EC314-Fall 2010
Problem Set 8

Matt Turner

When you write up your answers, your goal should be to (1) be correct, and (2) convince your reader that your answer is correct. Answers which do not achieve these goals will not be awarded full credit. To accomplish the second objective, it is helpful if your work is legible and if all steps are presented, possibly with a line of explanation. **Please STAPLE pages together so that we do not lose them.** *(This problem set updated: 18 August 2010)*.

Problems

1. Consider a two period mine gold mining industry where interest rates, demand, unit extraction costs, and initial stock are (respectively) given by:

$$\begin{aligned} r &= 10\% \\ p(q_t) &= 900 - \frac{q_t}{3} \\ c &= 200 \\ S_0 &= 2000 \end{aligned}$$

   Suppose that firms in the industry have perfect foresight and maximize the discount pv of profit.

   (a) Using the method of Lagrange, solve for the level of extraction in periods 0 and 1.

   (b) Using the method of reduction to one variable, solve for the level of extraction in periods 0 an 1.

   (c) Verify that prices rise at less than the rate of interest.

   (d) Verify that the present value of marginal rent associated with the last unit of harvest in any period is constant across periods.

2. What does "perfect foresight" mean in the context of this problem. Why is this an important condition/assumption for this problem?

3. Draw four figures that correspond to figure 8.6 for this problem. Since this is a discrete problem with just two periods, instead of drawing a continuous price path, for example, just draw the two price points that you calculate.