

TA Info

Gary Baker (he/him)

Office: Social Sciences 6470
Email: gary.baker@wisc.edu
Website: garygbaker.com
Office Hours: Mondays, 1–2 PM (Zoom, see Canvas for link)
 Wednesdays, 9–10 AM (in person)

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 Treasury 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 mortgage 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: $LV = \frac{FP}{1+i} + \frac{FP}{(1+i)^2} + \dots + \frac{FP}{(1+i)^n}$
- Coupon bond: $P = \frac{C}{1+i} + \frac{C}{(1+i)^2} + \dots + \frac{C}{(1+i)^n} + \frac{F}{(1+i)^n}$
 - 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): $P = \frac{C}{1+i} + \frac{C}{(1+i)^2} + \dots = \frac{C}{i}$
- 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 $-1 < r < 1$

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

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

3 Exercises (Past exam questions)

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

Answer: (A)

- Markets in which funds are transferred from those who have excess funds available to those who have a shortage of available funds are called
 - derivative exchange markets.
 - commodity markets.
 - financial markets.
 - fund-available markets.

Answer: (C)

- A financial market in which previously issued securities can be resold is called a _____ market.
 - primary
 - used securities
 - tertiary
 - secondary

Answer: (D)

- Which of the following instruments are traded in a capital market?
 - U.S. Treasury Bills
 - Banker's acceptances
 - Repurchase agreements
 - Corporate bonds

Answer: (D)

- 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.

Answer: (D)

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

Answer: (C)

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) $N(N/2) - 1$

Answer: (C). For each good, you need $(N - 1)$ prices (one for each other good that could be used for exchange). Since there are N goods, you would have $N(N - 1)$ different prices, however, this double counts—for example, the price of apples in terms of oranges is equivalently a price of oranges in terms of apples. So the total number of distinct prices is $N(N - 1)/2$.

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%

Answer: (C). Use the formula for rate of return. The current rate of return is the coupon rate (5%), but the growth rate of the asset price was -5% ($\frac{950-1000}{1000} = -0.05$). So total rate of return was $R = 0\%$

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

Answer: (A). Compounding annually, the payment at the end of year 3 is the principal times total interest which is $(1.06)^3 \times \$100 \approx \119.10

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%

Answer: (A). Use the YTM equation. Sara pays (lends) \$500 for the asset today, so that is her current value. Tom pays \$75 per year forever, so using the present value equation, we have

$$500 = \frac{75}{1+i} + \frac{75}{(1+i)^2} + \dots = \frac{75}{1+i} \times \underbrace{\left(1 + \frac{1}{1+i} + \frac{1}{(1+i)^2} + \dots\right)}_{\frac{1+i}{i} \text{ (Geometric summation)}} = \frac{75}{i}$$

Rearranging terms we find $i = 75/500 = 0.15$ or 15%.

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.

Answer: (A). All 4 bonds have the same future cash flow. Looking at the YTM equation, holding future cash flow fixed, YTM is **higher** when prices are **lower**.