

**University of Texas at Dallas
School of Management**

Finance 6310
Investment Management

Professor Day
Spring 2009

Spreadsheet Assignment 2
(Due March 3)

1. One year ago the portfolio manager for the Dredge Fund invested 30% of the fund's assets in the NASDAQ 100 index and 50% in the S&P 500 index. The remaining 20% of the portfolio was invested in U.S. government bonds. The total return on the portfolio was -15% over the last year. During this same period, the return on the NASDAQ 100 index was -15% while the return on the S&P 500 index was -20%. The Lehman Brothers government bond index earned 2%. Given the mix of assets held in the portfolio, determine the fund's active return.
2. The Pension Fund for the Verdegris Company follows an index portfolio strategy, attempting to closely match the year-to-year performance of the S&P 500. Assuming that the standard deviation of the yearly return on the S&P 500 is 37 percent per year (i.e., 0.37), determine the standard deviation for the Verdegris pension fund's average yearly return over the next 25 years.
3. *HBE Inc's* employee pension fund closely tracks the S&P 500, with assets having a market value of \$1 billion dollars. The CFO wants to determine a "lower bound" for the value of the fund's assets over the next 20 years, reflecting the possibility that the fund's average yearly return may fall 1.75 standard deviations below the expected continuously compounded yearly return on the S&P 500. The yearly returns on the S&P 500 have a lognormal distribution with an expected continuously compounded return of 10% and a yearly standard deviation of 28%,
 - a. compare the proposed lower bound on the terminal value of the fund with the terminal value if the fund's average continuously compound return is equal to the expected return.
 - b. compare the lower bound on a $1.75 \times \sigma$ confidence interval for the terminal value of an investment in the S&P 500 with the terminal value for an investment in a risk-free asset earning 2.85% per year,
 - c. use Excel to graph the value of a risk-free investment earning 2.85% per year, along with the lower bound on a 1.75 standard deviation confidence interval for value of the fund's assets (growing at the expected continuously compounded yearly return) over investment horizons ranging from 1 year to 20 years, *allowing the standard deviation of the average yearly return to change with the length of the investment horizon.*
4. D.B. Hadlock plans to retire in 15 years. The value of D.B.'s retirement assets is currently \$500,000. D.B. estimates that at retirement in 15 years, he will need assets of \$3 million to purchase an annuity that will provide his target retirement income. D.B.'s portfolio currently has an expected continuously compounded return of 9.0 percent, with a yearly standard deviation of 19.362%. Assuming that D.B will make no additional contributions to the retirement plan,
 - a. determine the standard deviation for the average return on DB's retirement assets over the 15-year period until his retirement,
 - b. by how many standard deviations must the (actual) average return on DB's portfolio exceed the expected return in order for DB to achieve his retirement income objective,
 - c. use the answer to part (b) along with the Excel spreadsheet function *NORMSDIST(*)* to determine the probability that DB's portfolio will meet his retirement income objective,
 - d. how would the answer to part (c) change if DB's retirement assets were immediately reallocated across asset classes to increase the expected continuously compounded yearly return on the portfolio to 10.2 percent, with a yearly standard deviation of 23.24 percent?