

**Winter 2025 Money and Banking  
Problem Set 1**

**Due Jan 21, 2025**

**Multiple Choice Questions** --- Please submit your answers to the MC questions on Canvas

1) Which of the following \$5,000 face-value securities has the highest yield to maturity? 1)

- \_\_\_\_\_
- A) A 10 percent coupon bond selling for \$5,000
  - B) A 12 percent coupon bond selling for \$4,500
  - C) A 6 percent coupon bond selling for \$5,500
  - D) A 6 percent coupon bond selling for \$5,000

2) Which of the following are true of fixed payment loans? 2)

- \_\_\_\_\_
- A) Installment loans and mortgages are frequently of the fixed payment type.
  - B) The borrower repays both the principal and interest at the maturity date.
  - C) The borrower pays interest periodically and the principal at the maturity date.
  - D) Commercial loans to businesses are often of this type.

3) The \_\_\_\_\_ is below the coupon rate when the bond price is \_\_\_\_\_ its par value. 3)

- \_\_\_\_\_
- A) discount rate; above
  - B) discount rate; below
  - C) yield to maturity; above
  - D) yield to maturity; below

4) If \$22,050 is the amount payable in two years for a \$20,000 simple loan made today, the interest rate is

4) \_\_\_\_\_

- A) 5 percent.    B) 10 percent.    C) 22 percent.    D) 25 percent.

5) A consol paying \$20 annually when the interest rate is 5 percent has a price of 5)

- \_\_\_\_\_
- A) \$100.
  - B) \$200.
  - C) \$400.
  - D) \$800.

6) The yield to maturity for a one-year discount bond equals the increase in price over the year, divided by the 6)

- \_\_\_\_\_
- A) coupon rate.
  - B) interest rate.
  - C) initial price.
  - D) face value.

7) A \$1000 face value coupon bond with a \$60 coupon payment every year has a coupon rate of 7)

\_\_\_\_\_

A) 5 percent.    B) .6 percent.    C) 6 percent.    D) 10 percent.

8) The \_\_\_\_\_ is calculated by multiplying the coupon rate times the par value of the bond. 8)

\_\_\_\_\_

A) par value                      B) present value  
C) coupon payment            D) maturity payment

9) If a \$5,000 face-value discount bond maturing in one year is selling for \$5,000, then its yield to maturity is 9)

\_\_\_\_\_

A) 0 percent.    B) 5 percent.    C) 10 percent.    D) 20 percent.

10) An increase in the time to the promised future payment \_\_\_\_\_ the present value of the payment. 10) \_\_\_\_\_

A) is irrelevant to              B) decreases  
C) increases                      D) has no effect on

11) For a 3-year simple loan of \$10,000 at 10 percent, the amount to be repaid is 11) \_\_\_\_\_  
A) \$10,030.    B) \$10,300.    C) \$13,000.    D) \$13,310.

12) A credit market instrument that provides the borrower with an amount of funds that must be repaid at the maturity date along with an interest payment is known as a 12) \_\_\_\_\_

A) discount bond.              B) simple loan.  
C) coupon bond.                D) fixed-payment loan.

13) A coupon bond that has no maturity date and no repayment of principal is called a 13) \_\_\_\_\_

A) cabinet.    B) Treasury bill.    C) Treasury note.    D) consol.

14) The price of a consol equals the coupon payment 14) \_\_\_\_\_

A) plus the interest rate.              B) divided by the interest rate.  
C) minus the interest rate.            D) times the interest rate.

15) If 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, the expectations theory predicts that the bond with the lowest interest rate today is the one with a maturity of 15) \_\_\_\_\_

A) one year.    B) two years.    C) three years.    D) four years.

16) The collapse of the subprime mortgage market 16) \_\_\_\_\_

A) increased the Baa-Aaa spread.  
B) increased the perceived riskiness of Treasury securities.

- C) reduced the Baa-Aaa spread.
- D) did not affect the corporate bond market.

17) Everything else held constant, if the federal government were to guarantee today that it will pay creditors if a corporation goes bankrupt in the future, the interest rate on corporate bonds will \_\_\_\_\_ and the interest rate on Treasury securities will \_\_\_\_\_. 17) \_\_\_\_\_

- A) decrease; increase      B) decrease; decrease
- C) increase; increase      D) increase; decrease

18) According to the liquidity premium theory of the term structure, a flat yield curve indicates that short-term interest rates are expected to 18) \_\_\_\_\_

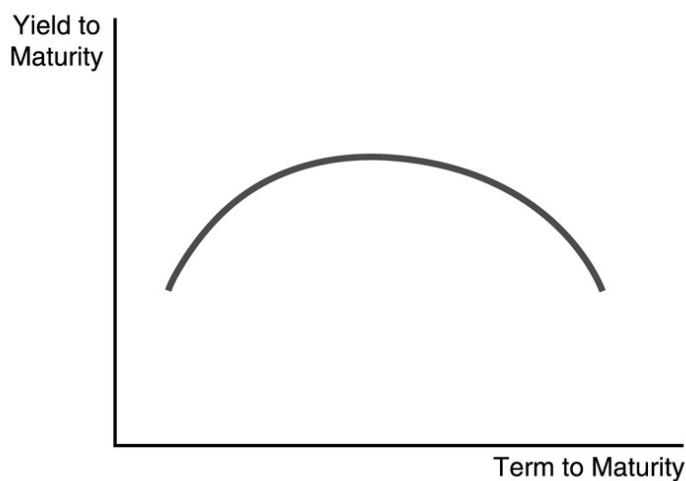
- A) rise in the future.      B) remain unchanged in the future.
- C) decline moderately in the future.      D) decline sharply in the future.

19) According to the liquidity premium theory of the term structure, a downward sloping yield curve indicates that short-term interest rates are expected to 19) \_\_\_\_\_

- A) rise in the future.      B) remain unchanged in the future.
- C) decline moderately in the future.      D) decline sharply in the future.

20) If the expected path of 1-year interest rates over the next five years is 1 percent, 2 percent, 3 percent, 4 percent, and 5 percent, the expectations theory predicts that the bond with the highest interest rate today is the one with a maturity of 20) \_\_\_\_\_

- A) two years.      B) three years.      C) four years.      D) five years.



21) The mound-shaped yield curve in the figure above indicates that short-term interest rates are

expected to

21) \_\_\_\_\_

- A) remain unchanged in the near-term and fall later on.
- B) fall sharply in the near-term and rise later on.
- C) fall moderately in the near-term and rise later on.
- D) rise in the near-term and fall later on.

22) According to the liquidity premium theory of the term structure

22) \_\_\_\_\_

- A) yield curves should never slope downward.
- B) interest rates on bonds of different maturities do not move together over time.
- C) bonds of different maturities are not substitutes.
- D) if yield curves are downward sloping, then short-term interest rates are expected to fall by so much that, even when the positive term premium is added, long-term rates fall below short-term rates.

23) According to the expectations theory of the term structure

23) \_\_\_\_\_

- A) when the yield curve is steeply upward sloping, short-term interest rates are expected to remain relatively stable in the future.
- B) investors have strong preferences for short-term relative to long-term bonds, explaining why yield curves typically slope upward.
- C) when the yield curve is downward sloping, short-term interest rates are expected to remain relatively stable in the future.
- D) yield curves should be equally likely to slope downward as slope upward.

24) When the Treasury bond market becomes more liquid, other things equal, the demand curve for corporate bonds shifts to the \_\_\_\_\_ and the demand curve for Treasury bonds shifts to the \_\_\_\_\_.

24) \_\_\_\_\_

- A) right; left
- B) left; left
- C) right; right
- D) left; right

25) Everything else held constant, if the tax-exempt status of municipal bonds were eliminated, then

25) \_\_\_\_\_

- A) the interest rate on municipal bonds would exceed the rate on Treasury bonds.
- B) the interest rates on municipal, Treasury, and corporate bonds would all increase.
- C) the interest rate on municipal bonds would equal the rate on Treasury bonds.
- D) the interest rates on municipal bonds would still be less than the interest rate on Treasury bonds.

26) An inverted yield curve

26) \_\_\_\_\_

- A) slopes up.                      B) slopes down.  
C) has a U shape.                D) is flat.

27) The risk that interest payments will not be made, or that the face value of a bond is not repaid when a bond matures is \_\_\_\_\_ 27)

- A) inflation risk. B) default risk.  
C) moral hazard.                D) interest rate risk.

28) Municipal bonds have default risk, yet their interest rates are lower than the rates on default-free Treasury bonds. This suggests that \_\_\_\_\_ 28)

- A) Treasury bonds are not default-free.  
B) the benefit from the tax-exempt status of municipal bonds equals their default risk.  
C) the benefit from the tax-exempt status of municipal bonds exceeds their default risk.  
D) the benefit from the tax-exempt status of municipal bonds is less than their default risk.

29) An inverted yield curve predicts that short-term interest rates \_\_\_\_\_ 29) \_\_\_\_\_

- A) will fall in the future.                      B) are expected to rise in the future.  
C) will remain unchanged in the future.    D) will rise and then fall in the future.

30) If the yield curve slope is flat for short maturities and then slopes steeply upward for longer maturities, the liquidity premium theory (assuming a mild preference for shorter-term bonds) indicates that the market is predicting \_\_\_\_\_ 30) \_\_\_\_\_

- A) constant short-term interest rates in the near future and a decline further out in the future.  
B) a decline in short-term interest rates in the near future and a rise further out in the future.  
C) constant short-term interest rates in the near future and further out in the future.  
D) a rise in short-term interest rates in the near future and a decline further out in the future.

## Short Answers

1. [Yield To Maturity and Real Interest Rate] Suppose a project costs \$1000 to invest and generates a cash flow of \$400 in the first year, \$400 in the second year, \$200 in the third year and \$300 in the fourth year.

(a) Compute the yield to maturity of this project.

(b) Suppose the expected inflation rate in the next four years is 2%. What is the real interest rate implied by the project?

(c) Suppose the expected inflation rate is 2% for the first year, 3% for the second year, 1% for the third year and 3% for the fourth year. What is the real interest rate implied by this project?

2. [Optimal Investment] Suppose you have \$1000 for investment and there are two potential investment projects A and B.

Project A: You pay an investment cost of \$1000 now and receive \$1150 after one year.

Project B: You pay an investment cost of \$1000 now and receive \$1300 after two years.

(a) Compute the yield to maturity of A and B. Which project is more profitable?

Now suppose two other projects are also available for investment.

Project C: You pay an investment cost of \$1150 one year from now and receive \$1600 three years from now.

Project D: You pay an investment cost of \$1300 two years from now and receive \$1650 four years from now.

(b) You can invest in multiple projects as long as you have enough money to pay the investment cost. For example, you can invest in Project A now, receive \$1150 after one year and then reinvest \$1150 in Project C. Which investment strategy (i.e. combination of projects) delivers the highest yield to maturity?

3. [Data exercise on the real interest rate] In this exercise we check if the nominal interest rate is a good approximation of the real interest.

(a) Plot the nominal interest rate from 1960 to 2014. (Hint: You can either use the daily interest rates for selected U.S. Treasury, private money market and capital market instruments from [www.federalreserve.gov/releases/H15](http://www.federalreserve.gov/releases/H15) or the effective federal funds rate from [FRED](http://FRED).)

(b) The *Consumer Price Index* (CPI) is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services. Intuitively, the CPI represents the cost of living or the average price level. Plot the CPI from 1960 to 2013.

(c) The *inflation rate* is the yearly percentage change in the average price level. In practice, we usually use the percentage change in the CPI to compute the inflation rate. Plot the inflation rate from 1960 to 2013.

(d) Explain the difference between the *ex-ante* and *ex-post* real interest rate. Use the Fisher equation to compute the ex-post real interest rate. Plot the nominal interest rate and the ex-post real interest rate from 1960 to 2013 in the same graph. Do they always move in the same direction?

4. [Data exercise on money growth and inflation] In this exercise we verify whether the money growth rate affects inflation in the long-run (it is called the Quantity theory of money, which we will cover later). Collect quarterly data on M2 money stock and CPI in the US from 1975-2010. You may use the data provided by [FRED](#).

- (a) Plot the growth rate of M2 (i.e. percentage change from year ago) and the inflation rate. Do we see any relationship between them?
- (b) Now we want to focus on the long-term trend of money growth and inflation, and ignore the high frequency fluctuations. To do so we use the Hodrick-Prescott filter which can decompose a time series into a slow moving trend component and a high frequency cycle component. Apply the Hodrick-Prescott (HP) filter, with a smoothing parameter of 1600, to both variables. Plot the trend components of the M2 growth and inflation. Do you see a pattern? The impact of M2 growth on inflation can take a few years to appear, so it is also useful to plot the M2 growth with a lag of 6 years.