BIA 650 A Homework#8 W&A Chapter 7, Problem 36

# Management Overview

Problem Statement:

The Objective is to come up with a portfolio that has an expected return of at least 0.12 and minimize the risk (variance).

Data Sources:

* + The **inputs** are Mean returns and Standard deviations of each Stock and the correlations between the 4 stocks.
  + The key **decision variables** are the investment weights for each stock
  + **Constraints** are identified as
    - Mean portfolio return must be at least 0.12
    - The investment weights must sum up to 1
  + **Output** is the Variance.

Model Approach:

* + Separate the data into inputs, decision variables, constraints and output and enter them on the spreadsheet.
  + The extra stock is added to the spreadsheet with its mean returns and standard deviation of returns.
  + The constraints, Decision Variables and objective cell to be minimized are added in Solver and it is run. The algorithm we use is GRG Non-Linear.

Sensitivity Analysis:

* **Addition of Stock 4 to Variance**

The variance of the return decreases if the company invests in all the 4 stocks instead of 3.

* **Expected Returns Vs Stock 4 Weights**

Plotting a graph of expected returns vs Stock 4 weights, we observe that for expected returns up to 0.135 the stock 4 is part of the portfolio. For expected returns beyond that Stock 4 is ignored.

Solution:

* If the company targets the original expected return of 0.12, I should definitely add Stock 4 to its portfolio because doing that significantly decreases the variance(risk)
* If the company targets an expected return beyond 0.135, it must skip Stock 4 – to be more accurate it must invest only on Stock 1.