**Covariance and Portfolio Standard Deviation**

There are three securities in the market. The following chart shows their possible payoffs:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **State** | **Probability of Outcome** | **Return on Security 1** | **Return on Security 2** | **Return on Security 3** |
| 1 | .15 | .25 | .25 | .10 |
| 2 | .35 | .20 | .15 | .15 |
| 3 | .35 | .15 | .20 | .20 |
| 4 | .15 | .10 | .10 | .25 |

1. What are the expected return and standard deviation of each security?
2. What are the covariances and correlations between the pairs of securities?
3. What are the expected return and standard deviation of a portfolio with half of its funds invested in security 1 and half in security 2?
4. What are the expected return and standard deviation of a portfolio with half of its funds invested in security 1 and half in security 3?
5. What are the expected return and standard deviation of a portfolio with half of its funds invested in security 2 and half in security 3?
6. What do your answers in parts (a), (c), (d), (e) imply about diversification?