

Midterm Exam I

Name _____

Id # _____

Instructions: There are two parts to this midterm. Part A consists of multiple choice questions. Please mark the answers to the multiple choice questions on the exam paper and fill in the relevant bubble on the Scantron sheet. Part A is worth 60%.

Part B is worth 40% and consists of short answer questions. Please answer in the space provided. Please attempt both parts and turn the exam in at the end.

Part A: MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) If the price level doubles, the value of money
- A) rises but does not double, due to diminishing returns.
 - B) more than doubles, due to scale economies.
 - C) falls by 50 percent.
 - D) doubles.

Answer: C

- 2) The narrowest measure of money that the Fed reports is
- A) M0.
 - B) M1.
 - C) M3.
 - D) M2.

Answer: B

- 3) The difference between money and income is that
- A) money is a stock and income is a flow.
 - B) money is a flow and income is a stock.
 - C) there is no difference—money and income are both stocks.
 - D) there is no difference—money and income are both flows.

Answer: A

- 4) Of the major central banks of the world, the most independent is
- A) the Bank of Japan.
 - B) the Bank of Canada.
 - C) the Federal Reserve System.
 - D) the Bank of England.
 - E) the European Central Bank.

Answer: E

- 5) The current yield on a \$10,000, 5 percent coupon bond selling for \$8,000 is
- A) 7 percent.
 - B) 5 percent.
 - C) 6 percent.
 - D) 8 percent.

Answer: C

- 12) If reserves in the banking system increase by \$100, then checkable deposits will increase by \$500 in the simple model of deposit creation when the required reserve ratio is
- A) 0.10. B) 0.20 C) 0.05. D) 0.01.

Answer: B

- 13) Of money's three functions, the one that distinguishes money from other assets is its function as a
- A) medium of exchange. B) standard of deferred payment.
C) unit of account. D) store of value.

Answer: A

- 14) If it is generally acceptable as a medium of exchange then it
- A) is money. B) must be a precious metal such as gold or silver.
C) must be a commodity. D) all of the above.

Answer: A

- 15) Both _____ and _____ are Federal Reserve assets.
- A) currency in circulation; government securities
B) discount loans; bank reserves
C) government securities; discount loans
D) government securities; bank reserves
E) currency in circulation; discount loans

Answer: C

Part B: SHORT ANSWER QUESTIONS (40%)

Write brief answers to the questions below being as succinct and clear as possible. **Show any calculations** as necessary in answering the questions. Note: You will not receive full credit for just simply writing down the answer, without showing any working!

16. (20%) Each part of this question is worth 4 points. In this question, you may assume that the market interest rate, $i=10\%$.

a. Suppose asset A pays coupon payments of \$100 per year forever. What is the price, P_A , of such an asset?

Answer:

Asset A is a perpetuity since it pays out forever. The price is the annuity value of its coupon payments.

$$P_A = \frac{C}{i} = \frac{\$100}{0.1} = \$1000$$

b. Suppose asset B is an asset, which if purchased, starts paying out coupons of \$100 from year six. What would be the price, $P_{B,5}$, of this asset in **year 5**?

Answer:

Asset B is also a perpetuity with the same characteristics as asset A. Hence in year 5, its price would be the same as that of asset A today, i.e. $P_{B,5}=\$1000$

c. What is the price, P_B , of asset B today?

Answer:

Price of asset B today, is the discounted value of $P_{B,5}$:

$$P_B = \frac{P_{B,5}}{(1+i)^5} = \frac{\$1000}{1.1^5} = \$620.92$$

d. Assume that there is an asset C that pays out \$100 each year for 5 years (starting paying out in year 1). How is the price of asset C, P_C , related to the price of assets A and B, P_A and P_B respectively? (Note: Here I am just looking for the algebraic relationship between P_A , P_B and P_C – you don't need to calculate P_C)

Answer:

$$P_C = P_A - P_B$$

- e. Suppose asset A also pays \$100 today and \$1610 in year 5. Show the algebraic relationship between the new price of asset A, P_A^{new} and the old price, P_A^{old} , without substituting in for interest rates. (That is, do not replace i with 0.1). You should have an expression for P_A^{new} in terms of P_A^{old} and i .

Answer:

To work out and see the relationship between the new price of asset A and the old price, we have to discount the new payoffs appropriately and add them to the old price:

$$P_A^{new} = \$100 + \frac{\$1610}{(1+i)^5} + P_A^{old}$$

17. (20%) Consider Asset A: a 5-year corporate bond with a \$1,000 face value and a coupon rate of 10%. Market interest rates at 5.325%.

- a. [4 pts] Calculate the current yield for this bond: suppose the corporate bond has an initial price of \$1,200.

Answer:

The current yield, $i_c = C/P_t$, where C is the value of coupon payments, and P_t is the current price, i.e.

$$\begin{aligned} i_c &= 1000 * 0.1 / 1200 \\ &= 8.333\% \end{aligned}$$

- b. [6pts] Suppose that the corporate bond's price is expected to increase to \$1,250 next period because of an expected decrease in interest rates. Calculate the rate of capital gain or loss. Using the (initial) current yield and rate of capital gain or loss, compute the expected 1 year rate of return for this bond (– that is if you were intending to hold the bond for 1 year and sell it next year when the price increases to \$1250).

Answer:

$$\text{Rate of capital gain/loss} = (P_{t+1} - P_t) / P_t = (1250 - 1200) / 1200 = 4.167\%$$

$$\begin{aligned} \text{Expected 1 year rate of return} &= \text{current yield} + \text{rate of capital gain} \\ &= 8.333\% + 4.167\% = 12.5\% \end{aligned}$$

- c. [3 pts] What would your expected rate of return be if you were to hold the 5 year corporate bond for the full 5 years instead of selling it prior to maturity?

Answer:

If the bond were held for the entire time to maturity, the expected rate of return equals the coupon rate, i.e. 10%

Now consider Asset B, another bond with similar characteristics to the 5 year corporate bond, except that it matures in 10 years (i.e. it has a \$1000 face value and a coupon rate of 10%).

- d. [2 pts] Would you expect asset B to be initially priced higher or lower than asset A? Why? (Please keep your answer to just one sentence)

Answer:

Asset B should be priced higher than Asset A initially, since it pays out more coupon payments, and as a result, the present discounted value of this stream of assets is higher than for asset A.

- e. [3 pts] Suppose that interest rates actually rose instead of falling as they were expected to in part (b). Which asset's price (i.e. asset A or asset B) would be most impacted by this event? Why?

Answer:

The price of asset B would be most impacted, since it has a greater number of terms to discount. As interest rates rise, payoff terms further away (i.e. after year 5) get discounted more and hence there is a bigger impact on the price of asset B.

- f. [2 pts] From your answer to part (e), what would you say is the relationship between changes in interest rates and returns for someone intending to hold a bond and sell it before it matures?

Answer:

Due to interest rate risk, there is a negative relationship between returns and interest rates.