

Math GR 5320: Financial Risk Management and Regulation

Assignment 8

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Due next Thursday by 1:00 pm.

For help, the preferred approach is to post questions on the Q&A tab in Piazza:

https://piazza.com/columbia/fall2016/mathg5320_001_2016_3/home

These will be quickly responded to and will be helpful to others in the class. Otherwise, attend TA office hours, email a TA or the professor, or schedule a meeting.

1. Credit risk mitigation

Consider the following three credit risk mitigants:

1. Netting
2. Collateralization
3. Use of a centralized clearing party

Explain what each is, how it reduces credit risk and describe one way that each one increases risk.

2. CDS

Assuming a constant hazard rate of 0.03, a risk free rate of 5%, a 40% recovery rate, and annual coupon payments, what is the par spread for a CDS contract maturing in 5 years? In 10 years?

3. Monte Carlo VaR I

Same setting as in previous VaR calculation problems.

Compute the 99% 5 day VaR and 97.5% 5 day ES of P by Monte Carlo. Simulate it based on the volatility estimates for P from previous problems using the parameter estimates based on 5 year windows and assuming that P follows GBM. Again, compute it each day assuming a \$10,000 position in P each day.

Graph the results and compare to the relevant previous versions of VaR calculations that used 5 year windows.

Which VaR calculations does the Monte Carlo VaR agree with, and which does it differ from? Why?

4. Monte Carlo VaR II

Repeat the last problem, but this time compute the VaR by simulating the underlying stocks, which are assumed to follow GBM, and estimated using 5 year windows.

Graph the results and compare to the appropriate previous VaR calculations using 5 year windows.

Which VaR calculations does the Monte Carlo VaR agree with, and which does it differ from? Why?