Problem Set 8
Intermediate Macroeconomics, Fall 2012
The University of Notre Dame
Professor Sims

Instructions You may work on this problem set in groups of up to four people. Should you choose to do so, please make sure to legibly write each group member’s name on the first page of your solutions. This problem set is due in class on Thursday November 15.

(1) Money in the Utility Function: Suppose that a household lives for two periods, earning an exogenous stream of real income, \( Y_t \) and \( Y_{t+1} \). It can consume goods, save in bonds, or hold money. The money price of goods is \( P_t \), which the household takes as given. The nominal return on saving in bonds is \( i_t \), which the household also takes as given. Household preferences are:

\[
U = \ln C_t + \ln \left( \frac{M_t}{P_t} \right) + \beta \ln C_{t+1}
\]

In nominal terms the first period budget constraint is:

\[
P_tC_t + P_tS_t + M_t = P_tY_t
\]

In nominal terms the second period budget constraint is:

\[
P_{t+1}C_{t+1} = P_{t+1}Y_{t+1} + (1 + i_t)P_tS_t + M_t
\]

(a) Write each period budget constraint in real terms by dividing through by the price level, and then combine the budget constraints by eliminating \( S_t \).

(b) What is the Fisher relationship? Provide some intuition for it.

(c) Using your combined intertemporal budget constraint from (a), find the first order conditions characterizing an optimal solution to the household problem.

(d) Use these first order conditions to derive a demand curve for money.

(e) In words, explain how the demand for money varies with \( i_t \) and with \( C_t \).

(2) Money in our Equilibrium Model: Consider our standard equilibrium model of the economy augmented to include money as developed in class. Graphically work through the effects of increases (one at a time) in \( A_t \), \( A_{t+1} \), \( G_t \), and \( G_{t+1} \) on \( P_t \). Also, work through the effects of an exogenous increase in expected inflation, \( \pi_{t+1} \), on the current price level.