

Second Midterm Exam

Each part of each question (a, b, c, etc.) is worth 5 points. Make sure to allot your time accordingly. Total of 30 points, -1 for messiness, -2 for extreme messiness.

1. *NaturalGas*. One of the most important energy trends of the past year has been the decline in natural gas prices in the United States. Measured per MMBtu (million British thermal units), they have declined from \$4 to \$2 from 2011 to 2012.
 - (a) Suppose there is a perfectly competitive, profit-maximizing electricity generating firm that uses natural gas to produce electricity. Suppose the price of the electricity was \$90 per MWh (megawatt-hour) in both 2011 and 2012. If the firm can freely adjust its input of natural gas, what was the marginal product of an MMBtu of natural gas in 2011 and in 2012?
 - (b) Explain the logic behind why the firm let the marginal product fall in part (a).
 - (c) Graph the firm's demand curve (the price), the average cost curve (assume there are some fixed costs), and the marginal cost curve. Draw it so the firm had price equal to average cost in 2011. Now show how the curves shift in 2012, and show whether the firm is making rents in 2012. (Think carefully how the AC curve shifts since the only change is in variable costs, not fixed costs.)
 - (d) In the long run, if nothing else changes, what will happen? Illustrate with a graph of the overall electricity market.

2. *SpanishBonds*. On April 19, 2012, the Spanish government sold about €2.5 billion of government bonds.
- (a) Suppose each bond has a coupon of €3 and a face value of €100. The first coupon payment is 1 year from now, and the second payment is in 2 years. The bond matures in 2 years. It turns out that on April 20, the bond yielded 3.46%. What was its price on April 20? Show the full formula before solving.
 - (b) If an average US consumer takes out a 3-year loan to pay for a new car, the interest rate they pay is 3.16%. It's strange that the yield on the 2-year Spanish government bonds is higher than that. How can this be?

When you are finished, please keep the exam sheet and hand in your blue book. Thanks.