

Econ 353 Money, Banking, and Financial Institutions
Spring 2006

Midterm Exam 1

Name _____

- The duration of the exam is 1 hour 20 minutes.
- 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 the 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:

Money is defined as the combined income of all individuals in the country.

False. Income is a flow variable and the definition of money we use implies that money is a stock variable. (The analogy to stock and flow: the stock of water in a river measures how much water there is at any moment in time, flow measures how much water moves along a certain interval over a period of time.)

Evidence from the United States and other foreign countries indicates that countries with low monetary growth rates tend to experience higher rates of inflation, all else being constant.

False. The opposite is true.

Monetary aggregate M1 is the most commonly used measure of money because it has been found to be the best predictor of inflation.

False. M2 is now the most commonly used measure.

Of money's three functions, the one that distinguishes money from other assets is its function as a store of value.

False. There are many other stores of value.

The main problem with barter exchange is that barter requires standardization of the goods exchanged.

False.

M0 is the narrowest measure of money.

False. There is no such thing as M0 in economics.

According to the expectations hypothesis, if the yield curve slopes upward it means that the interest rates are expected to rise.

True.

During periods of rapidly rising prices money fails to serve as a good store of value.

True.

2. (10 points) Explain the difference between direct and indirect finance. What role do financial intermediaries and financial markets play in this process? Explain whether direct or indirect finance is a more important source of funds and why this is the case. Give at least one example of each – a direct finance transaction and an indirect finance transaction – in which you personally can engage in.

Direct finance involves transfer of funds directly from borrowers to lenders, while for indirect finance, funds are channeled from borrowers to lenders through intermediaries.

Direct finance occurs in financial markets, while indirect finance involves financial intermediaries. Indirect finance is arguably more important, because transactions costs and asymmetric information (moral hazard and adverse selection) make direct finance costly in many cases. Financial intermediaries (e.g., banks) evolved to deal with asymmetric information and transaction costs. An example of direct financial transaction you can engage in is when you lend \$10 to your roommate. One example of indirect finance transaction is when you either take a loan from a bank or put \$100 on your savings account.

3. (10 points) You purchase a 30-year, \$1000 face-value, zero-coupon bond. The interest rate is 5%. One year later the interest rate has changed to 6% 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 $PV=\text{Face value}/(1+0.05)^{30}=\$1000/(1+0.05)^{30}=\$231.38$.

The price in one year is going to be $PV=\text{Face value}/(1+0.06)^{29}=\$1000/(1+0.06)^{29}=\$184.56$. (The payment is going to be made in 29 years; the interest rate is 6% instead of 5%.)

So the change in price is equal to $\$184.56-\$231.38=-\$46.82$ (capital loss). The holding period return is therefore:

Return= $-\$46.82 / \$231.38 = -0.202$ (-20.2%).

4. (10 points) Assume that the expected path of 1-year interest rates over the next five years is 2 percent, 4 percent, 1 percent, 4 percent, and 3 percent. Use the expectations hypothesis to determine the yields on bonds with the following maturities: one year, two years, three years, and four years.

Expectation 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: $i_{2(t)} = (i_{1(t)} + i_{1(t+1)})/2 = (2+4)/2 = 3\%$;

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: $i_{3(t)} = (i_{1(t)} + i_{1(t+1)} + i_{1(t+2)})/3 = (2+4+1)/3 = 2.33\%$;

Yield on a four-year bond today: $i_{4(t)} = (i_{1(t)} + i_{1(t+1)} + i_{1(t+2)} + i_{1(t+3)})/4 = (2+4+1+4)/4 = 2.75\%$;

The yield on one-year bond is given in the problem itself – 2%.

5. (5 points) Which of the following bonds would have highest returns: a corporate Aaa bond, a Treasury Bill, a corporate Baa bond? What determines the differences in returns among these bonds?

There is a positive relationship between risk and return. The higher is the risk, the higher is the return that investors would require to compensate them for the increased risk (they require risk premium). The least risky bond in this problem is a Treasury Bill (it is sometimes called risk-free), it will have lowest return. A corporate Aaa bond is nearly as riskless as a T-Bill. A corporate Baa bond is riskier than a T-Bill and will therefore have the highest return. Assuming that the maturities of all these bonds are the same, only differences in risk can lead to differences in returns.

6. (5 points) You buy a \$1000 face-value, 30-year, coupon bond with 5% coupon rate for \$500. What is the current yield of this bond? Suppose that you sell this bond next year for \$505, what is the holding period return on this bond?

The current Yield is the ratio of the yearly coupon payments to the price paid for the bond.

Current Yield= Coupon payment/Price Paid. Since the coupon payments are equal to $\$1,000 \times 0.05$ (face value times coupon rate) = \$50.

Current Yield= $\$50/\$500 = 10\%$.

The holding period return is equal to

Return=Coupon payment/Price Paid + Change in Price/Price Paid= 10% + (\$505-\$500)/\$500=10%+1%=11%.

7. (10 points) Suppose that you have \$100 to invest and there are two projects that you can invest your money into. The returns on each of these projects are unrelated to each other. The returns on Project A depend on oil prices in the following manner:

Project A:

Oil Prices	Probability	Return
High	0.2	20%
Average	0.6	10%
Low	0.2	0

The returns on Project B depend on amount of snow fall in New-York's Central Park in the following manner:

Project B:

Amount of snow	Probability	Return
High	0.2	18%
Average	0.6	10%
Low	0.2	2%

(a) You consider two investment strategies: either invest all your \$100 in Project A or invest all your \$100 in Project B. For each of these strategies compute the expected return and variance of the returns. If you are risk averse, which one you would choose?

The expected returns are:

A: $0.2*20 + 0.6*10 + 0.2*(0)=10\%$

B: $0.2*(15) + 0.6*10 + 0.2*(5)=10\%$

The variances are:

A: $0.2*(20-10)^2 + 0.6*(10-10)^2 + 0.2*(0-10)^2=40$

B: $0.2*(15-10)^2 + 0.6*(10-10)^2 + 0.2*(25-10)^2=26.5$.

Both investments have the same expected return, however, the investment B is less risky (as measured by the variance of returns). Any risk-averse investor would choose B over A.

(b) Propose an investment strategy that can offer the same expected return but lower variance of returns.

Consider the following investment strategy – put 50% of your money in A and 50% in B (put \$50 in each project). The returns on this investment can be determined by applying the appropriate weights (50%, 50%) to the respective returns on A and B for each combination of oil prices and the amount of snow:

50/50 Strategy:

Oil Prices/Amount of Snow	Probability	Return
High/High	$0.2 \cdot 0.2 = 0.04$	$0.5 \cdot (20\%) + 0.5 \cdot (18\%) = 19\%$
High/Average	$0.2 \cdot 0.6 = 0.12$	$0.5 \cdot (20\%) + 0.5 \cdot (10\%) = 15\%$
High/Low	$0.2 \cdot 0.2 = 0.04$	$0.5 \cdot (20\%) + 0.5 \cdot (2\%) = 11\%$
Average /High	$0.6 \cdot 0.2 = 0.12$	$0.5 \cdot (10\%) + 0.5 \cdot (18\%) = 14\%$
Average / Average	$0.6 \cdot 0.6 = 0.36$	$0.5 \cdot (10\%) + 0.5 \cdot (10\%) = 10\%$
Average / Low	$0.6 \cdot 0.2 = 0.12$	$0.5 \cdot (10\%) + 0.5 \cdot (2\%) = 6\%$
Low/High	$0.2 \cdot 0.2 = 0.04$	$0.5 \cdot (0\%) + 0.5 \cdot (18\%) = 9\%$
Low/Average	$0.2 \cdot 0.6 = 0.12$	$0.5 \cdot (0\%) + 0.5 \cdot (10\%) = 5\%$
Low/Low	$0.2 \cdot 0.2 = 0.04$	$0.5 \cdot (0\%) + 0.5 \cdot (2\%) = 1\%$

The expected return and variance of this investment strategy:

Expected return: 10%

Variances: 16.4%

The 50/50 investment strategy has exactly the same expected return as A and B, but it is less risky than either of them. This strategy is called spreading – investing in projects with unrelated returns.

8. (10 points) What are the three functions of money? Imagine two countries, one that uses music CDs as money, and the other that uses provolone cheese as money. Discuss the advantages and disadvantages of each of these two goods in their role as money?

Functions:

- **Means of payment**
- **Unit of account**
- **Store of Value.**

The advantage of CDs over provolone cheese is that they are relatively durable. Cheese cannot be stored forever, so it's not really useful as a store of value. The main problem with CDs is that they are relatively heterogeneous: to some people Britney Spears's CD is really valuable; to others it is nearly useless. So it may not be as useful as a unit of account.

9. (10 points) Name three factors that shift demand for bonds to the right.

Decrease in the expected future interest rates.

Reduction in the riskiness of the bonds.

Increase in the government expenditures.

10. (10 points) During President Reagan's administration, his supporters argued that higher real interest rates were the result of policies increasing the profitability of investment. Reagan's critics argued that the high interest rates were the result of high budget deficits. Demonstrate graphically and explain how increased profitability of investments and increased deficits affect bond prices and interest rates. Based on your graphs, is there merit to either viewpoint?

An increased budget deficit and increased profitability of investment both increase the supply of bonds. This leads to lower bond prices and higher interest rates. So each viewpoint has a merit.

