ECON 110, Prof. Hogendorn

Problem Set 9

1. *GrowingChina.* This problem discusses the Malthusian trap that has worried China for centuries and that the country now seems to have escaped. Let there be $L = 1000$ Chinese workers who inelastically supply labor and who spend all of their income on rice. These workers own the Chinese rice firms which have aggregate production function $Y = f(L, K) = A(hL)^{2/3}K^{1/3}$. (Aggregate meaning we treat all the firms as if there were just 1.) Let $A = 3.33$, $h = 1$, $p = 1$ and let $K = 729$. Note that the Chinese capital stock is constant until part (d) of this problem.

(a) Find the equilibrium real wage and graph the labor market.

(b) Verify that there is also equilibrium in the rice market and graph the production function. What is output per worker ($Y/L$)?

(c) Suppose that over several years, the Chinese workforce rises to 1,728 workers. If nothing else changes, what is the new general equilibrium (the new wage and the new output per worker)? Why don't these new workers produce enough to keep the output per worker at least as high as before?

(d) Consider the following changes to the production function: an increase in $A$, an increase in $K$, and an increase $h$. How would each of these help China escape the Malthusian trap? What is the name for each of these sources of growth?

2. *OldGermansMoney.* In Germany, the birth rate is low and the population is ageing. As a result, the working age population is falling at about 0.2% per year. Some observers believe this population decline puts the German economy at risk.
Suppose that Germany output is \( Y = 4374 \) beers now, and will fall to \( Y = 3713 \) beers in the future. If the European Central Bank (which acts as Germany’s central bank plus the other countries that use the Euro) does not change the money supply over the years and velocity does not change, will there be deflation or inflation in Germany? Show what happens on a graph of \( P \) as a function of \( M \) and also mathematically.