FitchLearning

Problem Solving Session: 15 Aug 2016

CQF

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Problem 1: Historical Simulation

Compute the 1-day VAR at 90% confidence (both in percent and monetary terms) for a portfolio of £3 million whose recent daily returns have been:

+1%, 0%, -1%, -2%, +1%, +3%, -1%, 0%, -3%, 0%

Problem 2: Analytic VAR

Compute (a) the 1-day VAR at 99% confidence, and (b) the 10-day VAR at 99% significance, for a portfolio composed of a single asset whose value is £1 million, a volatility sigma_daily=1%

Problem 3: Analytic VAR for Portfolio

Compute the 1-day VAR at 99% confidence, for a portfolio composed of two assets, whose values are A=£100 and B=£100. Their volatilities are sigma_A=1% and sigma_B=1%, and correlation rho_AB=50%.

Problem 4: Expected Shortfall (ES)

Compute the 10-day Expected Shortfall at 99% confidence ES(10d,99%) for a portfolio whose 10-day mean expected return mu=0 and its 10-day volatility sigma=£30 million.

Problem 5: Backtesting

For a portfolio where VAR(T,X), where T is the day time horizon and X the significance level, assume that T=1 day and X=99%, has been calculated daily for the last one hundred days, what is the theoretical probability that VAR will be exceeded m days during the period? If the empirical number of observed excedences in the period has been m=3, should we reject the VAR model?