MFE 409: Financial Risk Management
Problem set 4

Valentin Haddad

due 4/27 before midnight

You should work with your assigned group but should write up your answer individually (except for question 2). Give the name of your group memebers in your writeup and post it on CCLE before Monday April 27 at midnight.

1 Revisiting problem 1 from homework 3

We will consider additional variations on how to compute VaR for the return series and how to judge accuracy of VaR.

1. Go back to the previous homework. For each day in the sample, compute the 95% confidence intervals of the historical VaR and the exponential weighted VaR you obtained in Question 1 of homework 3, using both parametric (for the historical VaR) and bootstrap methods (for the two measures). For the parametric method, assume the gains are normally distributed.

2. Compute volatility using the EWMA with $\lambda = 0.995$. Compute the corresponding measure of VaR.

3. Use maximum likelihood estimation to estimate a GARCH model for volatility. Compute the corresponding measure of VaR.

4. Revisit your answer to question 5 last week in light of these new results.

2 Case Study: Implementing Quantitative Risk Management and VaR in a Chinese Investment Bank

You should buy the case study material using this link: `https://hbsp.harvard.edu/import/722095`.

1. Explain the objectives and priorities of each player: Jasper Wang, Jianguo Lu, and Charles Pan. What is motivating the different players? What tensions existed among their different objectives?

2. Why does Jasper choose to make the VaR model the first step towards rationalizing the trading function? What is the appeal of the VaR model generally?

3. Why do Jianguo and the traders resist the VaR model? Do you think their pattern of resistance to risk management is unique to China, or might it be found elsewhere too?

4. Using the spreadsheet provided, run backtests of the VaR predictions against actual daily gains or losses for both the S&P 500 index and the Shanghai Composite index.

   (a) Starting with a lookback period of three months, observe the number of exceptions in all years for both the Shanghai and S&P indexes. How do they compare?

   (b) Try different lookback periods (say, 3, 6 and 9 months) to see if the length of the period changes your conclusions.

   (c) Given that Jasper's VaR model assumes a 95% confidence level, how well does the backtest validate the model?

5. How might Jasper use the backtest results to bolster his case for introducing the VaR model?

6. How successful do you think Jasper will be in his attempt to implement Western risk management practices? What advice would you give to someone in a role similar to his?

7. What is the current regulation environment of risk followed by Chinese banks and how has it evolved since the crisis? *(Find information beyond the case study material)*