Intermediate Macroeconomics
Fall 2009

MIDTERM EXAM 1 ANSWERS

Part I

Choose two of the following three questions in this part.

1. Explain what economists mean by the market clearing model (hint: one short sentence). Under what conditions would this be a good description of reality?

A model in which markets clear has flexible prices so that if supply does not equal demand prices change to equilibriate the two. This holds in the long run, as prices are sticky in the short run.

2. Suppose that the price of apples rises and consumers purchase more oranges and fewer apples. Which of our two measures of inflation, the CPI and the GDP deflator, would give us a more accurate number for inflation? Why? Explain.

The GDP deflator gives a more accurate number because the CPI uses fixed weights for goods and cannot account for substitution of cheaper goods for more expensive ones.

3. Assume that a bakery hires more workers and pays them wages and that the workers produce more bread. Explain what happens to the GDP if the bread produced (i) is stored away for later sale; (ii) grows stale and is thrown away.

In the first case the bread is added to inventory and as such counted in the GDP as inventory investment. In the second case the bread produced does not become a final good and as such is not included in the GDP.

Part II

Choose three of the following four questions in this part.

1. In the 1300s, the bubonic plague hit Europe. Within a few years, the population fell by almost one-third. What does this suggest about real wages? Suppose that the aggregate production function was given by

$$Y = \sqrt{TL}$$

where T stands for land. Using this production function show whether real wages would rise or fall? How about real rents on land? Explain the intuition behind your answers.

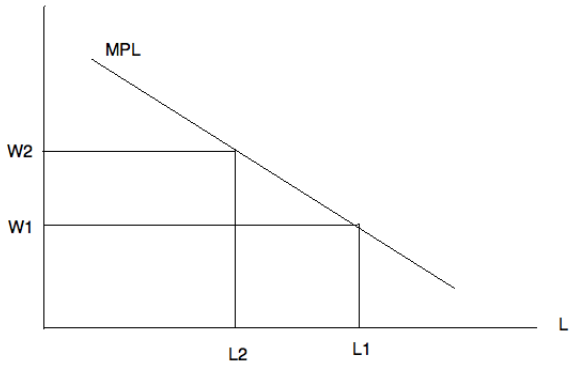

Figure 1:

This is an example of a production function which yields downward sloping marginal productivity curves. As the figure below shows, when there is less labor this implies that each worker works with more land and, thus, has higher marginal productivity. As factors are paid their marginal products, this leads to higher wages. Similarly, with less labor available each unit of land now gets worked on by less labor, lowering the marginal productivity of land and, thus, its rental.

2. Using the Cobb-Douglas production function $Y = K^{1-\alpha}L^{\alpha}$ show that the marginal product of labor is proportional to average labor productivity (Y/L). If average labor productivity rises over time, what would be the change in real wages over time?

Recall that the exponents (α,(1-α)) in the formula give the income shares of the two factors. Thus, $\alpha = wL/Y$. Now we also know that $w = MPL$. Then we have $\alpha = (MPL)L/Y$. Rearrange this to get $MPL = \alpha Y/L$ so that the marginal product of labor is proportional to average labor productivity (Y/L). If If average labor productivity rises over time, real wages will therefore rise over time.

3. Between the mid-eighteenth century and the early twentieth century, the United Kingdom was involved in a number of wars, during each of which military spending by government rose. Now, recall that goods market equilibrium requires

$$\overline{Y} = C(\overline{Y} - \overline{T}) + I(r) + \overline{G}.$$

Explain how the rate of interest must have been affected by this high level of military spending in the UK.

When government spending rises, given taxes (note that the question says nothing about taxes changing), national savings falls. With lower savings their price, the real interest rate will rise.

Also, though this is not the question asked, note that if taxes were raised to finance higher government spending this would still lower national saving so r would still rise. The twist here is that though government savings (T-G) does not change here, private savings (Y-C-T) would fall as the rise in T dominates the smaller fall in C (recall that MPC<1).

4. Assume that the consumption function is given by C = 200 + 0.7(Y - T), $Y = 50K^{0.5}L^{0.5}$, where K = 100 and L = 100, T=1000, and G=1000.

(i) If the labor force increases to L=144, what happens to national savings? Does it rise or fall? By how much?

(ii) If T=1500 (with L=144 still), what happens to national savings? Does it rise or fall? By how much?

To begin with note that initially $Y = 50(10)(10) = 5000$, $C = 200 + 0.7(5000 - 1000) = 3000$, *and* $S = Y - C - G = 1000$.

Then in (i) we have $Y = 50(10)(12) = 6000$, $C = 200+0.7(6000-1000) = 3700$, *and* $S = Y - C - G = 1300$.

And in (ii) we have $Y = 50(10)(12) = 6000$, $C = 200+0.7(6000-1500) = 3350$, *and* $S = Y - C - G = 1650$.