Economics 314 Spring 2013

Project #7 Assignment Due: 9am, Thursday, April 4

Partner assignments

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1. Steady-state growth and inflation in the new Keynesian IS/LM model. Suppose that the economy is growing at constant rate g in the steady state and that the money supply is increasing at constant rate μ. Assume that prices are perfectly flexible.

a. Show that if the discount factor β in the utility function is $\frac{1}{1+\rho}$, then the new Keynesian IS curve (without deleting the constant term as Romer does in moving from equation (6.7) to (6.8)) can be written as $\ln Y_t = \ln Y_{t+1} - \frac{1}{\theta}(r_t - \rho)$.

b. In the steady state, $\ln Y_{t+1} - \ln Y_t = g$. What is the steady-state equilibrium value of the real interest rate? Does the LM curve affect this rate? How does the equilibrium interest rate compare to the one we derived in the Ramsey growth model?

c. In the steady state, the inflation rate is constant at an equilibrium rate π^*. In class, we argued that the LM curve can be written as $r_t = \left(\frac{M_t}{P_t}\right)^{-\nu} (Y_t)^{\theta} - \pi^e_{t+1}$. With expected inflation equal to the steady state, this becomes $r_t + \pi^* = \left(\frac{M_t}{P_t}\right)^{-\nu} (Y_t)^{\theta}$. What is the steady-state rate of growth of the left-hand side of this equation from year to year? What is the steady-state rate of growth of the right-hand side, given that M grows at μ, P grows at π^*, and Y grows at g? What must the steady-state inflation rate be in order for the left-hand and right-hand sides to grow at the same rate in the steady state? Is the real money stock constant or changing over time in the steady state? Why?

d. Graphically, show what is happening to the IS and LM curves over time in the steady state and how the economy's equilibrium moves over time. Explain what is causing each of the curves to move (or not move).

e. Consider an alternative steady state with a higher rate of money growth μ'. How would the equilibrium rate of inflation, real interest rate, and nominal interest rate be

different? How (if at all) would the paths of real output and the real money stock be different? Does that change in the money growth rate have any real effects? Explain.

2. Work Romer's Problem 6.7. This uses Romer's IS/MP model, which we did not discuss very much in class but that is covered beginning on page 262.

3. Optimal consumption when credit markets are imperfect. This problem revisits the neoclassical, two-period consumption model when consumers face imperfect credit markets. In all of our discussions of two-period consumption models we have assumed that households can borrow or lend unlimited quantities at a market real interest rate r. Here we explore a more realistic model in which consumers pay a higher interest rate when they borrow than they receive when they lend.

a. Suppose that households can lend at interest rate r_L but that when they borrow they face a higher interest rate r_B. What will the budget constraint look like in this case? (Hint: There will be a kink.) What determines the location of the kink?
b. Show on a two-period consumption diagram (with C_2 on the vertical axis) the equilibrium situation of the Olds family, who has higher income in period one than in period two. (Assume that all utility functions are of the usual form, with moderate values of ρ and θ.)
c. Show the equilibrium situation of the Young family, who has higher income in period two than in period one.
d. How does the imperfection in the credit market affect the likelihood and amount that the Olds family will lend and that the Young family will borrow? Why?
e. Suppose that households can lend at r, but cannot borrow at all. (This is often called a situation of "liquidity constraints.") What does the budget constraint look like in this case? How are the Young family and the Olds family affected?
f. Suppose that the government initiates a transfer program to give additional income to people in period one and collects the taxes necessary to pay for it in period two. How would such a program affect the Young and Olds families? What is each family's marginal propensity to consume out of the change in period-one disposable income compared with the situation of perfect credit markets? If credit markets were imperfect during the Great Depression, how does this reconcile Keynes's emphasis on the effect of current disposable income on current consumption as opposed to the emphasis that the neoclassical model places on lifetime income?