Problem Set #2
Due September 23, 1997

1. Restaurants on Mackinac (pronounced "mack'-in-awe") Island have unusually high costs because the island is not accessible by car or truck. Even though there is a very famous Mackinac Bridge that runs between the two peninsulas of Michigan, it goes right past Mackinac Island, which can be reached only by boat or airplane. The complete absence of cars on the island (they are banned) is part of its appeal to the many tourists who visit there every summer.

   Let us suppose that the government of the island is considering building a tunnel from the mainland to the island that would be kept secret from the public and used only for trucking in supplies to the restaurants. This would lower the cost of providing meals by, let's say, $2 per meal. Before doing a full benefit-cost analysis of this proposal, however, the question has arisen as to who exactly will benefit from it. Will it be primarily the owners of the restaurants on the island, or will it be primarily the tourists who eat at them?

   The graphs below show three different ideas about what the restaurant market on Mackinac Island may look like, differing in terms of how costs currently depend upon output. Figure A shows constant cost suppliers, Figure B shows increasing cost suppliers, and Figure C shows costs and therefore supply turning vertical at some capacity output, $\overline{Q}$, a limit that is assumed to have been reached. Initial price and quantity are the same in all three cases.

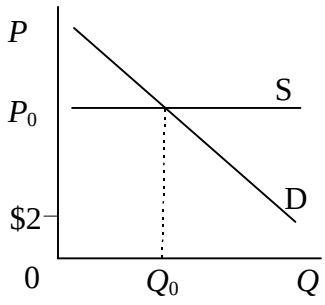


Figure A

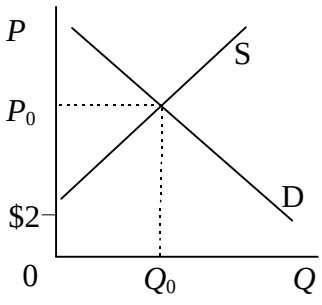


Figure B

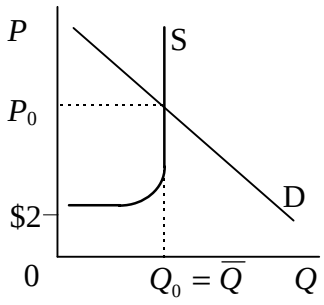


Figure C

   a) For each supply curve, show the new equilibrium price and quantity if costs per unit of production are reduced by $2 for every feasible level of output. (Amounts are not numbered in the graphs, but the size of the cost reduction is indicated by showing where $2 is on the vertical axis, measuring from the origin at 0.) How does the price change compare (larger, smaller, equal, opposite, etc.) to the change in costs?

b) Indicate using your diagrams the welfare effects on suppliers and demanders in each case.

c) Would it matter to the results of a benefit-cost evaluation of the tunnel which of these cases is correct? Why, or why not?

d) In addition to the cost of building the tunnel and the benefits and costs you identified in part (b), what other considerations do you think should be brought into a benefit-cost analysis of this project? (There is no single correct answer here. I'm looking for a paragraph or so speculating on what other sources of gain and loss might exist for project like this.)

2. In the village of Shuk Ping, province of Kwok Sun, a thriving market has long existed for Wing Kis, also known colloquially as Ki Wings because of their ability to fly back and forth at a moment's notice. Ki Wings are manufactured from the finest raw materials in a large number of local factories, and it is well-established that the supply curve for Ki Wings, accurately reflecting their marginal cost, is given by the following equation:

$$P = 120 + 4Q$$

where Q is the quantity of Ki Wings in thousands, and P is their price in Ching Ching per Ki Wing (☺/kw.). Demand for Ki Wings has been stable for many years, given by the equation

$$P = 930 - 0.5Q$$

Price, as you should verify, has been ☺840 per kw.

The mayor of Shuk Ping, Yuen-ling St. Vincent Millay, has just learned that Ki Wings can be used effectively to enhance productivity of government bureaucrats, and proposes to have the government buy 20,000 of them.

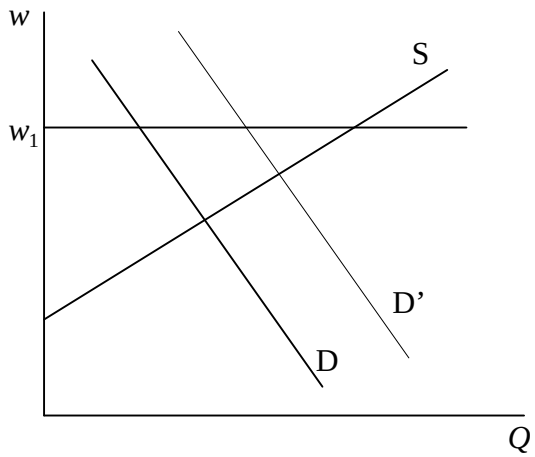
a) What percentage of current Ki Wing production would this government order be?

b) What would be the new equilibrium price of Ki Wings if this order were added to the current market? How much, therefore, will the 20,000 Ki Wings cost the government?

c) Calculate the effects of this purchase on private consumer and producer surplus in the Ki Wing market.

d) What is the net social cost of this policy?

3. The figure at the right shows, as solid lines, the initial supply and demand for labor and a legally enforced minimum wage, w_1. The demand curve then shifts to the right, to D', as a result of increased employment by government. Assuming that available jobs are allocated randomly among those who want to work at wage w_1, use the figure to identify the following:



   a) The quantity of labor employed before and after the increase in government demand for labor.

   b) The effect of the increased demand on the welfare of suppliers and demanders of labor.

   c) Is it possible that the increase in government employment is socially beneficial even if there is no social value to what they do in their new jobs? If so, identify the gain to society. If not, determine how productive they must be in their new jobs in order for this policy to be beneficial for society as a whole.

4. Calculate the present discounted value of the projects listed in the table below, which reports for each of four projects, a, b, c, and d, the relevant interest rate, r, and the benefits (positive) and costs (negative) in the present (t=0), and each of t years from the present.

Project	Interest rate	Benefits (+) and Costs (–) in present (0) and future years, t=							
		0	1	2	3	4…9	10	11	12…∞
a)	5%	–700	300	400					
b)	3%	5	–5	–5	–5	–5	–5		
c)	7%	–200	14	14	14	14	14	14	14
d)	10%							100	100