Fintech545 project4

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1 Problem1

Take one test as example: This is my result of test2.1, which is the same with testout2.1.

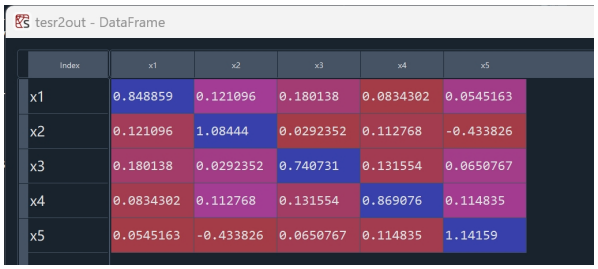

Figure 1: testout2.1

2 Problem2

Method	N with ($\lambda = 0.\ 94$)	MLE fitted T	Historic Simulation
VaR	0.09	0.076	0.079
ES	0.132	0.115	0.120

Table 1: VaR and ES with different methods.

Comparison and conclusion:

Normal Distribution with Exponentially Weighted Variance: This method gives more weight to recent data. It is responsive to recent changes in volatility.Since it assumes normal distribution, it doesn't account for heavy tails in returns, potentially underestimating VaR and ES during extreme market events.

MLE-Fitted t Distribution method captures tail risk more effectively, but it is More complex to estimate and computationally intensive

Historical Simulation approach relies purely on past data to calculate VaR and ES without making distributional assumptions. It can accurately reflects historical tail events, but may not fully account for recent changes in market conditions.

3 Problem3

Portfolio	A	B	C	Total
VaR	5256.4	4532.3	3578.1	12974.4
ES	6893.2	6059.1	4519.0	17088.9

Table 2: different portfolio's VaR and ES based on Arithmetic Return System.

Comparison and conclusion:

The VaR and ES calculated for Portfolios A and B using the Generalized T distribution are generally higher compared to those from the normal distribution. This is due to the T distribution's ability to capture heavy tails, making it better suited for capturing extreme losses.

Compared with the result in Week4, we obtain higher VaR and higher Es using copula. This may due to the influence of fat tail in the distribution of price data. The previous method likely underestimates risk due to assuming independent normal returns, while the current approach captures both dependency and tail risks.