Professor Christiano
362, Winter 2003

Midterm

IMPORTANT: read the following notes

• You may not use calculators, notes, books, 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. Back up what you say with liberal use of diagrams and state clearly any assumptions you use.

• Write neatly and label all diagrams. We cannot give you credit if we cannot read your answer.
Following is our model in the short and long run. The three equations of the model are:

1. **UIP**: \( R = R^f + \frac{E^e - E}{E} \).
2. **Money Market**: \( \frac{M}{P} = L(R, Y) \).
3. **Goods Market Equilibrium**: \( Y = D \),

where \( D \) is aggregate demand:

\[
D = C(Y - T) + I + G + CA(q, Y - T).
\]

The definition of the real exchange rate, the price of foreign versus domestic goods, is:

\[
q = \frac{E P^*}{P}.
\]

In the short run, the endogenous variables are \( Y, E, R \), and their values are determined by (1)-(3). In the long run, the endogenous variables are \( P, E, R \). In the long run, \( Y \) is at its ‘full employment level’, \( Y_F \).

1. (25) The \( AA \) and \( DD \) curves.

   a) (5) By manipulating the graphical representation of (1) and (2), show how the financial market equilibrium conditions (i.e., (1) and (2)) can be summarized in a graph with \( E \) on the vertical axis and \( Y \) on the horizontal axis. In particular, show that for given \( P, R^f, E^e, M, \) and \( P \), the \((E,Y)\) points on this graph are downward sloping. This graph is called the \( AA \) curve.

   b) (5) As you move from northwest to southeast along the \( AA \) curve, what is happening to the interest rate, \( R \)? Explain carefully, using graphs.

   c) (5) What happens to the location of the \( AA \) curve when: \( P \) goes up, \( R^f \) goes up, \( E^e \) goes up, \( M \) goes up? Explain carefully, using graphs.

   d) (5) The \( DD \) curve is the \( E,Y \) combinations where the goods market is in equilibrium. Show that, with \( E \) on the vertical axis and \( Y \) on the horizontal, the \( DD \) curve is upward sloping. Use graphical methods to show this.
(e) (5) What happens to the location of the \( DD \) curve when: \( P \) goes up, \( E^e \) goes up, \( P^* \) goes up, \( I \) goes up? Explain carefully, using graphs.

2. (40) Experiments in the Model.

(a) (10) Suppose \( R^f \) rises temporarily. Explain what happens to \( Y, E, R \) in the short run. To do this, first show what happens using the \( DD \) and \( AA \) curves. Then, explain what happens in words, as a journalist might tell the story.

(b) (10) Suppose that the domestic monetary authority is committed to keeping the exchange rate at a particular value. What would they have to do to \( M \) in response to the temporary rise in \( R^f \)? Explain using graphs.

(c) (10) Suppose there is a temporary fall in \( I \). Explain what happens in the short run using the same strategy as in (a).

(d) (10) What happens to \( E, P, R, Y \) over time if the fall in \( I \) is \textit{permanent}?. Explain carefully, first using graphs and then in a journalistic way.

3. (10) Over time, the US currency has undergone a real depreciation against several other currencies. It has been argued that this happens against countries where the non-traded good sector is protected from competition. Explain carefully the nature of this argument.

4. (10) Let \( r \) denote the real rate of interest, where \( r = R - \pi \), \( R \) is the nominal rate of interest on an asset and \( \pi \) is the inflation rate anticipated over the life of the asset. Describe carefully a set of circumstances in which the real rate of interest in different countries might be different in the long run.

5. (10) Consider our model in the long run only. Suppose money growth jumps from one level to another, while the level of the money stock traces out a continuous path over time. Draw a graph, showing the path taken by \( P, E, R, M/P \). Explain your results carefully, using graphs as much as possible. Explain why the paths of \( M/P, P \) and \( E \) are not continuous.
6. (5) Why can’t the nominal rate of interest in a free money market be negative. Explain carefully.