

## TERM PROJECT INSTRUCTIONS

### PART ONE

Select five Mutual Funds or Exchange-Traded Funds (ETF), each with a different objective. You can also choose a mix of Mutual Funds and ETFs if you wish. A fund can specify whatever objective its management wishes, and the fund can use its own terminology. You will encounter many objectives other than those listed in the textbook. Common examples are “balanced”, “growth and income”, “small company growth”, “BBB-rated bonds”, “precious metals”, and “international”. Just make sure to select five different objectives.

Also make sure that all funds have at least 5 years of performance data available. You must download MONTHLY DATA. The easiest (free) way to obtain the data is at [Yahoo Finance](#). But feel free to use others, such as Bloomberg for instance.

A. Prepare a single table showing the following for each of your five funds [TABLE 1]:

1. Fund name
2. Monthly returns for the past 5 years. When calculating returns, make sure to use prices that have been adjusted for dividends (“Adj Close” in Yahoo, for example).
3. Arithmetic average monthly return.
4. Geometric average monthly return.
5. Standard deviation of monthly returns.
6. The current value of \$10,000 invested 5 years ago, assuming all distributions were reinvested.

B. Prepare a covariance matrix of the five funds [TABLE 2]

C. Prepare a correlation matrix of the five funds [TABLE 3]

D. Using each fund’s prospectus or information you find on the web, state in your own words the strategy and philosophy of each fund.

### PART TWO

A. Using Treasury bill rates and the S&P 500 index, run a “CAPM” regression to estimate the beta of each fund. Constant maturity 3-month T-bill rates can be obtained on the web site of The Federal Reserve Bank of Saint Louis, Missouri (“FRED”). These rates are quoted in an annualized format, so adjust them according to your needs.

B. Repeat part A using this time the Dow Jones Industrial Average instead of the S&P 500 index.

- C. Show the T-bill rates and the two index levels in tabular form [TABLE 4].
- D. Write a 250-word essay on why your answers from part A and B might be different.
  
- E. Conduct a “Run Test” on the monthly changes in the level of the S&P 500 index. Write a 250-word essay on the interpretation of the results.

### **PART THREE**

- A. Construct an equally-weighted portfolio of your five funds. Prepare a table showing the arithmetic mean return, geometric mean return, and standard deviation of return for the five-fund portfolio over the five years [TABLE 5].
  
- B. Using Excel, prepare a graph showing the five-year performance of each of your funds and the five-fund portfolio. This chart should show the dollar value of an initial \$10,000 investment evolving month-by-month over the five-year period [GRAPH 1].

### **PART FOUR**

Using the five-year performance statistics of your five funds and the five-fund portfolio, determine and show graphically the efficient set using the following:

- A. Mean-variance plot: this is merely a standard deviation / expected return plot showing six points, one for each fund and one for the five-fund portfolio. Identify the point that shows the best return per unit of risk [GRAPH 2].
  
- B. Using the matrix Excel-based techniques learned in class, use the five funds and their statistics to derive the mean-variance frontier. Draw a plot showing the frontier as well as the 5 mean-variance points of the five individual funds [GRAPH 3].

### **PART FIVE**

Rank the performance of the five funds and the five-fund portfolio according to the following criteria:

- A. The Sharpe Measure
- B. The Treynor Measure
- C. The geometric mean return