

Problem Set #6 (answer key)  
ECNS 204  
Due Monday, Nov. 9<sup>th</sup> by 10am  
Submit to via email to TA at [alectruax@gmail.com](mailto:alectruax@gmail.com)

\_\_\_\_\_ Name

1.) Aaron and Charlotte find themselves on a deserted island. The only two activities available are fishing and hunting rabbits. In a full day, Aaron can catch 4 fish or 2 rabbits; in the same time, Charlotte can catch 3 fish or 6 rabbits. Activities can be divided with no loss of efficiency. When left to their own devices, Aaron consumes 2 fish and Charlotte consumes 2 fish also. (Silberberg and Ellis, Ch. 6, #3)

a.) How many rabbits can each person consume acting alone?

Acting alone, Aaron can consume 1 rabbit and Charlotte can consume 2 rabbits.

b.) What are each individual's marginal costs of fishing and hunting rabbits?

For Aaron: the marginal cost of an additional fish is  $\frac{1}{2}$  of a rabbit; the marginal cost of an additional rabbit is 2 fish. For Charlotte: the marginal cost of an additional fish is 2 rabbits; the marginal cost of an additional rabbit is  $\frac{1}{2}$  of a fish.

c.) Explain how Aaron and Charlotte can improve their standard of living through specialization. If they decide to continue to consume 2 fish each, what is their gain from specialization and trade?

Aaron and Charlotte can improve their standard of living if Aaron specializes in fishing and Charlotte specializes in hunting. By doing so, after a day's work there will be a total of 4 fish and 6 rabbits caught. With reference to each individual's production/consumption schedule above, if they both consume 2 fish each, Aaron will consume 1 rabbit and Charlotte will consume 2 rabbits. There will be 3 rabbits leftover, the gains from specialization, that they can divide between themselves.

2.) Mutt and Jeff find themselves on a deserted island. The only two activities available are fishing and hunting rabbits. In a full day, Mutt can catch 8 rabbits or 16 fish; in the same time, Jeff can catch 8 rabbits or 4 fish. Activities can be divided with no loss of efficiency. When left to their own devices, Mutt consumes 6 rabbits and 4 fish, and Jeff consumes 2 rabbits and 3 fish.

Explain how Mutt and Jeff can improve their standard of living through specialization. That is, what are their gains from specialization? What role, if any, does one person's absolute advantage play in your analysis? Also, illustrate graphically the combined production possibility frontier along with the bundle of goods in the economy when they specialize and the bundle of goods without specialization.

For Mutt:

$$MC_{\text{rabbit}} = 2 \text{ fish}$$

$$MC_{\text{fish}} = \frac{1}{2} \text{ rabbit}$$

For Jeff:

$$MC_{\text{rabbit}} = \frac{1}{2} \text{ fish}$$

$$MC_{\text{fish}} = 2 \text{ rabbits}$$

Absolute advantage plays no role in the analysis. Mutt has the comparative advantage in fishing and Jeff has the comparative advantage in hunting rabbits. So, if they specialize, Mutt will only fish and catch 16 fish and Jeff will only hunt and catch 8 rabbits.

When left to their own devices, they caught 8 rabbits and 7 fish combined. So, when specializing, they are able to produce 9 more fish...this represents their gain from specialization.

Graphically, this will look similar to the graphs we produced during lecture with a kink in the production possibility frontier at the point of 16 fish and 8 rabbits. One can easily show that the prior bundle of 7 fish and 8 rabbits is in the interior of the ppf.

**3.)** Why is it that in primary schools one teacher instructs a class for an entire day in such diverse subjects as spelling, arithmetic, geography, science, etc., whereas in secondary schools and in college, these topics are taught by specialists in each field. Why do you suppose primary schools are structured contrary to the gains from division of labor? (Silberberg and Ellis, Ch. 6, #7)

This probably has to do with the attention span of the primary school children, and elementary level of the material taught. At the primary level the material covered is usually not so difficult so that there is no significant loss of efficiency by having one instructor teach all subjects. One could argue, however, that elementary school teachers are themselves specialists in teaching young children basic education. The advantages of specialization in that task probably outweighs the gains from specializing in a subject at that level. Lastly, the costs of having primary children shuffle between subjects to different instructors as in secondary school would be considerable. Younger children are more easily distracted.

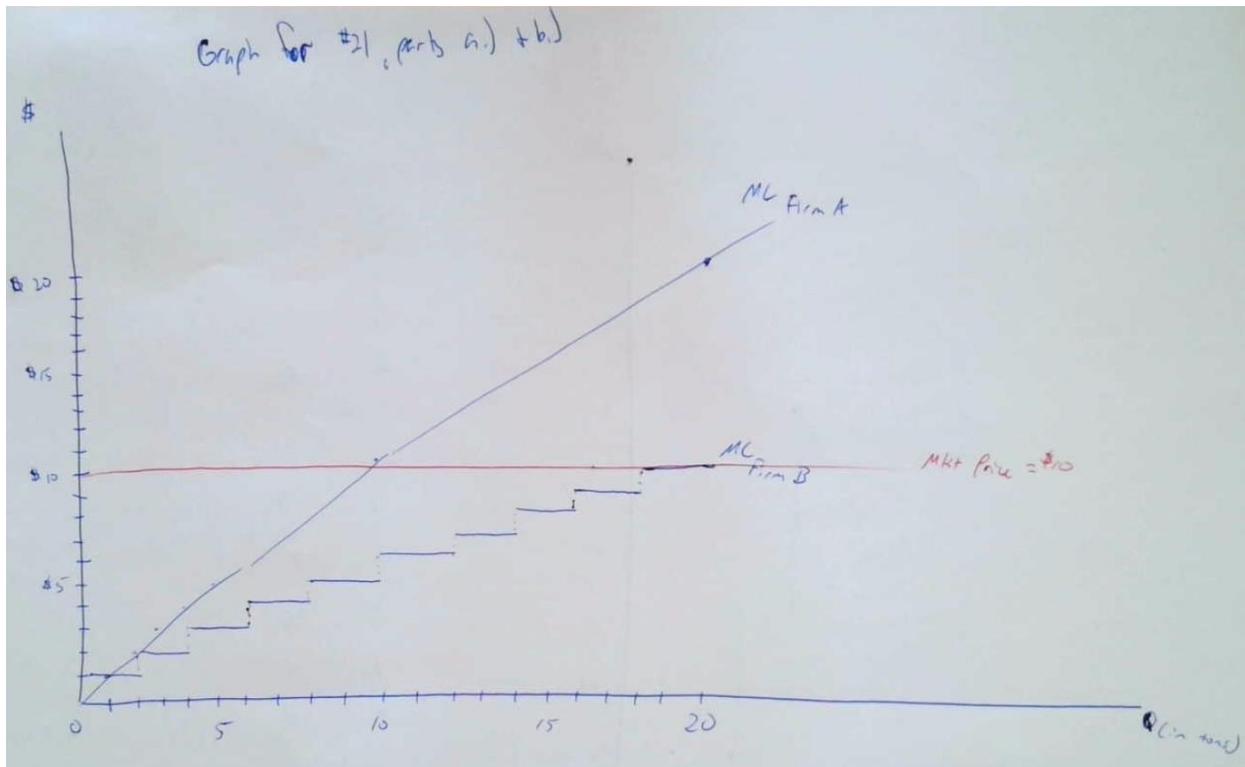
**4.)** California Sea Lions are protected by the Marine Mammal Protection Act. It is illegal to shoot or even to harass sea lions. In the Pacific Northwest, these animals have devastated salmon runs to the extent that certain subspecies of salmon are endangered. What fundamental principals of economics is illustrated by this policy? (Silberberg and Ellis, Ch. 6, #16)

This illustrates the trade-offs that must sometimes be made because of scarcity of resources. We have to decide which is more important at the margin, protecting sea lions or consuming more salmon.

**5.)** Consider two wood pulp firms with the following marginal cost schedules. Firm A produces the first ton of pulp at \$1 per ton, the 2<sup>nd</sup> ton at \$2/ton, the 3<sup>rd</sup> at \$3, etc., while firm B produces 2 tons of pulp at \$1 per ton, tons 3 and 4 at \$2 per ton and so forth. (Silberberg and Ellis, Ch. 6, #21). *Note: You need a graph for parts a. and b. of this problem (one graph can be used for both parts). No graph, no points.*

a.) If 30 tons of pulp are to be produced, what outputs at each plant would minimize the total cost of the pulp?

Firm A produces 10 tons and Firm B produces 20 tons



b.) Suppose the market price for pulp is \$10/ton. How much will each plant produce?

Answer is same as in part a.

c.) Suppose now, along with each ton of pulp produced, the firms produce a ton of pollutants, which decrease the value of the surrounding area by \$2 per ton. What is the economically efficient level of output at each plant?

The pollution costs should be added to the private costs of production, result in MC curves that are shifted up by \$2 each. Same as before...set the MCs equal to find the economically efficient level of production. Here, Firm A produces 8 and Firm B produces 16.

d.) Suppose the government simply ordered the firms to cut back pulp production to 3 tons each. Would that result in efficient use of resources? Explain.

No! MCs not equal at this point.