QF624-2025-W3

Number of participants: 36

1. Consider two assets, A and B, with expected returns of 6% and 8% respectively. The standard deviation of returns for Asset A is 10%, and for Asset B is 12%. The correlation coefficient between the returns of Asset A and Asset B is 0.2. What is the variance of a portfolio consisting of 40% Asset A and 60% Asset B?

17 correct answers
out of 20 respondents

	0.0128	5%	1 vote
✓	0.0079	85%	17 votes
	0.0108	0%	0 votes
	0.0112	10%	2 votes

2. Consider a portfolio optimization scenario under Modern Portfolio Theory where an investor seeks to construct a portfolio from three assets. The objective is to maximize the expected return of the portfolio subject to a specified level of risk. Which ones are essential of the optimization problem?

6 correct answers
out of 27 respondents

✓	Calculating the historical return of each asset to determine future performance.	26%	7 votes
✓	Consider the correlation between asset returns when calculating portfolio volatility.	63%	17 votes
	Restricting the portfolio to contain only the asset with the highest expected return.	0%	0 votes
✓	Defining the weights for each asset in the portfolio subject to constraint such as the sum of the weights equals 1.	89%	24 votes

3. An investor decides to construct an equal-weight portfolio of four assets. According to Modern Portfolio Theory, which of the following statements is true regarding the risk and return characteristics of this equal-weight portfolio?

15 correct answers
out of 22 respondents

	The portfolio's variance is the average of the variances of the individual assets.	14%	3 votes
	The portfolio's variance is the sum of the variances of the individual assets.	5%	1 vote
✓	The portfolio's expected return is the average of the expected returns of the individual assets.	68%	15 votes
	The portfolio's expected return is the sum of the expected returns of the individual assets.	14%	3 votes

4. A key feature of the GMVP is that it does not depend on:

15 correct answers
out of 19 respondents

	The covariance matrix	5%	1 vote
✓	The vector of expected returns	79%	15 votes
	The budget constraint	16%	3 votes
	The Lagrange multiplier	0%	0 votes

5. **In the MVO formulation $\max_w \left(w^T\mu - \frac{1}{2}\lambda w^T\Sigma w\right) \quad \text{s.t.} \quad w^T\mathbf{1} = 1$, what is the limiting portfolio as $\lambda \to 0^+$?**

13 correct answers out of 20 respondents

	The global minimum-variance portfolio	20%	4 votes
	The equally weighted portfolio	5%	1 vote
✓	Fully invested in the single asset with the highest expected return	65%	13 votes
	Fully invested in the single asset with the lowest variance \end{itemize}	10%	2 votes

6. Conversely, as $\lambda \to +\infty$, the MVO solution approaches:

17 correct answers
out of 19 respondents

	The maximum-return (corner) portfolio	5%	1 vote
	The equally weighted portfolio	0%	0 votes
✓	The global minimum-variance portfolio	89%	17 votes
	The tangency portfolio (assuming a risk-free asset)	5%	1 vote

7. **As you vary λ over $(0, \infty)$, the set of optimal $(\sigma, \mathbb{E}[R])$ pairs traces out the classic efficient frontier." In the risk–return plane this frontier is:**

14 correct answers
out of 18 respondents

	A straight line	0%	0 votes
	A parabola opening upward	11%	2 votes
✓	A hyperbola	78%	14 votes
	An ellipse	11%	2 votes

8. The Efficient Frontier is a critical concept in portfolio optimization under Modern Portfolio Theory (MPT). Which of the following statements accurately describes the Efficient Frontier?

16 correct answers
out of 19
respondents

	It is a single portfolio that provides the maximum return irrespective of the level of risk.	0%	0 votes
	It is a graph that displays the expected returns of individual assets against their respective standard deviations.	11%	2 votes
	It is the set of all possible portfolios that can be constructed with a given set of assets.	5%	1 vote
✓	It represents a set of portfolios that offer the highest expected return for different levels of risk.	84%	16 votes

9. **An investor is considering two assets for a portfolio, Asset 1 and Asset 2. The annual returns, variances, and the correlation coefficient between the two assets are as follows: Expected return of Asset 1: 7%, Variance of Asset 1: 9% Expected return of Asset 2: 10%, Variance of Asset 2: 16% Correlation coefficient between Asset 1 and Asset 2: 0.5 Assuming the investor wants to construct a minimum variance portfolio with these two assets, what are the weights of Assets 1 and 2 in this portfolio?**

0 correct answer
out of 0 respondent

	Asset 1: 40%, Asset 2: 60%	0%	0 votes
	Asset 1: 70%, Asset 2: 30%	0%	0 votes
✓	Asset 1: 77%, Asset 2: 23%	0%	0 votes
	Asset 1: 67%, Asset 2: 33%	0%	0 votes

10. The Sharpe-ratio objective $SR(w) = \frac{w^T \mu - R_f}{\sqrt{w^T \Sigma w}}$ is generally non-convex because:

17 correct answers out of 21 respondents

	the numerator $w^T \mu - R_f$ is non-linear in w	0%	0 votes
✓	the denominator $\sqrt{w^T \Sigma w}$ makes the ratio a non-convex function	81%	17 votes
	the budget constraint $w^T \mathbf{1} = 1$ is non-convex	19%	4 votes
	Σ need not be positive definite	0%	0 votes