Industry, Perseverance, & Frugality,
make Fortune yield.

Ben Franklin

NOTE: Compute all dollar-denominated answers to the nearest dollar, and compute all other answers to four decimal places (*i.e.,* 7.62%). For the multiple choice questions, give the correct choice and very briefly explain your answer.

1. Go to web page and download the data spreadsheet for this HW. You'll see the annual percentage returns for the Wilshire 5000 index and the MSCI BRIC index since 1998. The Wilshire 5000 is an index that represents the entire U.S. stock market, and the BRIC countries are Brazil, Russia, India, and China. Since the BRIC index is market weighted, Chinese companies represent about 72% of the index.
   (a) What is the average (arithmetic) yearly return of each index since 1998?
   (b) What is the average (geometric) yearly return of each index since 1998?
   (c) What are the respective variances (use the **VAR** function) and standard deviations (use **STDEV**) of the returns of the Wilshire 5000 index and the MSCI BRIC index?
   (d) What is the correlation (**CORREL**) of the two returns since 1998?
   (e) What is the covariance (**COVAR**) of the two returns since 1998?
   (f) What is the $\beta_{BRIC,W5000}$ (**SLOPE**) of the two returns since 1998.
2. Write down the CAPM formula. Which of the inputs are project specific and which are systematic?
3. What does a stock's market-beta indicate? What does it mean if a stock has a negative market-beta?
4. Beta and standard deviation differ as risk measures in that beta measures:
   (a) Only unsystematic risk, while standard deviation measures total risk
   (b) Only systematic risk, while standard deviation measure total risk
   (c) Both systematic and unsystematic risk, while standard deviation measures only unsystematic risk
   (d) Both systematic and unsystematic risk, while standard deviation measures only systematic risk
5. The measure of risk for a security held in a diversified portfolio is:
   (a) Specific or unique risk

(b) Standard deviation of returns

(c) Reinvestment risk

(d) Covariance

(e) Risky Business

6. Which of the following statements is (are) necessarily true?

   (a) If a stock's returns are positively correlated with the returns of the general market, it will have a market-beta equal to +1.0.

   (b) If a stock's returns are negatively correlated with the returns of the general market, it will have a market-beta equal to -1.0.

   (c) If a stock's returns are negatively correlated with the returns of the general market, it will have a negative market-beta.

   (d) Both A and B are true.

7. You have divided your money equally between two stocks. Both have expected returns of 12%, standard deviations of 18%, and βs of 1.1. Assume the returns of the two stocks are *not* perfectly positively correlated. Which of the following statements is (are) necessarily true?

   (a) The expected return on your portfolio is 12%.

   (b) The standard deviation of the portfolio returns is 18%.

   (c) The β of your portfolio is less than 1.1.

   (d) Both A and B are true statements.

8. If you put 10K into T-bills and 20K into the SP500 (assume it's the market portfolio), what will be the beta of your portfolio?

9. Use the CAPM to estimate the risk-adjusted market rate of return on an investment with $\beta = 1.1$ if the risk-free rate is 3% and the market premium 5%.

10. XYZ Corporation has β=0.75 and \$100 million in equity capital (100 million shares with a market value of \$1 each) and no debt. Suppose that XYZ refinances (replaces) some of its equity with debt—it borrows \$40 million and buys back \$40 million of its equity—so that it now has \$60 million in equity capital and \$40 million in debt. Assume the debt is risk free and the rate is 5% and the equity premium is 4%. XYZ otherwise continues in the same business, with the same amount of total capital.

    (a) Describe qualitatively the effect of the refinancing on the β of XYZ's stock (equity).

(b) Describe qualitatively the effect of the refinancing on the β of XYZ's assets.

(c) If you ignore the risk of default on XYZ's debt and ignore taxes, what should the β of XYZ's stock be after the refinancing?

(d) According to the CAPM, what is the E(r) XYZ has to offer its shareholders?

(e) What's XYZ's WACC before and after the refinancing? Assume we live in a no-tax world.