FINN 6216: Quantitative Risk Management
Spring 2016

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Class Meeting Day/Time: Thursday 5:30pm – 8:15pm, 805 Center City
Office hours: After class or by special arrangement

Prerequisites: MATH 6203 plus basic knowledge of multivariate probability and statistics. FINN 6210 recommended.

Required Text: *Quantitative Risk Management, Revised Edition,* by Alexander J. McNeil, Rudiger Frey and Paul Embrechts, 2015, Princeton.

Additional References:

Counterparty Credit Risk, Collateral and Funding, by Damiano Brigo, Massimo Morini and Andrea Pallavicini, 2013, John Wiley & Sons.

Risk Management and Financial Institutions, by John Hull, 3rd Edition, 2012, John Wiley & Sons.

Modeling, Pricing and Hedging Counterparty Credit Exposure, by Giovanni Cesari, John Aquilina, Niels Charpillon, Zlatko Filipovic, Gordon Lee and Ion Manda, 2009, Springer-Verlag.

Course Objective:

The purpose of this course is to provide a quantitative treatment of risk management primarily from an institutional and regulatory perspective. In this way it will differ from other courses that cover risk but more from a front-office trading and hedging perspective. The emphasis is on learning to create models aiming to protect a bank or other financial institution from

damaging losses, insolvency and instability resulting from market risk, credit risk, illiquidity, model risk and counterparty default risk. In addition, the Basel regulatory regime, which has received revisions and enhancements over the past 15 years, will play a major role and hence a recurring theme is the goal of creating risk management methodologies that satisfy the regulators and also maintaining capital levels that the regulators require.

List of Topics:

What is Risk Management, and why is it important?
Basel I, II, 2.5, III and IV modeling and capital requirements overview
Value at Risk (VaR), definition, basic properties and examples
VaR models based on analytical approximations
VaR models based on historical simulation
VaR models based on Monte Carlo simulation
Multivariate models – definitions, fitting and simulation
Copulas
Conditional models including ARMA and GARCH models
Aggregate risk, Expected Shortfall and coherence
Credit risk and Incremental Risk Charge

Counterparty risk including potential future exposure, credit valuation adjustment, debit valuation adjustment, right-way and wrong-way risk.

Liquidity and funding, if time permits.

Course Structure

The course will consist of 15 lectures, weekly homework assignments (total of 60 points), and a take-home final (40 points). There will be no in-class exams due to the complexity of the material and the requirement for access to real-world data.

UNC Charlotte "Code of Student Academic Integrity" (the Code)
All UNC Charlotte students have the responsibility to be familiar with and to observe the requirements of The UNC Charlotte Code of Student Academic Integrity (see the Catalog). This Code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials (such as Library books on reserve), and complicity in academic dishonesty (helping others to violate the Code). Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course.

Students who violate the Code can be punished to the extent of being permanently expelled from UNC Charlotte and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to "F." If you do not have a copy of the Code, you can obtain one from the Dean of Students Office or access it online at http://www.legal.uncc.edu/policies/ps-105.html. Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them.

Use of Cell Phones and Other Communications Devices
The use of cell phones or other communication devices is disruptive, and is therefore prohibited during class. Except in emergencies, those using such devices must leave the classroom for the remainder of the class period.

Disability Services
Students in this course seeking accommodations to disabilities must first consult with the Office of Disability Services (phone 704-687-4355, 230 Fretwell Building) and follow the instructions of that office for obtaining accommodations