6 (=11 – 5). Thus the deadweight loss is:*

$$\frac{\left(5\right)(6)}{2}=15$$

1. Why do production possibility frontiers always “bow” outward? In your explanation be sure to include the concept of comparative advantage. In a separate section, explain the intuition behind why increasing maximum production for one good on a PPF allows greater production for the other good. Include an example (hypothetical or otherwise) in your explanation.

*Production possibility frontiers are shaped as they are because as you move from everyone producing the same good to someone producing the other good, the entity with the comparative advantage will in the new good will produce it first. In other words, it’s cheaper for that entity to produce because the opportunity cost is the lowest. Since the opportunity cost is lowest, the amount lost of the first good will be small compared to what’s gained of the second (relative to other entities). This continues as one constructs the aggregate PPF, causing a concave shape.*

*If you increase the maximum production of one good on a PPF without directly increasing the maximum production of the other good, you can still get more of the second good. The expansion of one good allows one to economize on the resources of that good, freeing up resources to make more of the other good. For example, if people could teleport to any place on the planet with very little effort, we would probably not spend the same amount of resources on travel as we do now, even if we were to travel more than we do now. This allows us to use those resources on other things. Oil for cars, for example, might be transferred to power generation or plastic making.*

1. Illustrate the effects of establishing a tariff using the trade diagram. Be sure to indicate government revenue from trade, transfers to domestic producers, transfers payments to domestic inputs, deadweight loss, the new market quantity, and the new market price. Which of these areas were taken from consumer surplus?

P

SD

D

Q

QD\*

PD\*

QD’

PD’

SD’

A

B

C

D

*A is the reduction in domestic producer surplus.*

*B is the reduction in domestic inputs.*

*C is the loss of government revenue.*

*D is the reduction in deadweight loss.*

*A, B, C, and D all go to consumer surplus.*

1. Suppose the demand curve is given as Q = 100 – 2PD and the supply curve is given as Q = 10 + 4PS. If the government imposes a tax at 3, what is the new quantity? What is the price consumers pay and the price suppliers receive? What are the deadweight loss and the total government revenue? Who pays most of the tax? Justify your answer.

*First, we know that 3 = PD – PS, or PD = 3 + PS. Setting the equations equal to each other:*

*100 – 2(3 + PS) = 10 + 4PS*

*100 = 16 + 6PS*

*84 = 6PS*

*14 = PS*

*Thus the PD is 3 + 14 = 17.*

*The new quantity is 100 – 2(17) = 100 – 34 = 66.*

*(Or 10 + 4(14) = 10 + 56 = 66.)*

*To find deadweight loss, first determine equilibrium quantity.*

*100 – 2P = 10 + 4P*

*90 = 6P*

*15 = P*

*100 – 2(15) = 70.*

*(Or 10 + 4(15) = 70.)*

*Then subtract and multiply.*

*DWL is 0.5 \* 3 \* (70 – 66) = 6*

*Government revenue is just the new quantity times the tax.*

*66 \* 3 = 198.*

*Two ways come to mind to answer who pays more of the tax. The easiest way is to note that the market price (15) is two below what consumers pay after the tax but only one above what producers pay after the tax. Clearly consumers pay a larger share.*

*The second way is to go back to the equations. Note that the slope of the demand curve is 2 and the slope of the supply curve is 4. Since the axes are reversed (Q is our X axis even though according to the equation it is our dependent variable), that means the demand curve is steeper than the supply curve. And since steeper curves imply greater inelasticity and the side of the market that is more inelastic pays more of the tax, consumers pay more of the tax.*