Macroeconomics, Module 7: Market Clearing

Homework Assignment: Farm Equipment

(The attached PDF file has better formatting.)

The following homework assignment reviews the microeconomics of the capital and labor markets and the market clearing rental rate and real wage rate.

In 20X1, country W has no contact with the outside world. Mechanized farm equipment is unknown, and all food is planted and harvested by hand.

In 20X2, Country W learns about agricultural technology. Firms learn to make tractors and other mechanized equipment. In the textbook's terms, the technology level *A* increases.

In 20X3, Country W produces tractors and other mechanized equipment for its farms. The country has extensive land and a small population.

By 20X4, all farms are fully automated.

This scenario is shown at high speed but it reflects the progression of agricultural economies. Technology levels and capital stocks takes decades to acquire, but the relations are shown here.

A. In 20X2, does the change in technology affect the demand curve for capital?
B. Does the change in technology affect the supply curve for capital?
C. Does the market clearing rental rate for capital increase or decrease?
D. Does the market clearing quantity of capital increase or decrease?
E. In 20X3, does the demand curve for labor increase or decrease?
F. Does the supply curve for labor increase or decrease?
G. Does the market clearing real wage rate increase or decrease?
H. Does the market clearing real quantity of labor increase or decrease?

For Part A: Think of the question in the following fashion:

In 20X1, firms make hand tools, which do not require much capital and have a small marginal product of capital. In 20X2, they produce tractors, which require much capital and have a high marginal product of capital. The amount of capital desired at a given interest rate is the demand curve for capital. [The hand tools and tractors are the capital, not the cash used to produce the hand tools and the tractors.]

For Part B: Assume the country does not trade with the outside world, so the supply of tractors and the supply of investment dollars from outside the country does not change.

If the interest rate increases, people are more willing to lend money to entrepreneurs to produce tractors. Is this a change of the supply curve or a movement along the existing supply curve? The quantity supplied of capital increases; that does not mean that the supply curve increases.

For Parts C and D: Given the changes in the demand and supply for capital, what happens the rental rate and the market clearing quantity of capital?

- The supply curve is upward sloping.
- The demand curve is downward sloping.

An increase in either curve means we move the curve to the right.

For Part E: Assume the workers can easily be trained to use mechanized equipment. People once presumed that mechanized equipment displaces labor, and that the use of capital instead of unskilled labor transfers wealth from lower classes to upper classes.

The textbook shows the actual effects. If people are trained for new jobs, the marginal product of labor increases greatly with more capital. [Some European countries have mandated job benefits for permanent workers. The result is that firms hire temporary workers. But firms have no incentive to train temporary workers, so the economy suffers. Barro explains how government policies, though often well-intentioned, can ruin the economy.]

Illustration: Mobile phones have transformed agricultural work in Africa, as farmers without other means of communication learn where they can get the best prices for their crops. In Ethiopia, where the government controls telecommunications and doesn't allow foreign firms to sell mobile phones, farmers remain poor and without mobile phones.

For Part F: The supply curve is the working age people in the country. If the real wage rate increases, more people will work. Is that a movement of the supply curve or a movement along the supply curve?

For Parts G and H: Use the same analysis as for the market clearing rental rate and quantity of capital.

In subsequent years, the higher rental rate for capital implies a higher interest rate, which raises the savings rate. A higher real wage rate may also induce higher savings. In a later module, we discuss permanent vs temporary changes in the marginal product of labor.