Practice Questions 3 - Econ 136 - Fall 2002

Review Questions

1. Textbook Keynesian theory implies a downward sloping LM; hence—unlike CQT—it predicts a recession will occur after a real shock (i.e., after a leftward shift in the IS). But textbook Keynesian theory cannot explain big recessions if the opportunity cost of holding money is not very interest sensitive. Explain why, and illustrate your answer using IS-LM. Conclude that textbook Keynesian theory implies almost a monetary theory of business cycles.

2. The opportunity cost of holding money depends on the level of $r_{ST}$ rather than $r_{LT}$. Explain why, and illustrate your answer using 2 barrels ($D$ and $T$). Conclude that the textbook Keynesian theory of recessions depends mainly on the level of $r_{ST}$.

3. As you know, Mr. Keynes’s own theory of recessions focuses mainly on the level of $r_{LT}$ rather than $r_{ST}$. What’s the difference between $r_{LT}$ and $r_{ET}$? Mr. Keynes believed lenders have inelastic interest rate expectations. What is meant by this? Use this concept to tell Mr. Keynes’s story of what caused the Great Depression after the prosperity of the 1920’s. Start your story with the fall in investment opportunities by 1929. In what sense were lenders the “villain” in Mr. Keynes’s story. Illustrate your telling of the story by showing what happened to the investment function in 1929, and what $r_{LT}$ would have had to do to avoid recession.

4. Illustrate Mr. Keynes’s story of recessions in a IS-LM diagram (you can use the caricature version in which all lenders have the same $r_{LT}$). Also illustrate the story with a “bird flying” picture, being sure to explain why the money wing accommodates the downward pressure that initially hits the real wing.

5. In Mr. Keynes’s story, what happens to the money that lenders were lending to investors when investment opportunities were strong, but are no longer lending to investors once investment opportunities have declined? In what sense is this un-lent money “speculative balances”? What are lenders speculating on?

6. What do we mean by “uncertainty”? In what sense is a situation involving uncertainty different from one that just involves risk? Why do people want to keep their options open (stay flexible) when their uncertainty is high? In particular, why is high investor uncertainty (i.e., uncertainty by firms about what are the good investment projects) associated with a low investment function? Illustrate your answer using the OPEC example. Why does high investor uncertainty lead lenders to rationally have inelastic interest rate expectations?

The last set of questions aims at understanding and calculating $r_{min}$. Below, unless otherwise specified, “bonds” always mean perpetuities (that is, “forever loans” as opposed to 15 year loans or 30 year loans).

7. Explain why buying a newly-issued long term bond for $P_b$ dollars is equivalent to lending $P_b$ dollars long term to the corporation or government agency that issued the bond (e.g., lending money for 30 years if you buy a 30 year bond).

8. What is meant by the inverse relation between the price of long term bonds and the long term interest rate (that is, the “teeter-totter” relation)? Explain why such an inverse relation is implied by the pricing formula for perpetuities, $P_b = C/r_{LT}$. Explain why this formula makes sense (e.g., buying the bond for $P_b$ is equivalent locking up $P_b$ dollars in a bank: if the bank promises to pay you a fixed interest rate of $r_{LT}$ per year, you will end up with interest payments of … each year from the bank, for the duration of time you have locked into).

9. What is the formula for the expected rate of capital gains from long-term lending this year, that is, $g_b$? “Expected” means “best guess”; what is the lender guessing about? Explain why if you expect the long rate next year $r_{LT}$ to be higher (lower) than the current long rate $r_{LT}$, you will expect to suffer capital losses (gains) from lending long term this year. Hence, explain why long-term lending involves interest-rate risk.
10. The (total) expected rate of return from long term lending this year, \( R_{LT}^e \), is given by the formula \( R_{LT}^e = r_{LT} + g_b^e \), that is, the interest earned per dollar lent + the expected rate of capital gains. Illustrate \( R_{LT}^e \) in a barrel diagram. Why is the “leakage” rate equal to \(-g_b^e\) rather than \(g_b^e\)?

11. Assume lenders are risk neutral. What is meant by a lender’s \( r_{\text{min}} \)? Why is his \( r_{\text{min}} \) the value of \( r_{LT} \) that satisfies the equation \( r_{ST} = r_{LT} + g_b^e \)? Illustrating your answer using 2 barrel diagrams, one for short-term lending (T) and one for long-term lending (b). What will the lender do if \( r_{LT} \) is less than his \( r_{\text{min}} \)? If \( r_{LT} \) is great than his \( r_{\text{min}} \)?

12. Mr. Keynes’s story of recessions requires \( r_{ST} = 0 \). Why?

Exercises

1. **Basics of long-term lending** Assume bonds are perpetuities. Suppose the coupon on a bond is \( C = $100 \) per year, and the current long-term interest rate is \( r_{LT} = 4\% \).

   **a.** What price will the bond sell for today?

   **b.** If you expect the long-term interest rate to fall to 2\% next year, what would be your expected rate of capital gains from buying a bond this year? (Give a numerical answer.) What would be your expected rate of return from buying a bond this year? (Again please give a numerical answer.) Explain why your expected rate of return from buying a bond this year would exceed 4\%. Illustrate your answer using a barrel diagram.

   **c.** Now suppose instead that you expect the long-term interest rate to increase to 5\% next year. What would be your expected rate of capital gains if you buy a bond this year? What would be your expected rate of return from buying a bond this year? Explain why your expected rate of return from buying a bond would be less than 4\% in this case. Illustrate your answer using a barrel diagram. Explain why if \( r_{LT} = 4\% \) and you expect the long rate to increase to 5\% next year, you would prefer to stay liquid (not lend long-term) this year, even if \( r_{ST} = 0 \). You might want to use 2 barrel diagrams in your explanation, one for \( D \) or \( T \) and another for \( b \).

   **d.** Using the above example numbers, briefly explain why long term lending involves “interest rate risk.”

   **e.** **Detective work** If everyone in the economy is risk neutral and has the same belief about next year’s long-term interest rate \( r_{LT}^e \), what must \( r_{LT}^e \) equal if currently \( r_{ST} = 0 \) and \( r_{LT} = 4\% \)?

2. **A CQT World**

   **a.** Consider an economy in which:

   \[
   \text{CQT money demand: } \frac{M^d}{P} = \frac{1}{5}Y. \tag{1}
   \]

   Using (1) and the money-market equilibrium condition, find the equation of the economy’s LM curve.

   **b.** Suppose in this simple economy there is only consumption and investment demand (so \( G = T = NX = 0 \)). In particular:

   Consumption function: \( C = 700 + .1Y \) \tag{2}

   Investment function: \( I(r) = 290 - 900r \) \tag{3}

   Using (4)–(5), find the equation of the economy’s IS curve. Show your work. (You may want to refer to the IS-LM Review Sheet if you can’t do this easily.)

   **c.** Suppose \( Y_{FE} = 1,000 \) for this economy. If it is currently operating at full employment, what must the real money supply \( \frac{M}{P} \) equal? What must the interest rate \( r \) equal? Putting your IS and LM together, graph the economy’s full employment equilibrium.

   **d.** **A credit crunch recession in a classical world** Verify that if the money supply falls by 5\% to \( \frac{M}{P} = 190 \) a recession will occur in this economy. All you have to do is graph the IS along with the new LM, and calculate the short run (SR) values of \( Y \) and \( r \).
e. A fall in investment opportunities in a classical world. As you know, the third quarter of 2001 saw the U.S. economy fall into recession (negative growth). The main fall in expenditures was in investment demand, which fell more than 10%! If the investment function in our example economy falls to

\[ I_2(r) = 245 - 900r, \]

what would happen to \( r \), \( Y \), and \( V \) in the short run? (Give numerical answers.) Explain the intuition why a recession would or would not occur in this CQT world.

3. Mr. Keynes’s escape from CQT. Suppose in the above economy “\( r \)” stands for the long rate, that is \( r \equiv r_{LT} \). Suppose initially the economy is at full employment with demand on the real wing consistent with (2) and (3), while demand on the money wing (in particular, \( V \)) is consistent with (3). The real money supply initially equals 200. Now suppose, following Mr. Keynes, that after seeing the fall in the investment function to \( I_2(r) \) and seeing \( r_{LT} \) fall, all lenders believe that the long rate will return to \( r_{LT}^0 = 10\% \) by next year because they expect investment opportunities to improve. Calculate \( r_{min}^0 \) for this economy. Explain why, after the fall in investment opportunities, the economy will go into recession with \( r_{ST} = 0 \) and \( r_{LT} = r_{min}^0 \). Illustrate your answer graphically. Calculate the amount of idle speculative balances lenders are holding during the recession (please give a numerical answer).

4. Some situations involving uncertainty. Consider an economy in a liquidity trap recession after a fall in investment opportunities (a real shock).

a. Suppose the recession is due to investor uncertainty. Explain why lenders’ inelastic interest rate expectations may be rational in this case. Go even further, argue that the temporary recession may prove to be a good thing in the long run because it saves firms from making the wrong investment decisions, hence misallocating durable inputs like steel, etc. in producing the wrong machines. (Recall the OPEC example.)