

all the major stand-alone U.S. investment banks had been absorbed into commercial banks or had reorganized themselves into bank holding companies. In Europe, where universal banking had never been prohibited, large banks had long maintained both commercial and investment banking divisions.

6. The financial crisis of 2008 showed the importance of systemic risk. Systemic risk can be limited by transparency that allows traders and investors to assess the risk of their counterparties; capital requirements to prevent trading participants from being brought down by potential losses; frequent settlement of gains or losses to prevent losses from accumulating beyond an institution's ability to bear them; incentives to discourage excessive risk taking; and accurate and unbiased analysis by those charged with evaluating security risk.

KEY TERMS

investment	security selection	primary market
real assets	security analysis	secondary market
financial assets	risk–return trade-off	venture capital (VC)
fixed-income (debt) securities	passive management	private equity
equity	active management	securitization
derivative securities	financial intermediaries	systemic risk
agency problem	investment companies	
asset allocation	investment bankers	

PROBLEM SETS

- Financial engineering has been disparaged as nothing more than paper shuffling. Critics argue that resources used for *rearranging* wealth (i.e., bundling and unbundling financial assets) might be better spent on *creating* wealth (i.e., creating real assets). Evaluate this criticism. Are any benefits realized by creating an array of derivative securities from various primary securities?
- Why would you expect securitization to take place only in highly developed capital markets?
- What is the relationship between securitization and the role of financial intermediaries in the economy? What happens to financial intermediaries as securitization progresses?
- Although we stated that real assets constitute the true productive capacity of an economy, it is hard to conceive of a modern economy without well-developed financial markets and security types. How would the productive capacity of the U.S. economy be affected if there were no markets in which to trade financial assets?
- Firms raise capital from investors by issuing shares in the primary markets. Does this imply that corporate financial managers can ignore trading of previously issued shares in the secondary market?
- Suppose housing prices across the world double.
 - Is society any richer for the change?
 - Are homeowners wealthier?
 - Can you reconcile your answers to (a) and (b)? Is anyone worse off as a result of the change?
- Lanni Products is a start-up computer software development firm. It currently owns computer equipment worth \$30,000 and has cash on hand of \$20,000 contributed by Lanni's owners. For each of the following transactions, identify the real and/or financial assets that trade hands. Are any financial assets created or destroyed in the transaction?
 - Lanni takes out a bank loan. It receives \$50,000 in cash and signs a note promising to pay back the loan over 3 years.
 - Lanni uses the cash from the bank plus \$20,000 of its own funds to finance the development of new financial planning software.

- c. Lanni sells the software product to Microsoft, which will market it to the public under the Microsoft name. Lanni accepts payment in the form of 2,500 shares of Microsoft stock.
- d. Lanni sells the shares of stock for \$50 per share and uses part of the proceeds to pay off the bank loan.
8. Reconsider Lanni Products from the previous problem.
- Prepare its balance sheet just after it gets the bank loan. What is the ratio of real assets to total assets?
 - Prepare the balance sheet after Lanni spends the \$70,000 to develop its software product. What is the ratio of real assets to total assets?
 - Prepare the balance sheet after Lanni accepts the payment of shares from Microsoft. What is the ratio of real assets to total assets?
9. Examine the balance sheet of commercial banks in Table 1.3.
- What is the ratio of real assets to total assets?
 - What is the ratio of real assets to total assets for nonfinancial firms (Table 1.4)?
 - Why should this difference be expected?
10. Consider Figure 1A, which describes an issue of American gold certificates.
- Is this issue a primary or secondary market transaction?
 - Are the certificates primitive or derivative assets?
 - What market niche is filled by this offering?
11. Discuss the advantages and disadvantages of the following forms of managerial compensation in terms of mitigating agency problems, that is, potential conflicts of interest between managers and shareholders.
- A fixed salary.
 - Stock in the firm that must be held for five years.
 - A salary linked to the firm's profits.
12. Oversight by large institutional investors or creditors is one mechanism to reduce agency problems. Why don't individual investors in the firm have the same incentive to keep an eye on management?
13. Give an example of three financial intermediaries and explain how they act as a bridge between small investors and large capital markets or corporations.
14. The average rate of return on investments in large stocks has outpaced that on investments in Treasury bills by about 8% since 1926. Why, then, does anyone invest in Treasury bills?
15. What are some advantages and disadvantages of top-down versus bottom-up investing styles?
16. You see an advertisement for a book that claims to show how you can make \$1 million with no risk and with no money down. Will you buy the book?
17. Why do financial assets show up as a component of household wealth, but not of national wealth? Why do financial assets still matter for the material well-being of an economy?
18. Wall Street firms have traditionally compensated their traders with a share of the trading profits that they generated. How might this practice have affected traders' willingness to assume risk? What is the agency problem this practice engendered?
19. What reforms to the financial system might reduce its exposure to systemic risk?

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these Certificates. This offer is made only by the Offering Memorandum.

NEW ISSUE **\$100,000,000** July 7, 1987

AMERICAN GOLD CERTIFICATES

Due July 1, 1991

- American Gold Certificates represent physical allocated gold bullion insured and held in safekeeping at Bank of Delaware.
- Anytime during the four-year period, the certificate holder may request physical delivery of the gold.

Copies of the Offering Memorandum may be obtained in any State from only such of the undersigned as may legally offer these certificates in such State.

J. W. KORTH CAPITAL MARKETS, INC.

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Figure 1A A gold-backed security

mortgages pooled into its pass-through securities, but these guarantees are absent in private-label pass-throughs.

5. Common stock is an ownership share in a corporation. Each share entitles its owner to one vote on matters of corporate governance and to a prorated share of the dividends paid to shareholders. Stock, or equity, owners are the residual claimants on the income earned by the firm.
6. Preferred stock usually pays fixed dividends for the life of the firm; it is a perpetuity. A firm's failure to pay the dividend due on preferred stock, however, does not precipitate corporate bankruptcy. Instead, unpaid dividends simply cumulate. Variants of preferred stock include convertible and adjustable-rate issues.
7. Many stock market indexes measure the performance of the overall market. The Dow Jones averages, the oldest and best-known indicators, are price-weighted indexes. Today, many broad-based, market-value-weighted indexes are computed daily. These include the Standard & Poor's 500 stock index, the NYSE index, the NASDAQ index, the Wilshire 5000 index, and indexes of many non-U.S. stock markets.
8. A call option is a right to purchase an asset at a stipulated exercise price on or before an expiration date. A put option is the right to sell an asset at some exercise price. Calls increase in value while puts decrease in value as the price of the underlying asset increases.
9. A futures contract is an obligation to buy or sell an asset at a stipulated futures price on a maturity date. The long position, which commits to purchasing, gains if the asset value increases while the short position, which commits to delivering, loses.

money market
capital markets

ask price

bid price

bid-ask spread

certificate of deposit

commercial paper

banker's acceptance

Eurodollars

repurchase agreements

federal funds

London Interbank Offered
Rate (LIBOR)

Treasury notes

Treasury bonds

yield to maturity

municipal bonds

equivalent taxable yield

equities

residual claim

limited liability

capital gains

price-earnings ratio

preferred stock

price-weighted average

market-value-weighted index

index funds

derivative assets

(or contingent claims)

call option

exercise (or strike) price

put option

futures contract

KEY TERMS

Equivalent taxable yield: $\frac{r_{\text{muni}}}{1 - \text{tax rate}}$, where r_{muni} is the rate on tax-free municipal debt

KEY EQUATIONS

Cutoff tax rate (for indifference to taxable versus tax-free bonds): $1 - \frac{r_{\text{muni}}}{r_{\text{taxable}}}$

1. In what ways is preferred stock like long-term debt? In what ways is it like equity?
2. Why are money market securities sometimes referred to as "cash equivalents"?
3. Which of the following *correctly* describes a repurchase agreement?

- a. The sale of a security with a commitment to repurchase the same security at a specified future date and a designated price.
- b. The sale of a security with a commitment to repurchase the same security at a future date left unspecified, at a designated price.
- c. The purchase of a security with a commitment to purchase more of the same security at a specified future date.

PROBLEM SETS

KAPLAN
SCHWESER

4. What would you expect to happen to the spread between yields on commercial paper and Treasury bills if the economy were to enter a steep recession?
5. What are the key differences between common stock, preferred stock, and corporate bonds?
6. Why are high-tax-bracket investors more inclined to invest in municipal bonds than low-bracket investors?
7. Turn back to Figure 2.3 and look at the Treasury bond maturing in November 2041.
 - a. How much would you have to pay to purchase one of these bonds?
 - b. What is its coupon rate?
 - c. What is the yield to maturity of the bond?
8. Suppose investors can earn a return of 2% per 6 months on a Treasury note with 6 months remaining until maturity. What price would you expect a 6-month maturity Treasury bill to sell for?
9. Find the after-tax return to a corporation that buys a share of preferred stock at \$40, sells it at year-end at \$40, and receives a \$4 year-end dividend. The firm is in the 30% tax bracket.
10. Turn to Figure 2.8 and look at the listing for General Dynamics.
 - a. How many shares could you buy for \$5,000?
 - b. What would be your annual dividend income from those shares?
 - c. What must be General Dynamics' earnings per share?
 - d. What was the firm's closing price on the day before the listing?
11. Consider the three stocks in the following table. P_t represents price at time t , and Q_t represents shares outstanding at time t . Stock C splits two for one in the last period.

	P_0	Q_0	P_1	Q_1	P_2	Q_2
A	90	100	95	100	95	100
B	50	200	45	200	45	200
C	100	200	110	200	55	400

- a. Calculate the rate of return on a price-weighted index of the three stocks for the first period ($t = 0$ to $t = 1$).
- b. What must happen to the divisor for the price-weighted index in year 2?
- c. Calculate the rate of return for the second period ($t = 1$ to $t = 2$).
12. Using the data in the previous problem, calculate the first-period rates of return on the following indexes of the three stocks:
 - a. A market-value-weighted index.
 - b. An equally weighted index.
13. An investor is in a 30% tax bracket. If corporate bonds offer 9% yields, what must municipals offer for the investor to prefer them to corporate bonds?
14. Find the equivalent taxable yield of a short-term municipal bond currently offering yields of 4% for tax brackets of (a) zero, (b) 10%, (c) 20%, and (d) 30%.
15. What problems would confront a mutual fund trying to create an index fund tied to an equally weighted index of a broad stock market?
16. Which security should sell at a greater price?
 - a. A 10-year Treasury bond with a 4% coupon rate versus a 10-year T-bond with a 5% coupon.
 - b. A 3-month expiration call option with an exercise price of \$40 versus a 3-month call on the same stock with an exercise price of \$35.
 - c. A put option on a stock selling at \$50, or a put option on another stock selling at \$60 (all other relevant features of the stocks and options may be assumed to be identical).

17. Look at the futures listings for the corn contract in Table 2.8. Suppose you buy one contract for March 2017 delivery. If the contract closes in March at a level of 4.06, what will your profit be?
18. Turn back to Table 2.7 and look at the IBM options. Suppose you buy a June 2016 expiration call option with exercise price \$150.
 - a. Suppose the stock price in June is \$152. Will you exercise your call? What is the profit on your position?
 - b. What if you had bought the June call with exercise price \$145?
 - c. What if you had bought a June put with exercise price \$155?
19. Why do call options with exercise prices greater than the price of the underlying stock sell for positive prices?
20. Both a call and a put currently are traded on stock XYZ; both have strike prices of \$50 and expirations of 6 months. What will be the profit to an investor who buys the call for \$4 in the following scenarios for stock prices in 6 months? What will be the profit in each scenario to an investor who buys the put for \$6?
 - a. \$40
 - b. \$45
 - c. \$50
 - d. \$55
 - e. \$60
21. Explain the difference between a put option and a short position in a futures contract.
22. Explain the difference between a call option and a long position in a futures contract.

1. A firm's preferred stock often sells at yields below its bonds because
 - a. Preferred stock generally carries a higher agency rating.
 - b. Owners of preferred stock have a prior claim on the firm's earnings.
 - c. Owners of preferred stock have a prior claim on a firm's assets in the event of liquidation.
 - d. Corporations owning stock may exclude from income taxes most of the dividend income they receive.
2. A municipal bond carries a coupon of 6.75% and is trading at par. What is the equivalent taxable yield to a taxpayer in a combined federal plus state 34% tax bracket?
3. Which is the *most risky* transaction to undertake in the stock index option markets if the stock market is expected to increase substantially after the transaction is completed?
 - a. Write a call option.
 - b. Write a put option.
 - c. Buy a call option.
 - d. Buy a put option.
4. Short-term municipal bonds currently offer yields of 4%, while comparable taxable bonds pay 5%. Which gives you the higher after-tax yield if your tax bracket is:
 - a. Zero
 - b. 10%
 - c. 20%
 - d. 30%
5. The coupon rate on a tax-exempt bond is 5.6%, and the rate on a taxable bond is 8%. Both bonds sell at par. At what tax bracket (marginal tax rate) would an investor be indifferent between the two bonds?

7. Widely used measure of risk. Conditional tail expectations. Value at risk (VaR) measures the probability such as 1% or 5%. Expected shortfall (ES) measures the amount on the portfolio falling below a certain value. Thus, 1% ES is the expected value of the outcomes that lie in the bottom 1% of the distribution.
8. Investments in risky portfolios *do not* become safer in the long run. On the contrary, the longer a risky investment is held, the greater the risk. The basis of the argument that stocks are safe in the long run is the fact that the probability of an investment shortfall becomes smaller. However, probability of shortfall is a poor measure of the safety of an investment. It ignores the magnitude of possible losses.

nominal interest rate
 real interest rate
 effective annual rate (EAR)
 annual percentage rate (APR)
 dividend yield
 risk-free rate
 risk premium

excess return
 risk aversion
 normal distribution
 event tree
 skew
 kurtosis
 value at risk (VaR)

expected shortfall (ES)
 conditional tail expectation (CTE)
 lower partial standard deviation (LPSD)
 Sortino ratio
 lognormal distribution

DEFINITIONS

Arithmetic average of n returns: $(r_1 + r_2 + \dots + r_n)/n$

Geometric average of n returns: $[(1 + r_1)(1 + r_2) \dots (1 + r_n)]^{1/n} - 1$

Continuously compounded rate of return, $r_{cc} = \ln(1 + \text{Effective annual rate})$

Expected return: $\sum [\text{prob}(\text{Scenario}) \times \text{Return in scenario}]$

Variance: $\sum [\text{prob}(\text{Scenario}) \times (\text{Deviation from mean in scenario})^2]$

Standard deviation: $\sqrt{\text{Variance}}$

Sharpe ratio: $\frac{\text{Portfolio risk premium}}{\text{Standard deviation of excess return}} = \frac{E(r_P) - r_f}{\sigma_P}$

Real rate of return: $\frac{1 + \text{Nominal return}}{1 + \text{Inflation rate}} - 1$

Real rate of return (continuous compounding): $r_{\text{nominal}} - \text{Inflation rate}$

PROBLEMS

1. The Fisher equation tells us that the real interest rate approximately equals the nominal rate minus the inflation rate. Suppose the inflation rate increases from 3% to 5%. Does the Fisher equation imply that this increase will result in a fall in the real rate of interest? Explain.
2. You've just stumbled on a new dataset that enables you to compute historical rates of return on U.S. stocks all the way back to 1880. What are the advantages and disadvantages in using these data to help estimate the expected rate of return on U.S. stocks over the coming year?
3. You are considering two alternative two-year investments: You can invest in a risky asset with a positive risk premium and returns in each of the two years that will be identically distributed and

uncorrelated, or you can invest in the risky asset for only one year and then invest the proceeds in a risk-free asset. Which of the following statements about the first investment alternative (compared with the second) are true?

- Its two-year risk premium is the same as the second alternative.
- The standard deviation of its two-year return is the same.
- Its annualized standard deviation is lower.
- Its Sharpe ratio is higher.
- It is relatively more attractive to investors who have lower degrees of risk aversion.

4. You have \$5,000 to invest for the next year and are considering three alternatives:

- A money market fund with an average maturity of 30 days offering a current yield of 6% per year.
- A 1-year savings deposit at a bank offering an interest rate of 7.5%.
- A 20-year U.S. Treasury bond offering a yield to maturity of 9% per year.

What role does your forecast of future interest rates play in your decisions?

5. Use Figure 5.1 in the text to analyze the effect of the following on the level of real interest rates:

- Businesses become more pessimistic about future demand for their products and decide to reduce their capital spending.
- Households are induced to save more because of increased uncertainty about their future Social Security benefits.
- The Federal Reserve Board undertakes open-market purchases of U.S. Treasury securities in order to increase the supply of money.

6. You are considering the choice between investing \$50,000 in a conventional 1-year bank CD offering an interest rate of 5% and a 1-year "Inflation-Plus" CD offering 1.5% per year plus the rate of inflation.

- Which is the safer investment?
- Can you tell which offers the higher expected return?
- If you expect the rate of inflation to be 3% over the next year, which is the better investment? Why?
- If we observe a risk-free nominal interest rate of 5% per year and a risk-free real rate of 1.5% on inflation-indexed bonds, can we infer that the market's expected rate of inflation is 3.5% per year?

7. Suppose your expectations regarding the stock price are as follows:

State of the Market	Probability	Ending Price	HPR (including dividends)
Boom	0.35	\$140	44.5%
Normal growth	0.30	110	14.0
Recession	0.35	80	-16.5

Use Equations 5.11 and 5.12 to compute the mean and standard deviation of the HPR on stocks.

8. Derive the probability distribution of the 1-year HPR on a 30-year U.S. Treasury bond with an 8% coupon if it is currently selling at par and the probability distribution of its yield to maturity a year from now is as follows:

State of the Economy	Probability	YTM
Boom	0.20	11.0%
Normal growth	0.50	8.0
Recession	0.30	7.0

For simplicity, assume the entire 8% coupon is paid at the end of the year rather than every 6 months.

9. Determine the standard deviation of a random variable q with the following probability distribution:

Value of q	Probability
0	0.25
1	0.25
2	0.50

10. The continuously compounded annual return on a stock is normally distributed with a mean of 20% and standard deviation of 30%. With 95.44% confidence, we should expect its actual return in any particular year to be between which pair of values? (*Hint: Look again at Figure 5.4.*)
- 40.0% and 80.0%
 - 30.0% and 80.0%
 - 20.6% and 60.6%
 - 10.4% and 50.4%
11. Using historical risk premiums from Table 5.4 over the 1926–2016 period as your guide, what would be your estimate of the expected annual HPR on the Big/Value portfolio if the current risk-free interest rate is 3%?
12. Visit Professor Kenneth French's data library website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html and download the monthly returns of "6 portfolios formed on size and book-to-market (2 × 3)." Choose the value-weighted series for the period from January 1930–December 2016 (1,020 months). Split the sample in half and compute the average, SD, skew, and kurtosis for each of the six portfolios for the two halves. Do the six split-halves statistics suggest to you that returns come from the same distribution over the entire period?
13. During a period of severe inflation, a bond offered a nominal HPR of 80% per year. The inflation rate was 70% per year.
- What was the real HPR on the bond over the year?
 - Compare this real HPR to the approximation $r_{\text{real}} \approx r_{\text{nom}} - i$.
14. Suppose that the inflation rate is expected to be 3% in the near future. Using the historical data provided in this chapter, what would be your predictions for:
- The T-bill rate?
 - The expected rate of return on the Big/Value portfolio?
 - The risk premium on the stock market?
15. An economy is making a rapid recovery from steep recession, and businesses foresee a need for large amounts of capital investment. Why would this development affect real interest rates?
16. You are faced with the probability distribution of the HPR on the stock market index fund given in Spreadsheet 5.1 of the text. Suppose the price of a put option on a share of the index fund with exercise price of \$110 and time to expiration of 1 year is \$12.
- What is the probability distribution of the HPR on the put option?
 - What is the probability distribution of the HPR on a portfolio consisting of one share of the index fund and a put option?
 - In what sense does buying the put option constitute a purchase of insurance in this case?
17. Take as given the conditions described in the previous problem, and suppose the risk-free interest rate is 6% per year. You are contemplating investing \$107.55 in a 1-year CD and simultaneously buying a call option on the stock market index fund with an exercise price of \$110 and expiration of 1 year. What is the probability distribution of your dollar return at the end of the year?
18. Consider these long-term investment data:
- The price of a 10-year \$100 par value zero-coupon inflation-indexed bond is \$84.49.
 - A real-estate property is expected to yield 2% per quarter (nominal) with a SD of the (effective) quarterly rate of 10%.
 - Compute the annual rate of return on the real (i.e., inflation-indexed) bond.
 - Compute the continuously compounded annual risk premium on the real-estate investment.
 - Use the formula in footnote 17 and Excel's Solver or Goal Seek to find the standard deviation of the continuously compounded annual excess return on the real-estate investment.
 - What is the probability of loss or shortfall after 10 years?