Admission Exam for Shirai Seminar March 11, 2014

Microeconomics

Consider a wheat market in which a demand function for wheat is given by

$$P = a - bX,$$

where P is a price of wheat consumers face, X is a quantity of wheat demanded, and both a and b are positive parameters.

Suppose the cost function for a wheat producer is given by

$$C(q) = q^2 + f,$$

where q is the quantity of wheat produced by this producer and f is a positive parameter.

1. Suppose each producer is a price taker. State the profit maximization problem for an individual producer.
2. Derive the supply function of wheat for an individual producer from the above problem.
3. Draw a diagram of the supply function derived above.
4. Suppose the number of producers is n. Derive an industry supply curve for this wheat market.
5. Draw a diagram of the industry supply function derived above.
6. Derive equilibrium price and quantity of this wheat market when the number of producers is n.
7. If there is a free entry of producers in this wheat market described above, how many producers enter this market and what is the equilibrium price and quantity of this wheat market.
8. Suppose that there is only one producer in this wheat market and that this producer can act as price setter, i.e. this producer is a monopolist of the wheat market. State the profit maximization problem for the monopolist.
9. What is the equilibrium price and quantity of wheat produced and consumed under the above monopolist producer setting?

Macroeconomics

Read the essay "Total Factor Productivity and the Business Cycle" written by Paul Krugman and Robin Wells, (Ch. 18, page 539 of *Macroeconomics*). Then answer questions below.

1. State the definition of total factor productivity.
2. Describe the fact about total factor productivity and the business cycle.
3. How do early real business cycle theorists think about the relationship between total factor productivity and the business cycle?
4. How do current economists think about the relationship between total factor productivity and the business cycle?

TOTAL FACTOR PRODUCTIVITY AND THE BUSINESS CYCLE

Real business cycle theory argues that fluctuations in the rate of growth of total factor productivity are the principal cause of business cycles. Although many macroeconomists dispute that claim, the theory did draw attention to the fact that there is a strong correlation between the rate of total factor productivity growth and the business cycle. Figure 18-6 shows the annual rate of total factor productivity growth estimated by the Bureau of Labor Statistics. The shaded areas represent recessions. Clearly, recessions tend also to be periods in which the growth of total factor productivity slows sharply or even turns negative. And real business cycle theorists deserve a lot of credit for drawing economists attention to this fact.

There are, however, disputes about how to interpret this correlation. In the early days of real business cycle theory, proponents argued that productivity fluctuations are entirely the result of uneven technological progress. Critics pointed out, however, that in really severe recessions, like those of 1974-1975 or the early 1980s, total factor productivity actually declines. If real business cycle theorists were correct, then technology actually regressed during those periodssomething that is hard to believe.

So what accounts for declining total factor productivity during recessions? Some economists argue that it is a result, not a cause, of economic downturns. An example may be helpful. Suppose we measure productivity at the local post office by the number of pieces of mail handled, divided by the number of postal workers. Since the post office doesnt lay off workers whenever theres a slow mail day, days in which there is a fall in the amount of mail to process will seem to be days in which workers are especially unproductive. In other words, the slump in business is causing the apparent decline in productivity, not the other way around.

Its now widely accepted that some of the correlation between total factor productivity and the business cycle is the result of the effect of the business cycle on productivity, rather than the reverse. But the main direction of causation is a subject of continuing research.

FIGURE 18-6 Total Factor Productivity and the Business Cycle