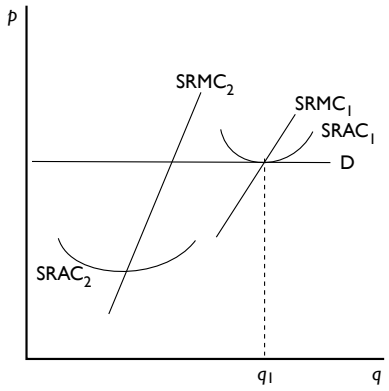
ECON 224, Professor Hogendorn

Problem Set 2

1. *OilWells.* Suppose a small county in West Texas has 28 oil wells with cost curves subscripted "1" in the graph below and 4 oil wells with cost curves subscripted "2." The price of oil is determined outside this market, and is shown by the horizontal demand curve.

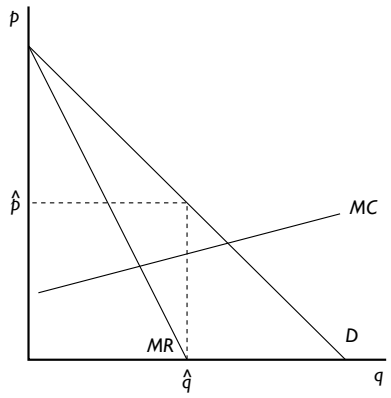


   (a) Show in the graph what quantity a type-2 well produces. How much profit does it make?

   (b) If the type-2 wells are earning Ricardian rents, what does this imply for the long-run number of each type of well and the price?

   (c) If the type-2 wells have recently adopted a new technology which is available to all oil wells worldwide, what does this imply for the long-run number of each type of oil well and the price?

2. *ProfitMax.* A monopoly firm produces quantity $\hat{q}$ at price $\hat{p}$ as shown in this diagram:



(a) Does this firm maximize profit? Explain.

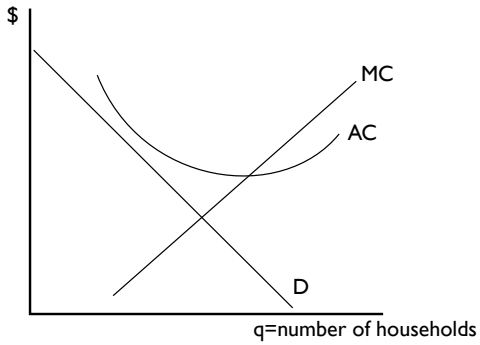
(b) Is there any deadweight loss? How much?

(c) If this firm is under threat of government regulation, does that help explain the firm's decision to produce $\hat{q}$?

(d) Harder. Without drawing any additional curves on the diagram, show how much operating profit this firm makes.

3. *RuralBroadband.* One part of the Obama administration's stimulus package funds broadband Internet service for rural and other underserved areas. This problem consider why government funding might be justified.

   Suppose that the cost and demand curves for broadband Internet in a rural area are given by the following graph:



(a) Explain concisely what could shift the AC curve up so far.

(b) Show on the diagram the smallest loss a monopoly could make serving this market.

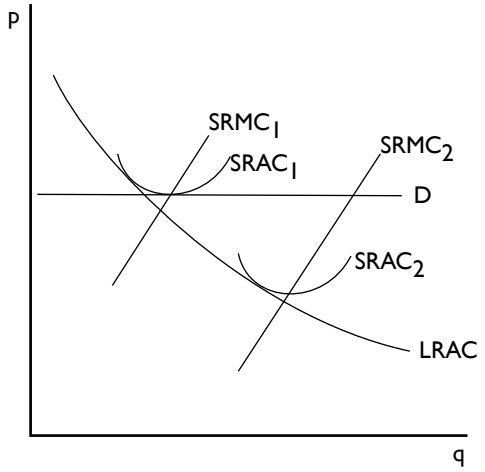
(c) Could the government increase total welfare by subsidizing the monopoly loss? Explain with reference to the graph.

(d) Is it possible for the government to raise total welfare beyond what you showed in part (c). Again, explain with reference to the graph.

(e) (You don't have to turn this part in, but I'll post the answer.) The Smith family buys the broadband service and the family members get pleasure and productivity from using World of Warcraft and Skype. Are these examples of positive externalities from the government's broadband Internet initiative? Explain why or why not.

Review Problem, not to turn in

4. *LongRun*. Currently, the industry shown in the following diagram is in a long-run, perfectly competitive equilibrium with many firms all using technology 1.

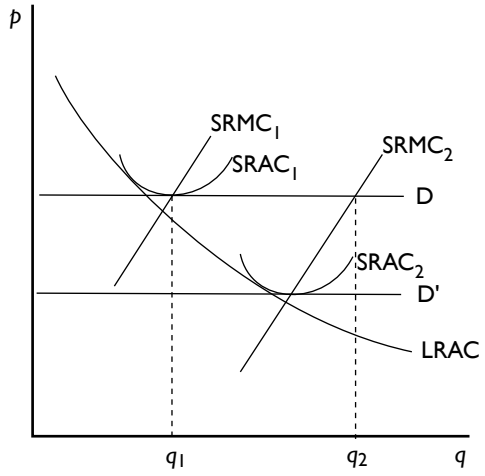


(a) What quantity does a type-1 firm produce? How much profit does it make?

(b) Suppose technology 2 becomes available. Nevertheless, there are some firms that would like to stay with technology 1 because they believe that the type of work involved in technology 1 is more creative and personally fulfilling. Can these firms stay with technology 1 in the long run?

Answer to Review Problem:

4. *LongRun_a.* Currently, the industry shown in the following diagram is in a long-run, perfectly competitive equilibrium with many firms all using technology 1.



(a) Each type 1 firm maximizes its profit by setting marginal cost equal to price, producing output q_1. Since the firms are in long-run equilibrium, price also equals average cost at that point. As a result, the firms do not make any economic profit.

(b) Initially, a small number of type 2 firms could enter the industry and produce output q_2. They would earn large profits since price is well above SRAC_2, while the type-1 firms would continue to earn zero profit.

However, the large profits available to type-2 firms would attract entry into the industry. Even if none of the type-1 firms changed technology, capital would move into the industry from other sectors of the economy. Eventually, the entry of type-2 firms would increase market supply and thus decrease equilibrium price. The new demand curve facing a single firm would shift to D' in the diagram. At this price, type-2 firms would make zero economic profit, but type-1 firms would incur a heavy loss. Eventually, all type-1 firms would have to leave the industry.

Note that all of this is based on the homogeneous-good demand curve which is given in the problem. If, somehow, the type-1 firms could differentiate their product, they could command a higher price, and perhaps then they could stay in business.