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Korea University
IIE 301 - Money & Banking
Summer 2005

Midterm Exam Key

This exam is closed book and closed notes, though you may use a calculator. **Write your name on each sheet of this exam!** Read all questions carefully before answering. Answer in the space provided, using any (clearly labeled) graphs you think are appropriate. Keep your answers concise and to the point. Points will be deducted for answers which are correct, but irrelevant to the question.

Section I (short answers)

1. What is the implicit annualized yield to maturity on a \$100,000 T-bill that comes due in 3 months and which sells for a price today of \$98,000? Show your reasoning.

$$\left(\frac{FV}{PV}\right)^{1/N} - 1 = i \quad \left(\frac{100,000}{98,000}\right)^4 - 1 = i \quad (1.020408)^4 - 1 = i \quad .08417 = i$$

8.42%

2. What is the annualized yield to maturity for an annuity that pays \$10,000 per year and sells for \$80,000 today? Show your reasoning.

Price this as a perpetuity.

$$PV = \frac{Pmt}{1+i} \sum_{t=1}^{\infty} \frac{1}{(1+i)^t} = \frac{Pmt}{1+i} \frac{1}{1 - \frac{1}{1+i}} = \frac{Pmt}{1+i} \frac{1+i}{i} = \frac{Pmt}{i} \quad 80,000 = \frac{10,000}{i} \quad i = \frac{1}{8} = .125$$

12.50%

3. What is the current yield on a 30-year coupon bond with a face-value of \$1,000,000 and yearly coupons of 9% that sells for \$800,000? Show your reasoning.

$$cy = \frac{Pmt}{PV} \quad cy = \frac{.09 \cdot 1,000,000}{800,000} = \frac{90,000}{800,000} = .1125$$

11.25%

4. What is the discount yield on a bond coming due in 30 days if the price is \$9900 and the face value is \$10,000? Show your reasoning.

$$dy = \left(\frac{FV-PV}{FV}\right) \frac{360}{days_to_maturity} \quad dy = \left(\frac{1000}{10,000}\right) \frac{360}{30} \quad dy = .01 \cdot 12 = .12$$

12.00%

5. Assuming there is no risk aversion (i.e. no economic risk premium), calculate the price of a no-coupon corporate bond that comes due in one year. Assume the rate on T-bills is 5%. Assume the corporate bond has the following payoff schedule:

pays \$1,000,000 with 90% probability
pays \$500,000 with 10% probability (firm goes bankrupt)

$$\frac{E\{FV\}}{(1+i)^N} = PV \quad E\{FV\} = .9(1,000,000) + .1(500,000) = 950,000$$

$$\frac{950,000}{1.05} = PV$$

\$904,761

6. List the three important stylized facts about the behavior of interest rates in relation to the yield curve.

- A) Interest rates of all maturities rise and fall together**
- B) Low short term rates are associated with a steep yield curve, High short term rates are associated with a flat or inverted yield curve**
- C) The yield curve usually slopes upward**

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7. Given the following data, calculate the CPI for each year, using 2000 as the base year. The market basket is 10 shirts and 2 pairs of shoes

Year	price of a shirt	price of pair of shoes	price of basket	CPI
2000	\$10	\$10	\$120	100.00
2001	\$12	\$10	\$140	116.67
2002	\$15	\$11	\$172	143.33
2003	\$15	\$12	\$174	145.00
2004	\$15	\$15	\$180	150.00

8. Given the following data calculate real GDP, nominal GDP & the GDP deflator for each year, using 2000 as the base year.

Year	Prices TV	sandwich	Production TV	sandwich	real GDP	nominal GDP	GDP Deflator
2000	\$100	\$1.00	100	10,000	\$20,000	\$20,000	100.00
2001	\$110	\$1.05	125	15,000	\$27,500	\$29,500	107.27
2002	\$125	\$1.10	150	20,000	\$35,000	\$40,750	116.43
2003	\$130	\$1.10	200	25,000	\$45,000	\$53,500	118.89
2004	\$150	\$1.25	300	30,000	\$60,000	\$82,500	137.50

Section II (multiple choice)

9. Which of the following is NOT a depository savings institution?
- a. commercial bank
 - b. life insurance company**
 - c. credit union
 - d. mutual savings bank
 - e. all of the above are depository savings institutions
10. The inability to distinguish between responsible and irresponsible borrowers leads to ...
- a. moral hazard
 - b. an externality
 - c. a free-rider problem
 - d. adverse selection**
 - e. none of the above
11. The market for securities with a maturity of less than one year is referred to as...
- a. the capital market
 - b. the secondary market
 - c. the exchange market
 - d. the equity market
 - e. none of the above, it is "the money market"**
12. A tradable security which pays small annual payments of a fixed amount in addition to a large final payment is called...
- a. a simple bond
 - b. a coupon bond**
 - c. a fixed payment loan
 - d. a simple loan
 - e. none of the above

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13. A *tradable* security which pays a single fixed amount on the maturity date is called...
- a. **a simple bond**
 - b. a coupon bond
 - c. a fixed payment loan
 - d. a simple loan
 - e. none of the above
14. A mortgage or financing for an automobile is usually done using...
- a. a simple bond
 - b. a coupon bond
 - c. **a fixed payment loan**
 - d. a simple loan
 - e. none of the above
15. An approximation of the ~~current yield~~ *yield to maturity* often used for coupon bonds is...
- a. the future yield
 - b. **the current yield**
 - c. the federal funds rate
 - d. the discount yield
 - e. **none of the above (if current yield is used in question)**
16. An approximation of the ~~current yield~~ *yield to maturity* often used for short-term bonds is...
- a. the future yield
 - b. the current yield
 - c. the federal funds rate
 - d. **the discount yield**
 - e. **none of the above (if current yield is used in question)**
17. The Fisher equation shows a relation between...
- a. **the real interest rate, the nominal interest rate and the expected rate of inflation**
 - b. the real interest rate, the nominal interest rate and the rate of economic growth
 - c. the real interest rate, the rate of economic growth and the expected rate of inflation
 - d. the rate of economic growth, the nominal interest rate and the expected rate of inflation
 - e. none of the above
18. The short-run drop in interest rates observed when the money supply rises is known as...
- a. the price effect
 - b. the Fisher effect
 - c. the domino effect
 - d. **the liquidity effect**
 - e. none of the above
19. A risk premium is the difference between...
- a. the price and the intrinsic value of a bond
 - b. the price and the face-value of a bond
 - c. the present-value and the face-value of a bond
 - d. the difference between the price of a bond and the price of a perfectly liquid bond
 - e. **none of the above, the difference between the price of a bond and the price of an otherwise identical riskless bond**
20. The liquidity preference model developed by Keynes...
- a. **equates the demand for real money balances with the real supply of money**
 - b. equates the demand for bonds with the supply of bonds at various maturities
 - c. equates the demand for investment with the supply of savings
 - d. equates the demand for real money with the supply of bonds & stocks
 - e. none of the above