

Econ 353 Money, Banking, and Financial Institutions  
Spring 2006

Final Exam

Name \_\_\_\_\_

- The duration of the exam is 2 hours.
- The exam consists of 10 problems and it is worth 100 points.
- Please write in the space provided. If necessary, write on the back of the page.
- Please ask me if you have any questions.
- To receive full credit you have to carefully explain all your answers and show all your work.

General advice: *If you get stuck in the early parts of a problem, do not stop there. You can receive substantial partial credit by explaining how you would solve the rest of problem if you had the necessary answers from its previous parts.*

1. (20 points) Determine whether each of the statements below is True or False:

US banking system is called dual because banks can be chartered either by the state level or the federal level authorities.

**True.**

Bank branching regulations reduced the amount of competition in the banking sector and hurt bank customers.

**True.**

Hedge funds typically have very low-risk portfolios because they engage in sophisticated hedging strategies.

**False.**

All defined-benefit pension plans are fully funded because there is no way to change benefits after they were defined.

**False.**

Federal Reserve is the most independent central bank in the world.

**False.**

Contractionary monetary policy is associated with higher interest rates.

**True.**

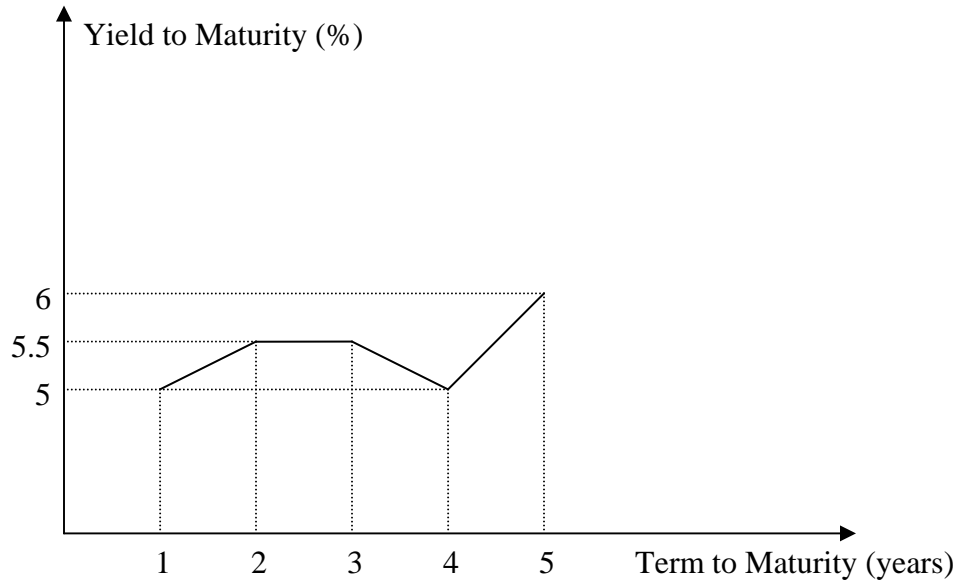
Eurodollars is the term used to denote the dollar-denominated deposits held by foreign banks in the US.

**False.**

The presence of the “lender of last resort” induces banks to pursue safer investment strategies.

**False.**

2. (10 points) Suppose that the following yield curve is observed today:



- a. Assuming that the expectations hypothesis is true, determine the current yield on 1-year bonds, 2-year bonds, 3-year bonds, and 4-year bonds?

**There are no calculations involved. These rates are obtained directly from the graph:**

**1-year bonds – 5%,  
2-year bonds – 5.5%,  
3-year bonds – 5.5%,  
4-year bonds – 5%.**

- b. Assuming that the expectations hypothesis is true, determine the yield on 1-year bonds one year from today, two years from today, and three years from today? Would you be able answer this question without assuming that the expectations hypothesis is true?

**Expectations hypothesis says that the (yearly) interest rate on a two-year bond is the average of this year's interest rate on a one-year bond and the next year's interest rate on a one-year bond (the first part of the subscripts denotes the maturity of the instrument (1-year, 2-year, and 3-year, and so on), the second part in parentheses denotes the time period (t-today, t+1 – a year from today, t+2 – two years from today, and so on)):**

**Yield on a two-year bond today:  $i_{2(t)} = (i_{1(t)} + i_{1(t+1)})/2 = (5 + i_{1(t+1)})/2 = 5.5\%$ ; where  $i_{1(t+1)}$  is the unknown yield on 1-year bond one year from now. Solving for it we get  $i_{1(t+1)} = 6\%$ .**

**Similarly, the (yearly) yield on a three-year bond is the average of the yields on one-year bonds today, a year from today, and two years from today:**

**Yield on a three-year bond today:  $i_{3(t)} = (i_{1(t)} + i_{1(t+1)} + i_{1(t+2)})/3 = (5 + 6 + i_{1(t+2)})/3 = 5.5\%$ ; where  $i_{1(t+2)}$  is the unknown yield on a 1-year bond two years from now. Solving for it we get  $i_{1(t+2)} = 5.5\%$ .**

**Yield on a four-year bond today:  $i_{4(t)} = (i_{1(t)} + i_{1(t+1)} + i_{1(t+2)} + i_{1(t+3)})/4 = (5 + 6 + 5.5 + i_{1(t+3)})/4 = 5\%$ ; where  $i_{1(t+3)}$  is the unknown yield on a 1-year bond three years from now. Solving for it we get  $i_{1(t+3)} = 3.5\%$ .**

**It is not possible to solve this part without assuming that expectations hypothesis is true.**

3. (5 points) Which of the following 1-year, \$1,000 face-value securities has highest yield to maturity?
- A 10 percent coupon bond selling for \$1,000;
  - A 8 percent coupon bond selling for \$1,000;
  - A 6 percent coupon bond selling for \$1,000;
  - A 6 percent coupon bond selling for \$1,100

**Clearly, i offers higher yield to maturity than both ii and iii because the price is the same, but coupon rate is higher in i. At the same time, iii offers higher yield than iv because you can buy it cheaper than iv (you'll have higher capital gain). So, i offers highest yield to maturity.**

4. (10 points) The Federal Reserve Open Market Committee released the following statement after its February 2, 2005 meeting:

*The Federal Open Market Committee decided today to raise its target for the federal funds rate by 25 basis points to 2-1/2 percent.*

*The Committee believes that, even after this action, the stance of monetary policy remains accommodative and, coupled with robust underlying growth in productivity, is providing ongoing support to economic activity. Output appears to be growing at a moderate pace despite the rise in energy prices, and labor market conditions continue to improve gradually. Inflation and longer-term inflation expectations remain well contained.*

*The Committee perceives the upside and downside risks to the attainment of both sustainable growth and price stability for the next few quarters to be roughly equal. With underlying inflation expected to be relatively low, the*

*Committee believes that policy accommodation can be removed at a pace that is likely to be measured. Nonetheless, the Committee will respond to changes in economic prospects as needed to fulfill its obligation to maintain price stability.*

What can you conclude from this statement about the current target rate for the federal funds? Why was (or wasn't) it changed? Is it more likely to be increased or decreased in the future?

**The first paragraph says that the target federal funds rate was raised by 0.25% to 2.5%. The second paragraph says that even after the increase, the rate is relatively low (accommodative stance of the monetary policy means that the policy is expansionary, even though rate increase is associated with contractionary policy). The statement says that this increase will not hurt the economy, which is growing steadily. Inflation might be a bigger concern (even though it says that it is contained). The last paragraph says that there is 50-50 percent chance that the rate will be increased again (risks to attainment of sustainable growth and price stability are roughly equal). In addition, since inflation is low, no rapid interest rate raise will likely be necessary.**

5. (5 points) You purchase a 30-year, \$1000 face-value, zero-coupon bond. The interest rate is 6%. One year later the interest rate has changed to 5% and you decide to sell the bond. What is your one-year holding period return?

**The holding period return is equal to**

**Return=Coupon payment/Price Paid + Change in Price/Price Paid.**

**There no coupon payments in this case, so all we have to do is to determine the change in price.**

**The price of this bond at the time of purchase has to be equal to the present value of all future payments. There a single payment of \$1,000 which will be made in 30 years. The present value is equal to  $PV=Face\ value/(1+0.06)^{30}=\$1000/(1+0.06)^{30}=\$174.11$ .**

**The price in one year is going to be  $PV=Face\ value/(1+0.05)^{29}=\$1000/(1+0.05)^{29}=\$242.94$ . (The payment is going to be made in 29 years; the interest rate is 5% instead of 6%.)**

**So the change in price is equal to  $\$242.94-\$174.11=\$68.84$  (capital gain). The holding period return is therefore:**

**Return=  $\$68.84/\$174.11= 0.3954$  (39.54%).**

6. (10 points) What are the two main elements of the price of an option and explain what each of them means?

**Option price has two components: (1) intrinsic value and (2) option premium. The intrinsic value is the value of the option if it is exercised immediately (it cannot be negative, only in-the-money options have any intrinsic value, at-the-money and out-**

of-the-money options have zero intrinsic value). For call options the intrinsic value is the difference between market price of the underlying asset and the strike price. For put options it is the difference between the strike price and the market price of the underlying asset. Option premium reflects the potential for gains in the future. If the market price will move in the favorable (for option holder) direction, there will be some gains to be made by exercising the option. Option holders only care about gains because losses are limited by the ability not to exercise the option.

7. (10 points) Show on a T-account how the following transactions affect the balance sheet of a central bank:

a. A customer withdraws \$1000 from a checking account.

A	L
	Currency +\$1000
	Reserves -\$1000

b. Central Bank sells \$1000 worth of T-Bills.

A	L
Securities -\$1000	Reserves -\$1000

c. Central Bank gives a \$1000 discount loan.

A	L
Loans +\$1000	Reserves +\$1000

8. (5 points) Why countries with more generous deposit insurance can be more likely to suffer from financial crises?

**Insurance creates moral hazard – insured have low incentives to behave in a cautious manner (invest in safe assets). If insurance is more generous, the moral hazard problem is more pronounced (banks would seek high risk investments because they know that they would be saved if investments do not work out).**

9. (5 points) What is a mutual fund and what is the difference between closed-end and open-end mutual funds?

**Mutual funds issue shares and sell them to individual investors and then invest the proceeds in the stock market. By accumulating resources of many individual investors mutual funds are able to substantially reduce the risk by diversifying their portfolios. In addition, since mutual funds have relatively low transaction costs because they deal in large quantities of securities. The shares of the open-end funds can be redeemed at any time at a value tied to the value of the asset portfolio of this fund. Closed-end fund's shares are traded on the stock market (the value of a share may differ from the value of the underlying asset portfolio, and no additional shares are being issued/sold).**

10. (5 points) What are the arguments against central bank independence?

**The main argument against central bank independence is lack of accountability. central bank officials are not elected and therefore not responsible to voters (as opposed to politicians). If central bank performs badly – there is no way to replace the management (as opposed to any politician at any time). Lack of accountability may lead central banked to follow some policies out of self-interest (as opposed to public interest). In the end it is undemocratic to have a group of people who are not responsible to anyone to make crucial policy decisions. In addition, it is often helpful to have all government agencies coordinate their policies. It may not be possible with an independent central bank.**

11. (5 points) Suppose that the currency-to-deposits ratio is 0.2, the required reserve ratio is 0.1, and the excess reserves ratio is 0.05. Compute the money (M1) multiplier and interpret what it means?

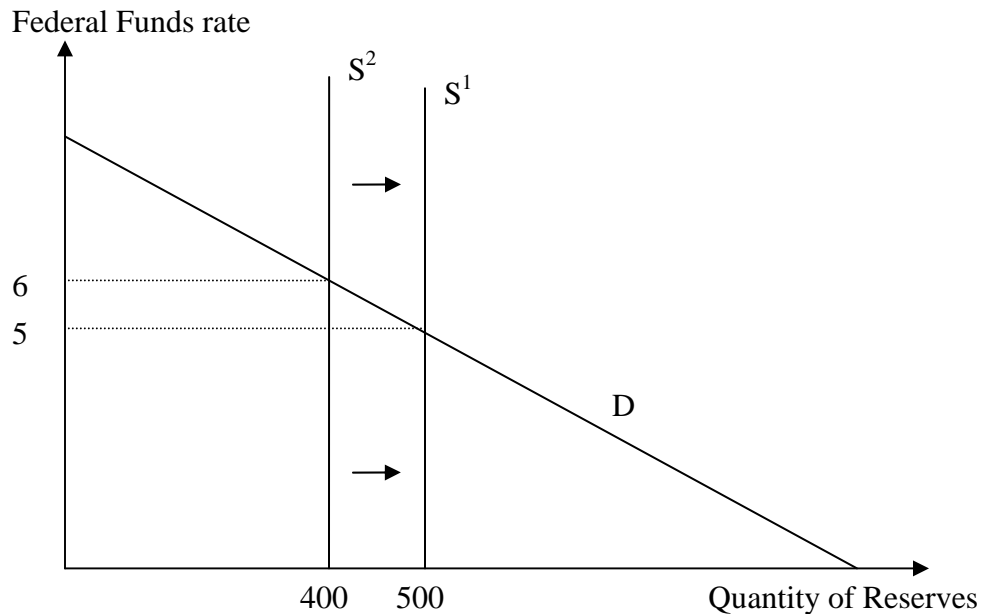
**The actual money multiplier can be calculated using the formula:**

**$m = [1 + C/D] / [C/D + r + ER/D]$ , where  $C/D$  = currency-to-deposits ratio,  $r$ =required reserves ratio, and  $ER/D$ =excess reserves ratio. Observe that cash holding affects multiplier in a more complex way than the excess reserves – cash is not part of deposits but it is part of money (M1). So it slows deposit creation but contributes to the money aggregate.  $m = 1.2/0.35 = 3.43$ .**

**It means that for every dollar of new reserves the amount of money (M1) in an economy grows by more than \$3 because commercial banks create deposits with reserves.**

12. (10 points) Assume that the Fed predicts that the following demand for reserves on the federal funds market:  $R^D = 1000 - 100 \cdot i$ , where  $R^D$  is the quantity of reserves demanded (in billions of dollars) and  $i$  is the current federal funds rate. Fed's target federal funds rate is 5%. Current supply of reserves is \$400 billion. Explain using a graph what the Fed has to do to achieve its target federal funds rate?

Setting supply equal to demand we get:  $R^D = 1000 - 100 * i = 400 \rightarrow i = 6\%$ , which is 1% above target. In order to decrease the rate, the Fed must increase the supply of reserves. This is done by buying securities. The exact amount of reserves needed can be calculated from  $R^D = 1000 - 100 * 5 = \$500$ . (We just plugged in the target federal funds rate of 5% in order to get to the desired supply of reserves.) Since the current supply is \$400, the Fed needs to buy \$100 worth of securities (and create the corresponding amount of reserves).



The formulas you may or may not need:

$$PV = [C/i] * [1 - 1/(1+i)^n],$$

$$PV = FV/(1+i)^n,$$

Expected value = value\*prob(value) + value\*prob(value)+...

Variance = (value - expected value)<sup>2</sup>\*prob(value) + (value - expected value)<sup>2</sup>\*prob(value) + ...

$$i_{n(t)} = (i_{1(t)} + i_{1(t+1)} + i_{1(t+2)} + \dots + i_{1(t+n-1)})/n.$$