SUNY-Binghamton **Name** _____

Fall 2014 Economics 450

Monetary Economics

Final exam

No calculators. Total points on exam: Good luck! Look over the entire exam before you begin. There are about 50 multiple choice questions for 5 points each, and two written questions for 60 points total.

1) A zero-coupon bond will pay $33 in December 2015, exactly one year from today. The current market price of the bond is $30. What is the yield to maturity on this bond?
a) 3 percent b) 5 percent c) 10 percent d) 20 percent e) 30 percent

2) 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?
a) 3 percent b) 5 percent c) 10 percent d) 20 percent e) 30 percent

3) A zero-coupon bond will pay $90 in December 2016, exactly two years from now. The current price of the bond is $10. What is the yield to maturity on this bond?
a) 100 percent b) 200 percent c) 300 percent d) 500 percent e) 900 percent

4) You buy a zero-coupon bond today for $100. After two years (in December 2016), you sell it for $100. What rate of return did you receive?
a) -10 percent b) 0 percent c) 10 percent d) 50 percent e) 100 percent

5) Suppose inflation is currently 3% a year. People think that future inflation may be higher, lower, or the same as current inflation - all possibilities about equally likely. Yields on bonds are 4%. What is the *real interest rate* in this economy?
a) 4% b) 3% c) 2% d) 1% e) 0%

6) Suppose that bonds yields are 4% and inflation is currently 3% a year, as in question 5). But now people think future inflation will be higher or the same as it is at present (no chance it will be lower). Compared with the situation in 5), is investment spending now:
a) Higher than in 5)
b) Lower than in 5)
c) The same as in 5)
d) Can't say anything about investment spending, as investment is determined by expected future sales revenues
e) Can't say anything about investment spending, as investment is determined by the IS curve

7) Suppose the "expectations hypothesis" is correct: people care only about the expected value of the return on an investment. Suppose also that the City of Binghamton has issued bonds. Financial market participants believe there is a chance Binghamton will default (totally default) on its bonds, due to population loss and resulting disappearance of the tax base. What is the perceived probability that Binghamton will default if:
- today's yields on one-year zero-coupon Treasury bonds is 50 percent
- today's market price of a one-year zero-coupon Binghamton bond promising to pay $300 in one year is $100
a) 10 percent b) 20 percent c) 30 percent d) 40 percent e) 50 percent

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

$_1i$ for bonds paying off December 2015 (one-year zero coupon bonds)

$_2i$ for bonds paying off December 2016 (two-year zero-coupon bonds)

$_3i$ for bonds paying off December 2017 (three-year zero-coupon bonds)

You are offered a bond that will make a payment of \$50 in December 2015, \$60 in December 2016, and \$70 in December 2017. Which of the following formulas defines the highest price you should be willing to pay for this bond?

a) $i = \frac{\$50}{1 + {}_1i} + \frac{\$60}{(1 + {}_2i)^2} + \frac{\$70}{(1 + {}_3i)^3}$

b) $\$50+\$60+\$70 = \frac{P}{1 + {}_1i} + \frac{P}{(1 + {}_2i)^2} + \frac{P}{(1 + {}_3i)^3}$

c) $\$P = \frac{\$50}{1 + i} + \frac{\$60}{(1 + i)^2} + \frac{\$70}{(1 + i)^3}$

d) $P = \frac{\$50}{1 + {}_1i} + \frac{\$60}{(1 + {}_2i)^2} + \frac{\$70}{(1 + {}_3i)^3}$

e) $\$P = \frac{\$P}{1 + i} + \frac{\$P}{(1 + i)^2} + \frac{\$P}{(1 + i)^3}$

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

2 percent (or 0.02) for bonds paying off December 2015 (one-year zero coupon bonds)

3 percent (or 0.03) for bonds paying off December 2016 (two-year zero-coupon bonds)

4 percent (or 0.04) for bonds paying off December 2017 (three-year zero-coupon bonds)

You are offered a bond that will make a payment of \$50 in December 2015, \$60 in December 2016, and \$70 in December 2017. Which of the following formulas defines the "yield to maturity" on the bond?

a) $\$130 = \frac{\$50}{1 + 0.02} + \frac{\$60}{(1 + 0.03)^2} + \frac{\$70}{(1 + 0.04)^3}$

b) $\$130 = \frac{\$50}{1 + 1} + \frac{\$60}{(1 + 2)^2} + \frac{\$70}{(1 + 3)^3}$

c) $\$130 = \frac{\$50}{1 + i} + \frac{\$60}{(1 + i)^2} + \frac{\$70}{(1 + i)^3}$

d) $P = \frac{\$50}{1 + {}_1i} + \frac{\$60}{(1 + {}_2i)^2} + \frac{\$70}{(1 + {}_3i)^3}$

e) $\$130 = \frac{2}{1 + i} + \frac{3}{(1 + i)^2} + \frac{4}{(1 + i)^3}$

10) Which of the following sets of yields and interest rates - the ones shown in column a), b), c), etc. - could exist *in reality* at a point in time? (Only one of the columns could be correct in reality.)

Loan or bond	Interest rate or yield, in percent				
	a)	b)	c)	d)	e)
Expected value of average future overnight rate between today and one year from today	2	2	2	2	2
Expected value of average future overnight rate between today and five years from today	3	3	3	3	3
U.S. Treasury bond maturing in one year	2	2	3	3	3
U.S. Treasury bond maturing in five years	3	3	3	5	5
Ford Motor Co. bond maturing in five years	4	4	4	5	6
Loan to Ford Motor Co. due in five years	4	5	5	6	7

11) The "term premium" compensates bondholders for taking on:

a) Interest-rate risk b) Default risk c) Liquidity management costs d) Costs of assessing default risk e) Costs of rolling over overnight loans

12) A firm that wants to issue a bond will pay a bond rating company (like S&P) to give the bond a rating (e.g. AAA, BAA) which indicates the bond rater's estimate of the probability the issuer will default on the bond. Why are bond issuers willing to pay for a bond rating?
a) Potential bond buyers would assume a bond without a rating must have high default risk, so the issuer can reduce the default risk premium on the bond by having it rated.
b) Rated bonds are more liquid than unrated bonds, because unrated bonds are perceived to have high default risk. Thus, the issuer can reduce the (il)liquidity premium on a bond by having it rated.
c) Rated bonds have more certain future prices than unrated bonds, so the issuer can reduce the term premium on the bond by having it rated
d) All of the above
e) None of the above

For questions 13)-15) this table gives interest rates and yields in the U.S.

Loan or bond	Interest rate or yield, in percent
Overnight loans, current rate	5
Expected value of average future overnight rate between today and five years from today	5.5
U.S. Treasury bond maturing in one year	6
U.S. Treasury bond maturing in five years	7
IBM bond maturing in one year	9
Loan to IBM, due in one year	9.5

13) Which of the following is equal to a "term premium" in this economy?
a) 0.5 percent b) 1.0 percent c) 1.5 percent d) 2 percent e) 3 percent

14) Which of the following is equal to a "default risk premium" in this economy?
a) 0.5 percent b) 1.0 percent c) 1.5 percent d) 2 percent e) 3 percent

15) Which of the following is equal to a "liquidity premium" in this economy?
a) 0.5 percent b) 1.0 percent c) 1.5 percent d) 2 percent e) 3 percent

For 16)-17), suppose a law is passed that requires all companies to make complete financial accounts available to anyone who asks for them, and that specifies the managers of any firms found to have published incorrect accounts will be executed.

16) This law is most likely to affect:
a) Term premiums b) Default-risk premiums c) (Il)liquidity premiums
d) Default-risk premiums *and* liquidity premiums e) None of the above

17) How is this law likely to affect the fraction of business borrowing that comes through loans rather than sales of bonds?
a) Increase the share that comes through loans b) Decrease the share that comes through loans
c) Either increase or decrease, depending on whether the Fed is followign the Taylor rule
d) No effect

18) Suppose that most investors were saving for retirement in the distant future and were sure they would not need their money back until then. In this situation,
a) Yield curves would be upward-sloping most of the time
b) Yield curves would be downward-sloping most of the time
c) Yield curves would be flat most of the time
d) (Il)liquidity premiums would be bigger
e) None of the above

19) Every morning, Fed staff estimate existing reserve supply. Then they engage in open-market operations. Which of the following events is most likely to result in the market overnight rate falling below the FOMC's target overnight rate in the afternoon?
a) In the morning, Fed staff estimate existing reserve supply to be $500m. Actually, existing reserve supply is $400m.
b) In the morning, Fed staff estimate existing reserve supply to be $500m. Actually, existing reserve supply is $600m.
c) Fed staff attept to buy $300m worth of bonds in open-market operations, but because of a computer glitch they end up buyng only $200m.
d) Banks are extraordinarily uncertain about the net credits that will be made to their reserve accounts at the end of the day
e) None of the above

For 20)-24), consider a central bank that follows the "inflation targeting" strategy very strictly: it *always* tries to keep inflation equal to a target inflation rate of 2 percent. The natural rate of unemployment (NAIRU) is 6 percent. Consider where the central bank will set the real interest rate in each of the following situations. Will the resulting unemployment rate be higher than, lower than or equal to 6 percent? And what will happen to inflation? Assume there is no danger of a liquidity trap.

20) Expected inflation is 2 percent. Government purchases, taxes and other determinants of spending are as forecast by the central bank.
a) $u = 6\%$, inflation = 2% b) $u < 6\%$, inflation > 2% c) $u > 6\%$, inflation < 2%
d) $u < 6\%$, inflation = 2% e) $u > 6\%$, inflation = 2%

21) Expected inflation is 3 percent. Government purchases, taxes and other determinants of spending are as forecast by the central bank.
a) $u = 6\%$, inflation = 2% b) $u < 6\%$, inflation > 2% c) $u > 6\%$, inflation < 2%
d) $u < 6\%$, inflation = 2% e) $u > 6\%$, inflation = 2%

22) Expected inflation is 1 percent. Government purchases, taxes and other determinants of spending are as forecast by the central bank.
a) $u = 6\%$, inflation = 2% b) $u < 6\%$, inflation > 2% c) $u > 6\%$, inflation < 2%
d) $u < 6\%$, inflation = 2% e) $u > 6\%$, inflation = 2%

23) Expected inflation is 2 percent. Government purchases turn out to be *less* than forecast by the central bank.
a) $u = 6\%$, inflation = 2% b) $u < 6\%$, inflation > 2% c) $u > 6\%$, inflation < 2%
d) $u < 6\%$, inflation = 2% e) $u > 6\%$, inflation = 2%

24) Expected inflation is 2 percent. Government purchases turn out to be *more* than forecast by the central bank.
a) $u = 6\%$, inflation = 2% b) $u < 6\%$, inflation > 2% c) $u > 6\%$, inflation < 2%
d) $u < 6\%$, inflation = 2% e) $u > 6\%$, inflation = 2%

The following information is for 25)-26). Assume the Fed is following an "inflation targeting" strategy, the economy is not currently in a liquidity trap, and expected inflation is equal to the target inflation rate. Considering how the Fed is likely to react,

25) Which of the following events is likely to be associated with an *appreciation* of the dollar (a dollar can buy more units of foreign currency)?
a) taxes are cut b) government spending is cut c) financial crisis hits d) a) and b)
e) b) and c)

26) Which of the following events is likely to be associated with an increase in net exports?
a) taxes are cut b) government spending is cut c) financial crisis hits d) a) and b)
e) b) and c)

The following graphs of yield curves are for questions 27) - 33).

a)

b)

c)

d)

Which yield curve is likely to hold in the following situations?

27) The Fed is believed to follow a "Taylor rule," inflation is currently equal to the target inflation rate, and output is currently less than potential (natural rate of) output.

28) The Fed is believed to follow a "Taylor rule," inflation is currently equal to the target inflation rate, and unemployment is currently greater than the natural rate of unemployment (NAIRU).

29) The Fed follows an "inflation targeting" strategy, and government spending is currently greater than it is expected to be in the future.

30) The Fed follows an "inflation targeting" strategy, and exports are currently greater than they are likely to be in the future.

31) The Fed follows an "inflation targeting" strategy, and expected inflation is currently higher than target inflation.

32) The Fed follows an "inflation targeting" strategy, and expected inflation is currently lower than target inflation.

33) The Fed follows an "inflation targeting" strategy, inflation expectations are "adaptive," and last year oil prices were increasing.

For 34)-35), assume the Fed's strategy is "inflation targeting," there is no danger of a liquidity trap and expected inflation is currently about equal to the FOMC's target inflation rate. Also, assume you are a bond trader, and you can get news a few seconds before anyone else does.

34) Which of the following pieces of news would make you want to BUY bonds?
a) Europe is recovering from recession so exports will rise.
b) Stock prices rise. c) Government expenditure will rise, with no increase in taxes.
d) All of the above. e) None of the above.

35) Which of the following pieces of news would make you want to SELL bonds (before their prices fall)?
a) European countries will go into recession next year, so exports will fall.
b) Stock prices crash
c) Government expenditure will be cut, with no decrease in taxes.
d) All of the above. e) None of the above.

36) Suppose you have data on the history of unemployment and inflation in the economy. From these data, you want to figure out whether people in the economy have "anchored" inflation expectations, "adaptive" inflation expectations, or something else. The data look like this:

Year	Unemployment rate	Inflation rate
1879	6	3
1880	8	2
1881	6	3
1882	5	4
1883	6	3
1884	7	2.4

Inflation expectations must be:
a) Anchored, with expected inflation equal to 2 percent
b) Anchored, with expected inflation equal to 3 percent
c) Anchored, but I cannot say what expected inflation is
d) Adaptive
e) Something else

37) Again suppose you have data on the history of unemployment and inflation in an economy and you want to figure out whether people in the economy have "anchored" inflation expectations, "adaptive" inflation expectations, or something else. But the data are different from those in 26). Instead they look like this:

Year	Unemployment rate	Inflation rate
1879	6	3
1880	8	2
1881	6	2
1882	5	3
1883	6	3
1884	7	2.4

Inflation expectations must be:
a) Anchored, with expected inflation equal to 2 percent
b) Anchored, with expected inflation equal to 3 percent
c) Anchored, but I cannot say what expected inflation is
d) Adaptive
e) Something else

38) In the context of lending by a financial intermediary, the term "moral hazard" refers to the possibility that:
a) the value of the financial intermediary's bonds may fall
b) among the pool of potential borrowers, only people with risky projects will ask for loans
c) after a borrower has received a loan from a financial intermediary, he will choose to engage in a risky project
d) lenders to the financial intermediary may refuse to renew their lending
e) none of the above

39) In the context of lending by a financial intermediary, the term "adverse selection" refers to the possibility that:
a) the value of the financial intermediary's bonds may fall
b) among the pool of potential borrowers, only people with risky projects will ask for loans
c) after a borrower has received a loan from a financial intermediary, he will choose to engage in a risky project
d) lenders to the financial intermediary may refuse to renew their lending
e) none of the above

40) How can a financial intermediary guard against the risk of defaults on the bonds it holds and the loans it has made?
a) Engage in "credit default swaps" b) Engage in "interest rate swaps"
c) Buy only relatively liquid bonds d) Minimize capital e) None of the above

41) Consider two countries, Adaptavia and Anchorland. In both countries, the central bank follows an "inflation targeting" strategy. In Adaptavia, expectations are adaptive. In Anchorland, expectations are anchored and equal to the central bank's target inflation rate. In Adaptavia, increases in oil prices are associated with recessions. That is not true in Anchorland. This is because:
a) in Adaptavia an oil-price hike has a bigger immediate effect on inflation, and with higher prices, real incomes are lower
b) in Adaptavia an oil-price hike tends to lower expected future inflation, raising the real interest rate at any given level of the nominal interest rate
c) in Adaptavia the central bank is more likely to respond to the oil-price hike by reducing the real interest rate
d) in Adaptavia the central bank is more likely to respond to the oil-price hike by raising the real interest rate
e) none of the above

42) The market for "mortgage backed securities" changed around the turn of the twentieth century. Which of the following was one of the changes that occurred?
a) Mortgage-backed securities came into being: they were not issued before the late 1990s
b) Mortgage-backed securities came to be structured as coupon bonds rather than fixed-payment bonds
c) More mortgage-backed securities were constructed out of government-insured mortgages
d) Financial intermediaries like banks and investment banks held fewer mortgage-backed securities as assets
e) None of the above

Questions 43)-46) refer to the following table

	Assets				Liabilities	
	Loans	U.S. Treasury Bonds	Bills	Reserves	Deposits	Overnight loans
Bank of Rodents	4	6		1	5	5
Green Bank	11	11				20
Edward Bear, Inc.	22					20
Rearguard Mutual Funds			22	2	10	10

43) What is Bank of Rodents' capital?
a) 2 b)5 c)11 d) 13 e) None of the above

44) What is Green Bank's capital?
a) 2 b)5 c)11 d) 13 e) None of the above

45) Which institution is in most danger of a liquidity crisis?
a) Rodents b)Green c) Edward Bear d) Rearguard e) None is in danger

46) Which institution is least subject to interest-rate risk?
a) Rodents b)Green c) Edward Bear d) Rearguard e) None is in danger

47) The figure below describes the payoffs that will be received by two lenders to a financial intermediary under various scenarios. Which of the outcomes are possible equilibria?
a) A and B b) A and C c) A and D d) B and D e) B and C

48) The figure below describes the payoffs that will be received by two lenders to a financial intermediary under various scenarios. Which of the outcomes are possible equilibria?
a) A and B b) A and C c) A and D d) B and D e) B and C

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49) Prior to the financial crisis, money-market mutual funds were not supposed to have access to the Fed as a lender of last resort. Why were people willing to put funds on deposit at money-market mutual funds?
a) Deposits with money-market mutual funds were insured by the Federal Deposit Insurance Corporation (FDIC)
b) Mortgages held by money-market mutual funds were insuranced by the Federal National Mortgage Association ("Fannie Mae."
c) Money-market mutual funds were subject to high capital requirements
d) Money-market mutual funds held only long-term Treasury bonds
e) None of the above

50) In years since the financial crisis, members of the FOMC have often stated that they will leave the target fed funds rate at practically zero far into the future. This practice is called:
a) Quantitative easing b) Large-scale asset purchases (LSAPs) c) Bagehot's rules
d) Forward guidance e) None of the above

51) The Fed acts as "lender of last resort" when it:
a) lends at the "primary credit" rate to a bank that would otherwise run an overdraft in its reserve account
b) lends to the U.S. Treasury to cover the lag between tax revenues and bond payments
c) lends to foreign central banks
d) lends to a financial intermediary which has become insolvent because of defaults on the loans it made
e) none of the above

Written questions.

I) **25 pts.** Here is a statement that many of you made in your papers: “When the Fed wants to stimulate spending, it buys bonds in open-market operations to increase reserve supply. When the Fed wants to slow down spending, it sells bonds.” Explain why this statement is wrong. Also explain why someone might say this. Use graphs.

II) **35 pts.** You are in charge of open-market operations for the Fed. On Tuesday morning, you must decide whether to buy bonds, sell bonds, or do nothing. 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 *4*. That is, $r_P = 4$. The target overnight rate is *1/2*.
You know that 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 postive 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 shortfall,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 *-1*, and a maximum value (the largest possible payment into the bank's reserve account) of *+1*.
Let *r* stand for the market overnight rate. If *r* is zero, a bank will choose to leave $R^D \geq 1$ in its reserve account at 5 pm (that is, it will hold at least 1 in its reserve account). If *r* is greater than or equal to $r_P = 4$, a bank will choose to hold $R^D \leq -1$ in its reserve account at 5 pm (that is, it will leave a less than zero balance in its account at 5 pm, less than or equal to -1).

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*. Assume *r* is greater than zero but less than 4.

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 $r_P = 4$.

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.** What is the reserve supply per bank (that is, total reserve supply divided by number of banks) that will cause the market overnight rate to hit the target?

f) **5 pts.** What is the reserve supply per bank that will cause the market overnight rate to be zero?

g) **5 pts.** What is the reserve supply per bank that will cause the market overnight rate to be 4?.