



15.010 / 15.011 Economics Analysis For Business Decisions

HOMEWORK SET #2

(Due Thursday, September 30th, 2004)

Name: _____

Section: _____

**Please staple this sheet to the front of your answer set.
Do NOT write your answers on this sheet.**



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DIRECTIONS: Answer all questions and show your work. Your completed homework is due in class or may be placed in the assignment box for your section before 4:30 p.m. *Late homework sets will not be corrected.* Please read the statement on 15.010/15.011 homework policy contained in the course overview.

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1. In the following problem you will take a new look at the sugar market. You have the following information about the sugar market:

US demand: $Q = 60 - \frac{2}{3}P$

US domestic supply: $Q = P$

Also, the US could import any quantity of sugar from world producers at a price of (US\$) 10 cents/lb

(all quantities expressed in billion lb. and prices in (US\$) cents/lb).

- a. In a scenario with free international trade:
 - What would be the equilibrium price and quantity in the US sugar market?
 - What would be the consumer surplus and the producer surplus?
- b. Suppose that the FDA impose a very strict regulation that, in practice, makes it impossible to import sugar into the US market:
 - What would be the equilibrium price and quantity in the US sugar market?
 - What would be the consumer surplus and the producer surplus?
 - What is the deadweight loss compared to the previous scenario?
- c. Assume that the FDA changes its mind and opens the US to sugar imports. However, the government wants to promote domestic sugar production by giving a subsidy of 15 cents/lb:
 - What would be the new equilibrium price and quantity?
 - How much of the quantity is produced domestically and how much is imported?
 - What would be the new consumer surplus and the producer surplus?
 - What is the deadweight loss compared to the scenario presented in a.?
- d. Briefly comment on the effect of trade regulations on the general welfare of the society. What constituency do you think will advocate in favor of free trade? Who would lobby against it?

Note: The questions e. and f. are **Optional Practice Problems**

- e. The government is concerned about the social costs associated with the subsidy. They are considering other mechanisms to promote domestic production with lower social costs. In particular, they are evaluating the creation of an import quota system.
- How large should the quota be in order to have the same domestic sugar production as in the case of the subsidy?
 - What would be the difference between this scenario and the scenario in c.? In your comparison, consider consumer surplus, producer surplus, amount of subsidy paid by the government and total domestic production.
- f. Assume that the government sets an import quota of 15 billion lb. Suddenly; an improvement in HFCS makes it a perfect substitute of sugar. The US production capacity of HFCS is 10 billion lbs. and the industry shows a constant marginal cost of production of 15 cents/lb.
- What would be the equilibrium price and quantity in the US sugar market (specify sugar domestic production, sugar imports and HFCS production)?
 - What would be the surplus of the different constituencies in this scenario?
 - What is the deadweight loss generated by imposing the quota?
2. You are the advisor of Unity Car, a company that provides partially assembled automobile components to Packard, a major automobile manufacturer. They have just received a rush order from Packard, offering to pay \$160 per unit for the first 500 units, and \$120 per unit thereafter.

In your initial interviews of the management and the workers of Unity Car, you have collected the following information:

- The cost structure of our plant involves fixed costs of \$30,000 per month, plus variable costs for assembly
- Unity Car's variable costs are the following:

Units	Variable Cost
100	5,000
200	15,000
300	24,000
400	33,000
500	43,000
600	54,000
700	67,000
800	83,000
900	103,000
1,000	128,000

Assume that Unity Car can only produce in multiples of 100.

The Top Management of Unity Car is divided about whether to accept the offer. These are some arguments mentioned by them:

- Unity Car should turn the order down because Packard is not paying enough
- Producing 500 units, the average costs would be lower than the pricing offered by Packard, but this wouldn't be true at 600 units. Therefore, Unity Car should agree to produce 500 units.
- There is a possibility to negotiate a price of \$160 for each unit. In that case, Unity Car would produce 1000 units, since Average Costs for that production level would be \$158.

What would be your recommendations to the company? Remember to explain how many units Unity Car should produce (assuming that you can only produce a multiple of 100 and that the rush order is Unity Car's only production) and at what profits/loss. In your answer, comment on each of the statements using your knowledge of the firm's cost schedules.

3. You have the following information about the three electricity generation plants in Cleanland.

Source	Capacity (in GW-hour)	Marginal Cost (C\$/GW-hour)
1. Coal	4.6	1,310
2. Gas	2.7	1,860
3. Oil	2.0	1,730

(C\$=Cleanland dollars)

Due to the regulation prevailing in this country, the price that the consumers pay for electricity is equal to the marginal cost during the peak hours.

The peak hours demand for electricity varies depending on the season. Cleanland has two seasons: Dry and Wet. A recent estimation of the peak demand is the following:

$$\text{Dry:} \quad Q = 14.25 - 0.005 \cdot P$$

$$\text{Wet:} \quad Q = 18.3 - 0.005 \cdot P$$

(quantities expressed in GW-h and prices in C\$/GW-h)

- a. Draw a graph showing the supply-demand equilibrium for each season. What would be the price paid by consumers in each season? What would be the surplus of each plant? What would be the consumer surplus?
 - b. Assume that the government imposes a tax on the oil used as an input for electricity generation. This tax raises the marginal cost of this plant by 20%. How will this measure affect the producers and consumers? How do you think that the different producers and the consumers will react to this tax?
4. "Daily Bugle", the oldest newspaper in Historicville, owns a building called "The Blue House". This building was declared a historic monument in 1965 and, therefore, any alteration of its external or internal form was expressly prohibited. Due to the historic link between the paper and the building, the only economic activity that was allowed inside the building was the operations of the "Daily Bugle".

Last year a new mayor was elected. The new administration reinterpreted the historic monuments regulation in the following way: "although we will protect our cultural heritage, we will allow any development that, without changing the external layout of our historic monuments, allows the current owner to adapt its property to new economic activities".

- a. Does the mayor's decision change the user cost of capital of "Daily Bugle"?
- b. Historic preservation activists worry that the Bugle may leave its traditional home. They issue a statement where they argue:

"The Bugle operates out of the Blue House rent free. It should keep its costs down by staying where it is."

Do you agree with the activists' argument?

5. **True, False, or Uncertain:** (Explain why): "A firm whose marginal cost is increasing can still be experiencing economies of scale".