Peer-graded Assignment: Assignment for the second milestone: investment policy

1. **Here are the average yearly returns and volatilities of the returns for the three SAAs before the last 3 years of data were added (i.e. as you computed them in the previous milestone).**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Conservative** | **Balanced** | **Aggressive** |
| **Avg. return** | **8.44%** | **9.07%** | **9.93%** |
| **Volatility** | **5.92%** | **7.29%** | **9.93%** |

**Compare them with the values you computed in the previous prompt (i.e. after including the three most recent years of data) and answer the following questions:**

* **What happened to the average yearly returns? Did they increase, decrease, stayed the same?**
* **What happened to the yearly volatilites? Did they increase, decrease, stayed the same?**
* **Which asset class is responsible for these changes?**

***Note: please answer in 3 sentences (1 sentence per question).***

- Due to the last bad results included, the average yearly returns decreased in all portfolios.

- The yearly volatilites increased (since the latest points were far from the mean)

- The equities are responsible for the decrease (since the other two still increase)

1. **When we use the variance-covariance approach to compute them, we make the assumption that the returns of the portfolio (i.e. the SAA or TAA) are normally distributed. When we use the historical approach, we make no assumption about the shape of their distribution but look instead at past realizations of the portfolio's returns.**

**Please answer the following questions by referring to the risk management quantities you have computed previously:**

* **Are the risk management quantities computed through the variance-covariance and historical approaches equal?**
* **What can you conclude regarding the assumption that the returns of the SAAs (and your client's TAA) are normally distributed?**
* **According to the variance-covariance approach, is the ranking (from low to high risk) of the SAAs in accordance with their name (i.e. conservative, balanced and aggressive)?**
* **Are the rankings the same for the historical approach? If not, what is the order of the SAAs from low to high risk?**
* **Regarding the Aggressive SAA and according to the historical approach, how much can we expect to lose on average (in %) in the 5% of the worst months?**

***Note: please answer in 5 sentences (i.e. 1 sentence per question).***

- As we can see from the tables, they are not equal.

- The SAAs returns are not exactly normally distributed, otherwise the variance-covariance and historical approaches would be equal.

- Yes, from the variance-covariance results we can see that less risky portfolios is the conservative, followed by the balanced and the riskier is the aggressive one.

- Yes, the historical results are consistent with the variance-covariance results.

- As we can see from the tables, according to the historical approach, the Expected Shortfall is -6.23%.