Professor Christiano 362, Winter 2002

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 70 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.

1. (25) Here is our short run model:

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

where E^e is the expected value of the future exchange rate and 1 + Ris the dollar rate of return on a one-year government bond which is viewed as risk free in dollar terms. Also, $1 + R^f$ is the rate of return on a foreign-currency denominated one-year government bond which is risk free in foreign currency terms. We assume that P is fixed in the short run, and flexible in the long run. In addition, R^f and Y are fixed too. You may assume that if M rises by 5% in the long run, the exchange rate and the price level rise by 5% in the long run too.

- (a) (5) Explain carefully the rationale for the UIP relation. That is, describe a set of assumptions and explain how one can go from those to the UIP relation.
- (b) (3) Explain why the foreign government bond is likely to look riskier to a US investor than the domestic government bond. Explain how the US investor could use the forward market to eliminate that risk.
- (c) (3) How much further into the future does E^e apply, relative to E (hint: think about the time horizon in R and R^f)? Explain
- (d) (5) Display in a graph the impact on R, E, P, over time, of a 5% jump in M that is temporary.
- (e) (5) Display in a graph the impact on R, E, P, over time, of a 5% jump in M that is permanent.
- (f) (4) In each of (d) and (e), the exchange rate, E, approaches its long-run value from above. Explain why this is so.
- 2. (10) Suppose C+I+G = 150, where C is total consumption by domestic households, I is total investment by domestic business and G is total consumption by government. Suppose that gross output, Y, is only 100 in this particular country. Explain why all investment, I, must

be paid for with other people's savings, by doing things like issuing equity or borrowing from a bank, or borrowing from existing equity holders. Show that investment in the example economy exceeds total domestic saving. How can we be sure that there are enough foreign funds available to pay the part of investment not financed by domestic saving?

- 3. (10) Suppose it is now period 0 and there is a financial asset which will pay D_1 and D_2 dollars in each of periods 1 and 2. Suppose that the value of D_t , t = 1, 2, is known with complete certainty in period 0, when the asset is purchased. Let P_1 denote the dollar price of the asset in period 1, after D_1 , has been paid.
 - (a) (5) Suppose $D_t > 0$ for t = 1, 2, and that P_0 is known at the time the asset is purchased. Display a formula showing the rate of return on the asset from period 0 to the end of period 1. Is this rate of return risky? What if $D_2 = 0$? Explain carefully.
 - (b) (5) What is the rate of return on this asset when measured in consumption good terms, when $D_2 = 0$? Suppose that the price of consumption goods is P_t^c , t = 0, 1, and that P_0 , P_0^c are known at the time the asset is purchased. Is the real rate of return risky?
- 4. (5) It has been said that the income elasticity of money demand is important for determining the level of money growth that is required to achieve a particular inflation target in the long run. Explain.
- 5. (5) When the interest rate is zero, it is argued that a change in the money supply has no impact on the exchange rate. Explain.
- 6. (5) Recently the Japanese yen has been depreciating against the US dollar. At the same time, short-term US interest rates are higher than the corresponding Japanese interest rates. Explain why this might be construed as a puzzle from the point of view of the UIP theory?
- 7. (10) Augment the system of two equations stated above by PPP: q = 1, where $q = EP^f/P$, and P^f is the foreign price level taken here to be fixed. This is a question about the long run, when Y is fixed, but P, E, R are to be determined. Suppose there is a *reduction* in

the growth rate of money by 1 percentage point. At the point in time where money growth is reduced, the stock of money does not change. Over time, the stock of money ends up lower than it would have been in the absence of the cut in money growth. Show what happens to the paths of M, M/P, E, $(E^e - E)/E$, R, π , P, where $\pi = (P^e - P)/P$, using graphs. Explain carefully the reasons for your results.