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1 Review, Ch 1–3

1.1 Structure of Financial Markets

Debt and Equity Markets: How to raise funds?
   debt instruments: e.g. bonds, mortgages, or **equities**: e.g. common stock
Primary and Secondary Markets; Exchanges vs Over-the-counter markets; Money and Capital markets

1.2 Financial Market Instruments

1.2.1 Money Market Instruments: (Short-term (<1 year maturity), less price fluctuation, less risk)

Examples: US Treasure Bills (T-Bills); Negotiable bank certificates of deposit (CD); Commercial paper; Repurchase agreements (repos); Federal funds

1.2.2 Money market rates

prime rate; federal funds rate; LIBOR rate

1.2.3 Capital Market Instruments (Intermediate- to long-term (>1 year) maturity, more price fluctuation)

Corporate shares; Mortgages and Mortgage-backed securities; Corporate bonds; Long-term U.S. government securities: e.g. treasury *bonds* (not to be confused with treasury *bills*); State and local government bonds (municipal bonds); Bank commercial loans; Consumer loans; Commercial and farm mortgages

1.2.4 Capital Market Interest Rates

10-year treasury rate; 30-year mortgage rate; 5-year adjustable-rate mortage rate (ARM)

1.3 Function of Financial Intermediaries: indirect finance

Reducing transaction costs; Risk sharing; Asymmetric information (adverse selection and moral hazard)

1.4 Types of Financial Intermediaries

Depository institutions (banks);

- Commercial banks
- Thrifts: savings and loans (S&L) and mutual savings bank; credit unions
- Contractual savings institution (investment funds)
- Insurance companies
- Pension funds and government retirement funds
- Finance companies

1.5 Regulation of the Financial System

Securities and Exchange Commission (SEC); Commodities Futures Trading Commission (CFTC); Office of the Comptroller of the Currency (OCC); Federal Deposit Insurance Corporation (FDIC); National Credit Union Administration (NCUA); Federal Reserve System (Fed); Office of Thrift Supervision; State banking and insurance commissions

1.6   What is Money?

1.6.1   Functions of Money

- Medium of exchange
- Unit of account
- Store of value

1.6.2   Evolution of the payments system

Commodity money; Fiat money; Checks; Electronic payments; Electronic currencies (e.g. cryptocurrency)

1.6.3   Measures of money

M1: most liquid forms of money—e.g., currency, checking account deposits, travelers checks
M2: adds slightly less liquid forms like savings accounts

2   Understanding Interest Rates

2.1   Present value

$$\text{Present Value} = \frac{\text{Future Cash Flow}}{(1 + \text{interest rate})^{\text{number of years to maturity}}} = \frac{CF}{(1+i)^n}$$

2.2   Four Types of Credit Market Instruments

- Simple loans: Principal plus interest paid at maturity

  - Discount bond (zero-coupon bond): e.g. T-bills. Pays face value at maturity, sold at a discount (less than face value)

- Fixed-payment loans: loan repaid over time in scheduled payments

  - Coupon bond: e.g. longer-term treasury securities. Pays fixed amounts at regular intervals and face value at maturity. Coupon rate: annual coupon payment divided by bond face value.

2.3   Yield to Maturity (YTM)

Yield to maturity: interest rate that equates the present value of cash flow from a financial instrument with its value today.

- Simple loans: YTM = simple interest rate
- Fixed-payment loans: $LV = \frac{FP}{1+i} + \frac{FP}{(1+i)^n} + \ldots + \frac{FP}{(1+i)^n}$
- Coupon bond: $P = \frac{C}{1+i} + \frac{C}{(1+i)^n} + \ldots + \frac{C}{(1+i)^n} + \frac{F}{(1+i)^n}$

  - If sold at face value ($P = F$) then YTM is coupon rate.
  - Price of coupon bond and YTM are *negatively* related. Higher price $\Rightarrow$ lower YTM
  - If $P > F$, then YTM is less than the coupon rate

- Perpetuity/consol (Pays fixed payments forever): $P = \frac{C}{1+i} + \frac{C}{(1+i)^2} + \ldots = \frac{C}{i}$
- Discount bond $P = \frac{F}{1+i^n}$, so for a 1-year maturity ($n = 1$) we have $i = \frac{F-P}{P}$

2.4   Interest Rates vs. Returns

Rate of return is the sum of payments plus the change in security's value as a fraction of current price of the asset.

- Return on a bond held for from t to $t + 1$:

$$R = \frac{C + P_{t+1} - P_t}{P_t} = \underbrace{\frac{C}{P_t}}_{\text{current yield}} + \underbrace{\frac{P_{t+1} - P_t}{P_t}}_{\text{capital gain rate}}$$

Rate of return will typically differ from YTM on account of price fluctuations.

2.5   Maturity and Volatility of Bond Returns: Interest-rate Risk

Longer-term bonds are more volatile than shorter-term ones. (Why?)

2.6   Real vs. Nominal Interest Rates

Fisher equation: Nominal interest is real interest plus inflation rate $i = r + \pi$

2.7   Some Useful Formulae

Geometric sums: for $-1 < r < 1$

$$1 + r + r^2 + r^3 + \ldots + r^n = \frac{1 - r^{n+1}}{1 - r}$$

$$1 + r + r^2 + r^3 + \ldots = \frac{1}{1 - r}$$

3   Exercises (Past exam questions)

1. Economists group commercial banks, savings and loan associations, credit unions, mutual funds, mutual savings banks, insurance companies, pension funds, and finance companies together under the heading *financial intermediaries*. Financial intermediaries:

   (a) provide a channel for linking those who want to save with those who want to invest.
   (b) hold very little of the average American's wealth.
   (c) can hurt the performance of the economy.
   (d) produce nothing of value and are therefore a drain on society's resources.

2. Markets in which funds are transferred from those who have excess funds available to those who have a shortage of available funds are called

   (a) derivative exchange markets.
   (b) commodity markets.
   (c) financial markets.
   (d) fund-available markets.

3. A financial market in which previously issued securities can be resold is called a _____ market.

   (a) primary
   (b) used securities
   (c) tertiary
   (d) secondary

4. Which of the following instruments are traded in a capital market?

   (a) U.S. Treasury Bills
   (b) Banker's acceptances
   (c) Repurchase agreements
   (d) Corporate bonds

5. The conversion of a barter economy to one that uses money

   (a) does not increase economic efficiency.
   (b) increases efficiency by reducing the need to exchange goods and services.
   (c) increases efficiency by reducing the need to specialize.
   (d) increases efficiency by reducing transactions costs.

6. Kevin purchasing concert tickets with his debit card is an example of the _____ function of money.

   (a) store of value
   (b) specialization
   (c) medium of exchange
   (d) unit of account

7. In a barter economy, the number of prices in an economy with N goods is:

   (a) $2N$
   (b) $N(N/2)$
   (c) $N(N-1)/2$
   (d) $N(N/2) - 1$

8. The return on a 5% coupon bond that initially sells for $1000 and sells for $950 next year is

   (a) -5%
   (b) 5%
   (c) 0%
   (d) -10%

9. Sara decides to lend Tom $100 for 3 years at 6% interest with principal due at the end of the 3rd year. What is the total amount Tom must pay Sara at the end of the 3rd year?

   (a) $119.10
   (b) $118.21
   (c) $106.18
   (d) $125.66

10. Tom would like to borrow $500 from Sara today. In return, Tom has agreed to pay Sara $75 forever, but will never pay back the $500 (assume they both live forever). What is Sara's yield to maturity?

    (a) 15%
    (b) 18%
    (c) 13%
    (d) 12.5%

11. Which of the following $1,000 face-value securities has the highest yield to maturity?

    (a) A 5% coupon bond with a price of $600.
    (b) A 5% coupon bond with a price of $800.
    (c) A 5% coupon bond with a price of $1,000.
    (d) A 5% coupon bond with a price $1,200.