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VPM (MSF 504)

Homework 1: Due February 11

***Answer the questions below neatly. You will have to use Excel (or something cooler) to answer questions 3 and 4.***  ***I want a hardcopy turned in at the beginning of class on Feb 11.***

1. Write out the matrix formula for the covariance of two three-asset portfolios with returns , and . That is, how do you express in matrix form, for

,  and 

2. Show that a is the vector, , using the definitions of and from problem 1.

3. Assume an investor has a coefficient of risk aversion, *A* = 4, then use the information in the table below, along with Excel to find

1. the utility maximizing portfolio weights
2. the expected return of the portfolio
3. the volatility of the portfolio

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **Covariance Matrix** | | | | |
| **Asset** | **E(R)** |  |  | AAA | BBB | CCC | DDD | EEE |
| AAA | 8.0% |  | AAA | 0.30 | 0.10 | 0.20 | 0.08 | -0.10 |
| BBB | 11.0% |  | BBB | 0.10 | 0.25 | 0.10 | -0.10 | 0.20 |
| CCC | 15.0% |  | CCC | 0.20 | 0.10 | 0.36 | 0.10 | 0.22 |
| DDD | 13.0% |  | DDD | 0.08 | -0.10 | 0.10 | 0.60 | 0.20 |
| EEE | 16.0% |  | EEE | -0.10 | 0.20 | 0.22 | 0.20 | 0.40 |

4. How do your answers change for an investor with a risk-aversion coefficient *A* = 8? (Compare portfolio weightings, expected returns, and volatility.) Do these changes make economic sense? How?