

ORIE 567 Credit Risk: Modeling, Management and Valuation

Spring Term 2006

Hours and location

- Lectures: TR 0840-0955A
- Sub-courses: Sec 1 R 0255-0425P; Sec 2 W 0255-0425P

Staff

- Instructor:
Stefan Weber, 279 Rhodes, (607) 254-4825, email: sweber@orie.cornell.edu
- Teaching assistant:
Serkan Kirac, 283 Rhodes, email: ysk7@cornell.edu

Office hours

- Stefan Weber: W 0400 – 0600P, or by appointment.
- Serkan Kirac: to be announced

Text books

- Alexander J. McNeil, Rüdiger Frey & Paul Embrechts: Quantitative Risk Management
- David Lando: Credit Risk Modeling

Additional references

- Tomasz R. Bielecki & Marek Rutkowski: Credit Risk
- Tomas Björk: Arbitrage Theory in Continuous Time
- Darrel Duffie & Kenneth J. Singleton: Credit Risk
- Hans Föllmer & Alexander Schied: Stochastic Finance, 2nd edition
- Marek Musiela & Marek Rutkowski: Martingale Methods in Financial Modelling
- Philipp J. Schönbucher: Credit Derivatives Pricing Models
- Steven E. Shreve: Stochastic Calculus for Finance 2 – Continuous-Time Models

Prerequisites

A good knowledge of elementary probability theory is required (ORIE 360). This includes random variables, probability distributions, density functions, expectation and variance, and multidimensional random variables. In addition, students should already have taken a course on stochastic processes (ORIE 361). Background knowledge on stochastic calculus will be helpful, but is not required (ORIE 568).

Grading policy

Your final grade will be based on homework assignments (40%), one take home exam (30%), and one final exam (30%). In addition, a prerequisite for passing the course will be a sufficient performance in the final exam.

- **Homework (40%):** Homework assignments will be given approximately every two weeks. The due date can be found on each assignment.
- **Take home exam (30%):** The take home exam will be given on March 7 and is due by 0830A on March 14.
- **Final exam (30%):** About the middle of the term a complete list of final exam dates and rooms will be posted at:

<http://registrar.sas.cornell.edu/Sched/finals.html>

Academic integrity

Direct copying of another's work and representing it as one's own is a violation of academic integrity that will be taken seriously. Similarly, allowing another student to copy one's work is also a violation of academic integrity. It is your responsibility to make sure that no student copies from your paper. Students caught cheating on a homework will be reported to the Academic Integrity Hearing Board. If you have any doubts, please read the Code of Academic Integrity for more information about what constitutes a violation:

<http://www.cuinfo.cornell.edu/Academic/AIC.html>

Homepage

Information about the course including assignments can be found at

<http://www.blackboard.cornell.edu/>

Please enroll in this site. For further information see

http://www.cit.cornell.edu/atc/cst/howto_selfenroll.shtml

The required access code will be announced in class.

Tentative syllabus

The course provides an introduction to credit risk modeling, management and valuation.

1. Introduction: purpose of credit models, forecasting default, pricing and hedging of credit sensitive securities, probabilistic framework, information, physical versus pricing probabilities, overview over modeling approaches
2. Dynamic single-name models – structural approach: Merton model, first passage and excursion models, incomplete information models
3. Dynamic single-name models – reduced form approach: hazard rates, doubly stochastic random times, pricing formulas, affine and quadratic models

4. Static multi-name models: copulas and dependence, threshold models, mixture models, Monte Carlo methods, statistical inference
5. Dynamic multi-name models: conditionally independent defaults, copula models, default-contagion