

SUNY-Binghamton
Spring 2015

Economics 450
Monetary Economics
Final exam

Name _____

No calculators. Total points on exam: **141**. Good luck! Look over the entire exam before you begin. If I ask you to explain your answer, your grade for the question will depend on your *explanation*.

1) **5 pts.** You buy a 30-year coupon bond today for \$10. After one year, you sell it for \$11. In the meantime, you receive a coupon payment of \$1. What rate of return did you receive?

_____ percent

2) **5 pts.** A zero-coupon bond will pay \$90 in May 2017, exactly two years from now. The current price of the bond is \$10. What is the yield to maturity on this bond?

_____ percent

3) Suppose that current market yields to maturity for "zero-coupon" bonds are:

- i_1 percent for bonds paying off May 2016 (one-year zero coupon bonds)
- i_2 percent for bonds paying off May 2017 (two-year zero-coupon bonds)
- i_3 percent for bonds paying off May 2018 (three-year zero-coupon bonds)

You are offered a bond that will make a payment of \$50 in May 2016, \$60 in May 2017, and \$70 in May 2018.

a) **5 pts.** Write a formula that defines the highest price anyone should be willing to pay for the bond.

b) **5 pts.** Suppose the current price of the bond is \$130. Write a formula that defines the "yield to maturity" on the bond.

4) **5 pts.** Suppose people care only about the expected value of the return on an investment. Suppose also that the XYZ corporation has issued bonds. Financial market participants believe there is a 50% chance XYZ will default (totally default) on its bond by the end of this years. What is today's yield on a one-year zero-coupon XYZ bond if the yield on a one-year zero-coupon Treasury bond is 10% (0.10)?

_____ percent

5) **10 pts.** Define commodity money *versus* fiat money. In class I said it is more efficient for a country to use fiat money, even though commodities work equally well as money. What reason did I give?

6) **10 pts.** Explain why reserve requirements practically ceased to exist in the 1990s, even though they were still on the books as a regulatory requirement.

7) **10 pts.** What is “rollover risk”?

8) **15 pts.** Assume that the Fed follows the strategy known as “inflation targeting,” the FOMC’s next meeting will be one month from today, and the overnight rate is well above the “zero bound.”

a) Suppose that on MONDAY the overnight rate is 3 percent. Inflation is equal to the Fed’s target inflation rate, and output is equal to potential output. Everyone believes that, in the future, the IS curve may shift back, or out, or remain stable - all possibilities equally likely.

Draw what the yield curve looks like on MONDAY.

Using a solid line, draw what the yield curve would look like given the existence of term premiums.

b) On Tuesday, a Republican is elected to the Presidency. It is announced that the new president and the Republican majority in Congress plan to cut taxes, while keeping government expenditure that same.

Draw the CHANGE in the yield curve from Monday to Tuesday. Using a line labelled “Monday,” reproduce Monday’s yield curve from a). Using a line labelled “Tuesday,” draw the yield curve that will prevail after Tuesday’s news comes out.

c) What do you think will happen to the exchange rate - euros per dollar - in response to the election news - rise, fall, or stay the same? Explain your answer.

9) **15 pts.** A central bank is said to be "transparent" if it is clear about its goals for the economy and the procedures it follows to reach those goals. It has been argued that greater central bank "transparency" tends to make the yield curve flatter. Why would that be?

10) **15 pts.** When inflation expectations are "adaptive" rather than "anchored," increases in oil prices are more likely to be associated with recessions. Explain.

11) Janet and Ben agree that the Fed should have a target inflation rate, but they differ as to what the target inflation rate ought to be. Janet wants a relatively high inflation target (like 4 percent). Ben wants a low inflation target (like 1 percent). Their disagreement stems from different beliefs about the natural rate of interest (in terms of a real overnight rate). Ben believes the natural rate of interest is always within a range from 2 to 6 percent. Janet believes the natural rate of interest can be anywhere in a range from -2 (negative 2) to 2 percent. Explain the connection between their beliefs about the natural rate of interest, and their beliefs about the best target inflation rate. Use a graph or graphs.

12) **10 pts.** Consider an economy with no banks and no central bank. A person faces a situation similar to that described by the standard Baumol-Tobin model. As in that model,

Y is annual income, received at the beginning of the year

i is the annual interest rate or bond yield (expressed as a fraction, as in class)

N is the number of financial transactions the person engages in. $\frac{M}{P} = \frac{Y}{2N}$ is the average money balance if the person engages in N financial transactions.

Here, however, the cost of engaging in one financial transaction is not F . Here the cost of engaging in a financial transaction is *lower* for a person with a higher income, because the staff in the bond brokerage are nicer to rich people. The cost of engaging in one financial transaction is F/Y . The total cost of engaging in N financial transactions is $(F/Y)N$.

a) Derive the average real money balance that a person will choose to hold.

b) **10 pts.** Suppose the supply of money and the price level are fixed. Draw graphs that show what happens to the interest rate in this economy, and what happens to the interest rate in an economy described by the *standard* Baumol-Tobin model, if there is an increase in income Y .

13) Billy is broke. He has a plan. He will borrow \$100 from each of his two room-mates, Jack and Tom, drive to the Krispy-Kreme place in Scranton and spend the \$200 on doughnuts. Tomorrow afternoon, he will sell the doughnuts in front of Lecture Hall 1 just before his Econ 160 class, which has many doughnut-loving students willing to pay a pretty penny for Krispy Kremes. Billy promises that, with the proceeds, he will pay Jack and Tom each \$105 tomorrow evening (keeping a nice profit for himself). Jack and Tom are hesitant to lend Billy their money. Each fears that he may need cash tomorrow morning before Econ 160. To persuade them to lend, Billy promises to pay back \$100 (not \$105) to anyone who asks for his money back tomorrow morning. In fact, however, if either Jack or Tom or both asks for money back tomorrow morning, Billy will have to sell the doughnuts immediately around the dorm, which is full of people who don't like doughnuts very much; in that case Billy will get just \$100 for the doughnuts - not enough to pay \$100 to both Jack and Tom.

a) Suppose Jack and Tom believe that, if one of them asks for his money back in the morning and the other does not, the one who asks for his money back in the morning will get his \$100 and the other will get nothing; if both ask for their money back in the morning, both will get \$50. Fill in the boxes below to describe this situation.

Which box or boxes can actually occur? _____

b) Can you think of a slightly different promise that Billy could make, which would improve the set of outcomes which can actually occur? Describe that promise in words, and fill in the boxes below to describe the situation.

Which box or boxes can actually occur? _____

14) **35 pts.** Suppose the Fed does *not* pay interest on reserves. There is no reserve requirement. The Fed charges an interest rate for emergency loans r_p to cover overdrafts. This interest rate is equal to 2. That is, $r_p = 2$. All banks in the

country are identical. Each bank has \$100 to divide between its reserve account and overnight lending. At 5 pm each bank will choose how much to leave in its reserve account. Between 5 and 6 pm, the Fed will clear payments between banks, adding a net sum P to each bank's reserve account. P can be a positive or negative number. That leaves $R+P$ in the bank's reserve account at 6 pm. A bank will have overdrawn its reserve account if the balance after clearing, at 6 pm, falls below zero. A bank that overdraws its reserve account must take an emergency loan from the Fed to cover the overdraft, to bring its reserve account up to a zero balance. From a bank's point of view, P is a random variable, uniformly distributed between a minimum value (the smallest possible net payment into the bank's reserve account) of -2, and a maximum value (the largest possible payment into the bank's reserve account) of +2. The market overnight rate is denoted r .

a) **5 pts** Using the information given above, write an expression that gives the probability that a bank will run an overdraft in its reserve account, for any given value of R , assuming r is greater than zero but less than 2.

b) **5 pts** Assuming a bank runs an overdraft in its reserve account, what is the expected value of the amount that the bank will have to borrow from the Fed, for any given value of R ?

c) **5 pts** Using your answers to a) and b), write an expression that gives, for any value of R , the expected value of the bank's profit. Remember $r_p = 2$.

d) **5 pts.** Using your answer to c) and calculus and algebra, find the reserve balance R^D that a bank would choose to leave in its reserve account at 5 pm, as a function of r .

e) **5 pts.** Suppose the target overnight rate is $1/2$. What is the reserve supply per bank that will cause the market overnight rate to hit the target?

f) **5 pts.** On the graph below, draw a bank's reserve demand curve, and the reserve supply per bank that will cause the market overnight rate to hit the target.