Professor Christiano
C-11, Winter 1997

First Midterm

IMPORTANT: read the following notes

- You may not use calculators, notes, or aids of any kind.
- Please feel free to ask the proctor questions if the wording of a question is unclear.
- A total of 100 points is possible, with the distribution by question indicated in parentheses.
- Explain your answers carefully in clear English. Supplement what you say with liberal use of diagrams.
- Write neatly and label all diagrams. We cannot give you credit if we cannot read your answer.

1. (10) Explain how an open market operation conducted by the Federal Reserve changes the quantity of money.

2. (10) Why might the demand for money be less when the rate of interest is high than when it is low?

3. (10) In the IS-LM model we emphasize the view that high interest rates discourage investment by firms (this negative relationship between desired investment and the interest rate is called the *planned investment curve*). This is motivated in part by the fact that to finance investment, firms often need to go out and borrow the funds, and that gets more expensive the higher is the rate of interest. But, in practice a lot of investment is funded from a firm's retained earnings - income from profits that is kept inside the firm. Since no borrowing occurs for these types of investment projects, will higher interest rates discourage investment in these cases? Explain.

4. (35) Suppose the components of planned spending are of the following form:

$$\begin{aligned} C &= c_0 + c_1(Y - T) \\ I &= \bar{I} \\ G &= \bar{G}, \end{aligned}$$

so that planned investment and government spending are determined outside of the model.

   (a) Define what equilibrium in the goods market is.

   (b) Suppose equilibrium is disturbed by a rise in $\bar{G}$.

      i. At the old equilibrium level of output, planned spending exceeds actual output. But, actual spending must *always* equal actual output. Explain.

      ii. Explain carefully how the economy progresses from the old to the new equilibrium. How much higher is the new equilibrium level of output?

iii. Discuss factors that could make the transition between old and new equilibria quick or slow.

(c) Suppose planned investment were instead an increasing function of aggregate output, Y (but, still not a function of the interest rate.) How would this alter the dynamic response of the economy to the rise in government spending?

5. (35) Modify the previous model so that investment is a decreasing function of the rate of interest, but not a function of income. Also, suppose that the supply of money is fixed, and that money demand has the following form:

$$M^d = PYL(i),$$

where L is a decreasing function of the rate of interest and the price level is taken to be fixed. Suppose people decide to shift up their saving function by reducing c_0.

(a) Explain carefully what happens to the rate of interest, the level of output and investment over time as you go from one equilibrium to another.

(b) Explain why the level of saving is higher in the new equilibrium than in the old one.

(c) Suppose that the fall in c_0 is due to pessimism on the part of households about the future. Suppose firms feel the same pessimism, and that they respond by shifting their planned investment curve down. How would this change your analysis in (a) above? Is it possible that the shift up in the saving function associated with the general increase in pessimism could actually lead to a *decline* in saving?