Industry, Perseverance, & Frugality,
make Fortune yield.

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1. In the WilshireBricData spreadsheet, you'll see the annual percentage returns for the Wilshire 5000 index and the MSCI BIC index since 1998. Note, the BIC index used to be the BRIC index, with the "R" representing Russia. For some reason, Russia was removed from the index. The Wilshire 5000 is an index that represents the entire U.S. stock market (there used to be 5,000 publicly traded US stocks, now there are about 3,700), and the BIC countries are Brazil, India, and China. Since the BIC index is market weighted, Chinese companies represent about 60% 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.S** function) and standard deviations (use **STDEV.S**) of the returns of the Wilshire 5000 index and the MSCI BIC 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 $\beta_{BIC,W5000}$ (**SLOPE**) of the two returns since 1998.
   (g) What is the standard deviation of a portfolio consisting of 70% Whilshire 5000 and 30% BIC? Is is a weighted average of the standard deviations of the two portfolios?
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. 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%.
9. 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.

10. 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?

11. If the correlation of the returns of two assets is 1, then

(a) if one asset's return increases by 10%, the second asset's return will also increase by exactly 10%.

(b) if one asset's return increases by 10%, the second asset's return will also increase, but not necessarily by 10%.

(c) if one asset's return increases by 10%, the second asset's return will usually, but not always, also increase.

(d) if one asset's return increases by 10%, the second asset's return will decrease by exactly 10%.

12. You have \$5,000 cash to invest and *borrow* another \$5,000 at the risk-free rate of 5%. You invest \$10,000 in Portfolio Z, with an expected return of 15% and a standard deviation of 20%. What is the expected return and standard deviation of your investment portfolio, which consists of Portfolio Z and the risk-free borrowing?

Before you do the actual numbers: what should be the SD of a portfolio consisting of a RF asset and a risky asset, given that the RF asset has a variance/SD of 0? Also, should SD of the investment portfolio be greater than the SD of portfolio Z? Hint: the investment portfolio has more leverage than Portfolio Z.

(a) 17.5% and 28.3%

(b) 12.5% and 28.3%

(c) 25% and 40%

(d) 25% and 30%

(e) 25% and 20%

13. The E(r)s and standard deviations (SD) of stocks A and B are as follows: 10% E(r) and 40% SD for Stock A; 13% E(r) and 50% SD for Stock B. Calculate the E(r)

and SD of a portfolio consisting of 60% stock A and 40% stock B if the correlation between the returns is:

(a) 0.5

(b) -0.5

(c) How does the correlation between the returns of stock A and stock B affect the SD of the portfolio?

14. You hold a very well diversified portfolio and are considering adding a small position in stock Z. Briefly explain why the covariance of the stock with the rest of your portfolio is a more appropriate measure of the risk of the stock than the stock's variance (standard deviation). If you wish, use the covariance box (matrix) from the slides to help explain your answer.

15. You are at one of those deathly boring firm functions when loudmouth Larry Lawyer begins bragging how easy it is to make money in the stock market by merely buying super high beta stocks because they offer super high expected returns. In fact, last year Larry's portfolio returned 30%. What's wrong with Larry's reasoning?